



Tomorrow's Doctors, Tomorrow's Cures

Teaching Population Health: Innovative Medical School Curricula for Biostatistics and Epidemiology

January 26, 2015
1:00-2:30 p.m. ET

Learn

Serve

Lead



Association of
American Medical Colleges

Welcome & Introductions: Malika Fair, M.D., M.P.H. Association of American Medical Colleges



- University of Michigan Medical School
- Emergency Medicine Residency, Carolinas Medical Center
- Director of Public Health Initiatives, AAMC
- Assistant Clinical Professor, Department of Emergency Medicine, The George Washington School of Medicine and Health Sciences

Webinar Objectives

- Discuss innovative ways to teach biostatistics & epidemiology in clinically relevant scenarios and as the foundation for population health perspectives.
- Understand the benefits and challenges of current curriculum models to improve medical students' training in population sciences.
- Provide a forum for faculty and learners to collaborate and discuss opportunities for curriculum and clinical training improvement moving forward.

Moderator: Yumi Shitama Jarris., M.D. Georgetown University



- University of Maryland School of Medicine
- FM Residency, Inova Fairfax Family Practice Program
- Director, Population Health Scholars Track, Georgetown University School of Medicine
- Co-chair of the Workforce Committee for the ASTHO-supported Primary Care and Public Health Collaborative

Webinar Panelists



Emma Morton-Eggleston,
M.D., M.P.H.
Harvard Medical School



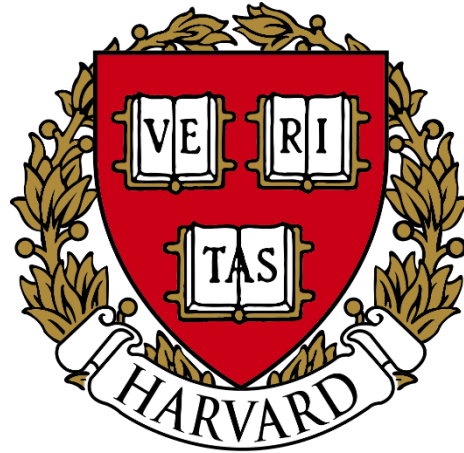
Richard DiCarlo, M.D.
Louisiana State University

Panelist: Emma Morton-Eggleston, M.D., M.P.H. Harvard Medical School



- University of North Carolina at Chapel Hill Schools of Medicine and Public Health
- IM Residency, Brigham and Women's Hospital
- Director of Teaching Programs, Department of Population Medicine, Harvard Medical School
- Director, Div. of Endocrinology Pregnancy Program; Brigham and Women's Hospital

Clinical Epidemiology and Population Health, AC511.0



- Department of Population Medicine, Harvard Medical School and Harvard Pilgrim Health Care Institute
- Course Directors:
 - Jonathan Finkelstein, M.D., M.P.H.
 - Emma Eggleston, M.D., M.P.H.

Some History

- Prior to 2006, traditional clinical epidemiology course
- 2005 – Recipient of grant from AAMC and CDC *Regional Medicine-Public Health Education Centers* (RMPHEC) initiative
- Course Redesign: Goal of incorporating population health concepts and competencies
- → Clinical Epidemiology and Population Health, a.k.a. “CEPH”

Overarching Goal for Students

“....to understand that care for individuals and promotion of the health of populations represents a continuum of strategies, all requiring engagement of physicians.” (clinicians)

Some Context

- HMS curricular approach: “The New Pathway”
- Tutorial structure
- ~170 medical and dental students
- Medical students organized by societies
 - Student’s academic “home”
- 1st year: Physiology, CEPH, health policy, social medicine, ethics
- 2nd year: Pathophysiology
- Practice of Medicine throughout
- Intensive month long blocks
- CEPH: heart of the Boston Winter (January)
 - Have you seen the forecast for tomorrow?

Course Goals

Allow students to:

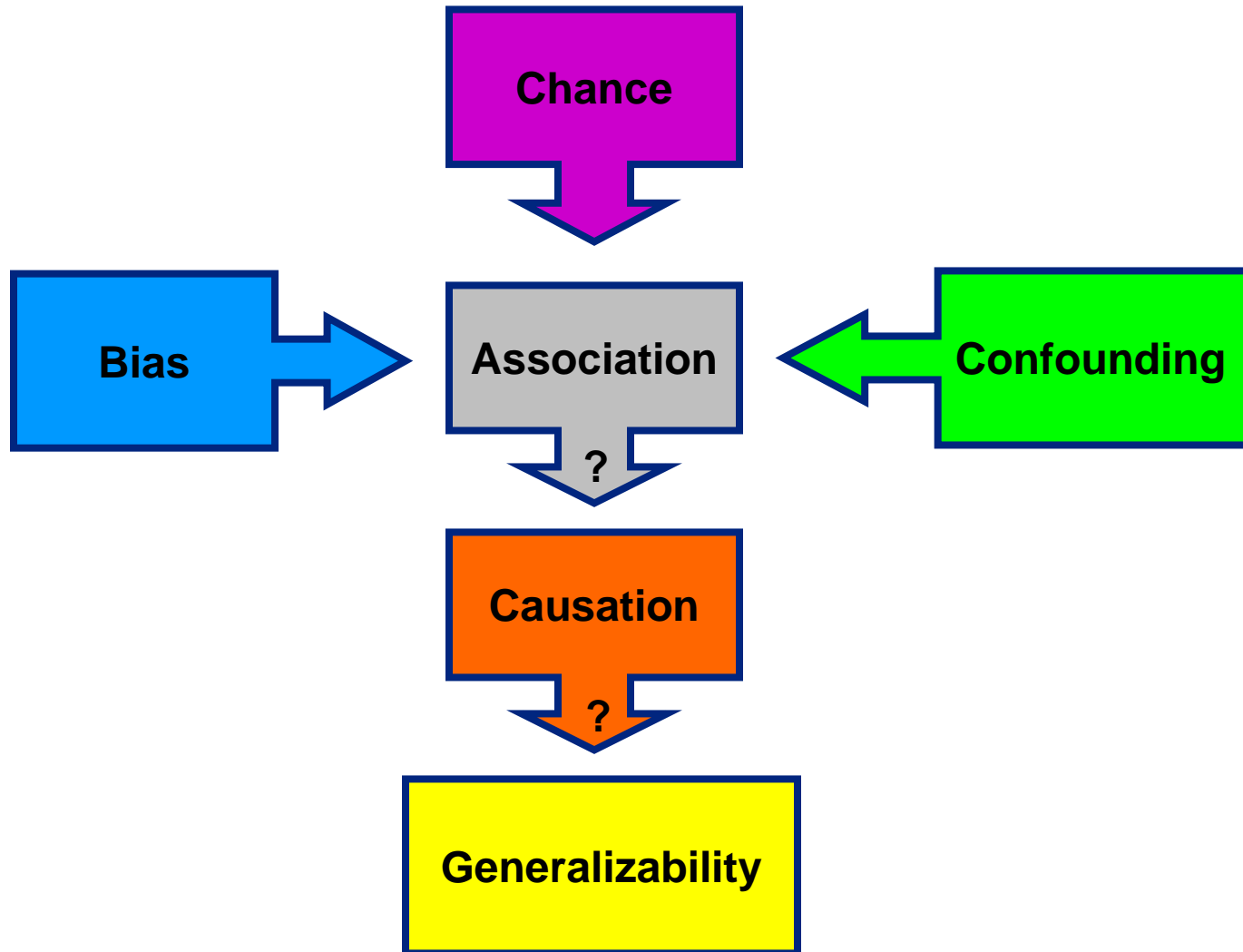
- Develop an appreciation of the continuum of medical care for individuals and the health of populations.
- Learn specific skills of clinical epidemiology to interpret and apply medical evidence to the care of individual patients and populations.
- Continue to develop and apply skills of critical thinking related to medical science and clinical care.

Learning Objectives: Clin Epi

Using critical current health issues, understand...

- Strengths and weaknesses of medical evidence
- Factors that can distort medical evidence:
 - Chance
 - Bias, and
 - Confounding
- Commonly used study designs and statistical approaches
- Interpretation of evidence to inform care of patients, including data from diagnostic tests and technologies

A Structured Framework for Critical Interpretation of Medical Literature



Learning Objectives – Population Health

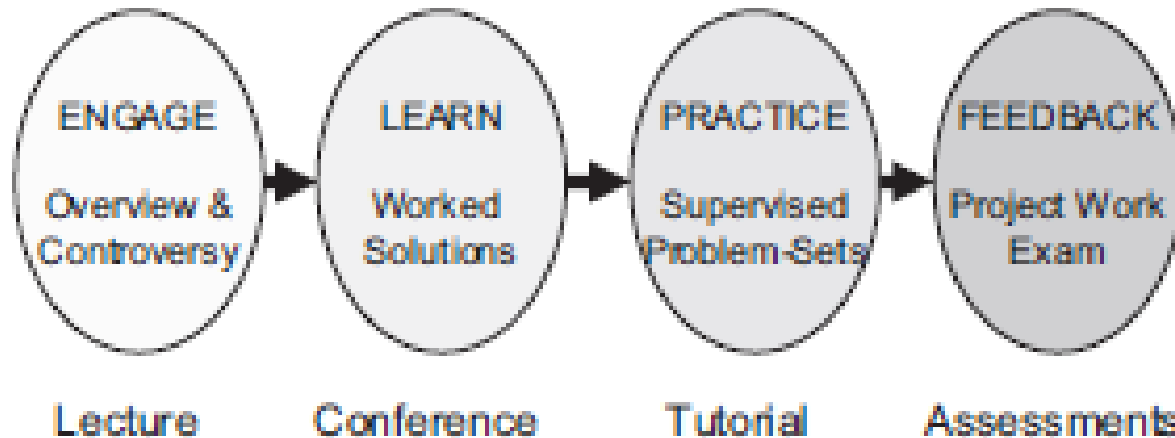
Using critical current health issues, understand...

- How to translate benefit and harm of screening and interventions to patients and populations
- How to communicate benefit and harm of screening and interventions to your patients
- Strategies to alter health-related patient behaviors at an individual and population level
- How decision makers (clinicians and policy makers) use evidence
- The role of the public health system in promoting health of populations, in responding to population-level threats.

Overt Focus on Examples that Matter to Population Health

- Obesity and Diabetes
- Tobacco and Human Health
- Prevention of Cardiovascular Disease
- Medicines: Detecting Unsuspected Harms
- Breast Cancer Screening and Diagnosis
- Clinician's Role in Public Health Emergencies
- Structuring Decisions for Immunization Programs

Course Formats



- Layering:
 1. Lecture*
 2. Conference
 3. Tutorial

Lectures

- Provide background and framework
- Topics chosen for relevance and to “set up” the conferences and tutorials
- Seek to be interactive
 - A conversation with the faculty
 - A conversation with colleagues (fellow students) in large group setting

Conference

- Nuts and bolts of biostatistics and clinical epidemiology concepts and skills
- One conference leader to 30-40 students
- Common teaching notes, examples across sections
- Slides and key points posted
- Team of dedicated conference leaders (N=6) throughout years
 - Cycle of debate, refinement, revision
 - Q year forest fire of some content to allow regrowth

Tutorial

- Applications to critical reading of articles
- Working through problem sets and thought questions
- Tutors are clinician-researchers or doctoral-level epidemiologists
 - Encourage students to learn from and about them
- Learn from each other
- Dedicated team of tutorial leaders (N=44); core group of “senior” tutors throughout the years
 - Cycle of debate, refinement, revision
 - Q year forest fire of some content to allow regrowth

How the Layering Works - I

Population health topic area	Lecture focus	Linked conference for epidemiological and statistical methods	Tutorial
Treatment of myocardial infarction	<ul style="list-style-type: none"> • Large, international randomized trials for treatment of acute myocardial infarction 	<ul style="list-style-type: none"> • Randomized trials • The role of chance • Type I and II errors • Interpretation of confidence intervals and p-values 	<ul style="list-style-type: none"> • Review of randomized controlled trial paper • Problem set review: <ul style="list-style-type: none"> - Expressing uncertainty
Smoking and health	<ul style="list-style-type: none"> • History of link between smoking and health • Use and misuse of data • Determination of causality (with focus on Surgeon Generals' reports) • Individual and population level intervention to reduce smoking 	<ul style="list-style-type: none"> • Cohort studies • Measures of frequency and association • Biases in study design 	<ul style="list-style-type: none"> • Smoking case* <ul style="list-style-type: none"> - "Classic" cohort studies on smoking and health - Interpreting associations for patients - Smoking cessation • Problem set review: <ul style="list-style-type: none"> - Measures of association
Obesity	<ul style="list-style-type: none"> • Epidemiology of the obesity epidemic • Individual and population-level behavior change 	<ul style="list-style-type: none"> • Addressing confounding using stratification • Multivariate models 	<ul style="list-style-type: none"> • Obesity case* <ul style="list-style-type: none"> - Interpretation of studies relating obesity to mortality • Problem set review: <ul style="list-style-type: none"> - Confounding
Drug safety	<ul style="list-style-type: none"> • Process of drug approval • Role of post-marketing surveillance 	<ul style="list-style-type: none"> • Case-control studies • Assessing causality from observational studies 	<ul style="list-style-type: none"> • Review Cox-2 inhibitor papers • Problem set review: <ul style="list-style-type: none"> - Case-control studies

How the Layering Works - II

Breast cancer screening and diagnosis

- Changes and controversies in screening
- Individual and population consequences of false positive and negative results

• Test characteristics for diagnostic testing and population screening

- Breast cancer screening case
- Review screening paper
- Problem set review:
 - Screening

Vaccines

- Introduction to decision analysis
- Impact of vaccines nationally and internationally
- Role of economics on decisions to implement public health interventions

- Heuristics in medical decisions
- Decision analysis
- Cost-effectiveness analysis

- Review cost-effectiveness paper

Childhood asthma

- Racial, ethnic, and socioeconomic disparities in health and health care

- Asthma case*
- Possible solutions to health care disparities

- No tutorial

Weight loss approaches

- Peer review and journal editing process
- Interpretation of study results by the media and public

- Methods for synthesizing evidence
- Meta-analysis

- Review of manuscripts as submitted to a journal for review, then of final published manuscripts

Emphasize with Interactive Sessions: Experiments

- **Controversial/complex application of recent evidence**
(ex: change in recommendation for AHA lipid lowering guidelines)
 - What does it mean to recommend medical therapy for asymptomatic patients at low risk of disease?
- **Race/ethnicity in the biomedical literature**
 - Should race/ethnicity be measured and reported and, if so, how? (Kaplan and Bennett, JAMA; Flegal, NHANES)
- **Food environment & obesity mapping exercise**
 - What are the strengths of cross-sectional epidemiologic data and how do we move from association to causality?
- **Pandemic Flu exercise**
 - What are the roles of the public health and medical systems in responding to public health threats?

More Experiments

- **Communicating risk and benefit to patients**
 - How do you communicate risk and benefit to individual patients? Review and live patient decision making.
- **Small group RCT and power exercise**
 - What are the components of a rigorous RCT and how do you calculate power or sample size? Design study and present strengths, limitations, & power calculation to group.

Interactive lectures from:

- **Recent Director of MA Department Public Health**
 - Role of public health department and examples of approaches to recent population level questions (helmets, non-cigarette tobacco products, cesarean section rates).
- **Policy maker w/USPTF and AHRQ guideline development**
 - Intersection between evidence, politics, and society?

Other

- Faculty from DPM that help throughout the year
 - Biostats back-up (key)
 - Content experts
- Support from Medical School administration
 - Course Support (key)
 - Student support

It takes a team...(!)

What Works?

- Integrating Clinical Epidemiology and Population Health
- Layered format
- Team approach – building a coalition
- Faculty from across the system
 - Different disciplines, backgrounds, levels
- Experimentation
- Revision
- The Cod-Liver Dimension: there are some things students just need to know even if no fun

Less Well? It's All About Balance a.k.a. Aristotle's Golden Mean

- Experimenting
 - Not too much at once
- Revision
 - Not too much at once
- The cod liver dimension... “ “
- The math...” “
 - Critical for understanding overlying concepts, but important to remember end goal
 - Can lead you down conceptual “Rabbit Holes” that are beyond the scope of intro Clin epi for clinicians

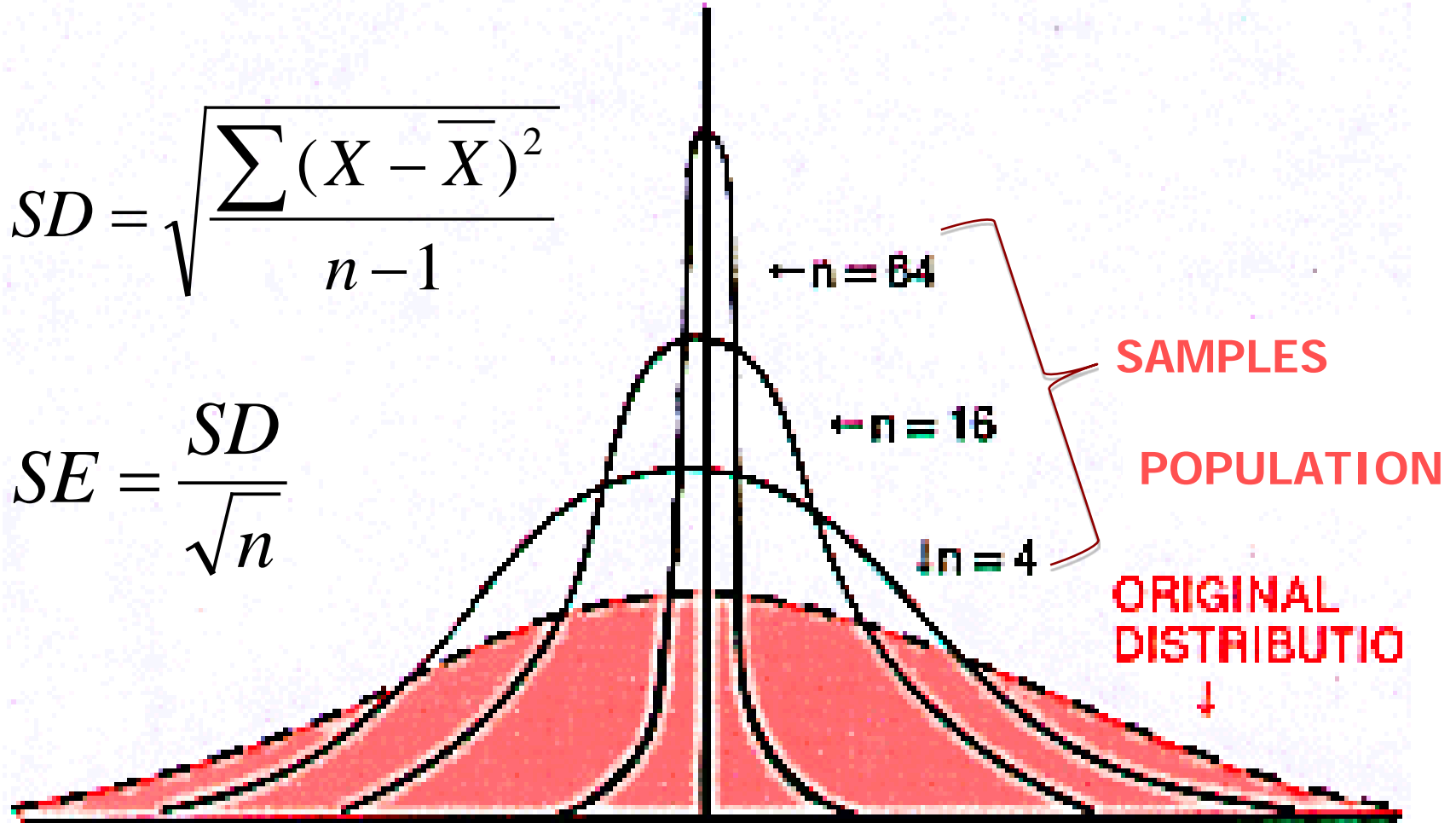
Conceptual Rabbit Holes

- Particularly important with Clin epi where the disconnect between the analytics (biostats) and clinical application is inherent + complex
- So you can have a population, and you want to ask important questions, but you can never **know** it, so you take a sample and make some **assumptions** based on mathematical properties...

You've Got This Population...

$$SD = \sqrt{\frac{\sum (X - \bar{X})^2}{n - 1}}$$

$$SE = \frac{SD}{\sqrt{n}}$$



Take Home Points



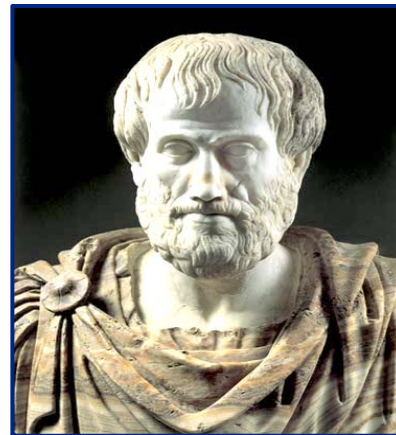
Experiment

+



Team

+



The golden mean

Q&A Session

Type your questions in the 'Q&A' box at the bottom right of your screen

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Contact Information

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Director, Public Health Initiatives
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E-mail: mfair@aamc.org

AAMC

Participants (10)

Speaking: AMSA Webex3

Panelists: 2

- AMSA Webex3 (Host)
- AMSA Webex3

Attendees: 8 (1 displayed)

- Katy Carkuff (me)

View all attendees...

Chat

from AMSA Webex3 to All Participants:
Welcome to tonight's HEWA presentation. We will be starting in a couple minutes.

Send to: [Host]

Send to a participant in the Send to menu first, type chat message, and send...

Q&A

All (0)

Ask: All Panelists

Select a panelist in the Ask menu first and then type your question here. There is a 255 character limit.

Panelist: Richard DiCarlo, M.D. Louisiana State University



- LSU School of Medicine in New Orleans
- IM Residency at Charity Hospital, New Orleans
- Assistant Dean for Medical Education at LSU since 2003
- Medical Director of the City of New Orleans STD Clinic from 1994-1999

LSU School of Medicine - New Orleans



- Class size: approximately 200
- Year 1 and Year 2 curricula have been departmentally based
- Integrated Science and Practice of Medicine course - year 1
- Integrated Science and Practice of Medicine course - year 2
- 16 small groups for case discussions, role playing, simulation labs, learning communities and mentorship activities

Science and Practice of Medicine 100

- **Computer based cases** (clinical problem solving)
- **Skills lab** (hand washing, basic procedures, BLS, physical examination)
- **Clinical Forums** (small group discussions on ethics, interviewing [with role-play], doctor-patient relationship, cultural competence)

Science and Practice of Medicine 200

- **Computer based cases** (clinical problem solving)
- **Skills lab** (more advanced procedures; ACLS protocols, physical diagnosis done in the hospital)
- **Lecture series** (epidemiology and biostatistics)
- **Clinical Forums** (small group discussions and journal club sessions on population medicine and disease prevention)

SPM 200 Lectures

- Population Medicine, Health Disparities, and Healthy People 2020
- Principles of Prevention
- EBM and Study Design – Part 1
- Library Informatics
- How to Present a Paper for Journal Club
- How to Give a Presentation
- Measures of Disease Rate and Measures of Risk and Association
- Test Interpretation
- Biostatistics: Data, Distributions, Probability, and Confidence Intervals
- Biostatistics: Hypothesis Testing, p-values, and Error
- Correlation and Regression
- Study Design – Part 2
- How to Read and Critique Clinical Trials and Analytic Studies
- Health Systems and Quality Metrics
- Patient Safety and Medical Errors

SPM 200 Clinical Forums

- **Modules:** Immunization, Screening, Physical Activity, Diet and Nutrition, Substance Abuse, Reproductive Health, Health Systems and Quality Metrics
- Each module comprises:
 - Introductory lecture
 - Student preparation (review population data and papers)
 - Small group session (journal club)
 - Preparation of Power Point presentation
 - Symposium of student presentations

Sample Module: Screening

- Follows lectures on Test Interpretation
- **Four topics:** each group focuses on 1 topic
- **Prior preparation:** all students read a paper and review screening guidelines (USPSTF and ACS)
- **Small group meeting:** journal club presentation by two students; group discussion

Sample Module: Screening Symposium Presentations

- Four groups meet (45-50 students) and hear all topics presented:
 - Cancer screening in men
 - Cancer screening in women
 - Screening for cardiovascular disease
 - Screening for sexually transmitted diseases
- Two students in each group give a 15 minute presentation following guidelines in the module
- Discussion/questions by faculty moderator after each
- This is repeated on 4 different afternoons (to accommodate all 16 groups)

Similar Format in All Modules

- Immunization
- Screening
- Physical Activity
- Diet and Nutrition
- Substance Use and Abuse
- (Reproductive Health)
- Health Systems and Quality Metrics

Student Assessment

- Symposium presentation (content, slides, critical thinking, delivery)
- Peer evaluation from small group discussions
- Quizzes on literature searching and critical interpretation skills

Student Assessment

Item	Score				
Patient Care – This student demonstrated knowledge of healthcare practices aimed at preventing health problems and maintaining health.	5	4	3	2	1
Practice Based Learning – This student demonstrated the ability to review current sources of medical information to answer questions about patient care. Relevant information was accurately summarized and clearly presented.	5	4	3	2	1
Practice Based Learning – This student demonstrated the ability to critically appraise evidence in order to enhance knowledge. Evidence from scientific studies and practice guidelines were evaluated for quality, relevance, appropriate study design, and appropriate statistical analysis.	5	4	3	2	1
Communication Skills – This student demonstrated effective presentation skills: clear speaking, adequate projection, and good audience interaction (e.g., eye contact, gestures, and response to audience questions)	5	4	3	2	1
Communication Skills – Organization, Time Management, and Visual Aids: effective session organization (e.g., introduction, conclusion, smooth transitions); appropriate pace; and design/use of slides (e.g., appropriate and easy to read, effective use of graphs and tables, proper citations and references)	5	4	3	2	1
Total Score (Honors 23 – 25; High Pass 18 – 22; Pass 8 -17)					

Comments:

Library Informatics Quizzes

- **Literature searching:**
 - Students are given a vignette that raises a clinical question. They are asked to search the literature for the three best primary studies that provide evidence in answer to the clinical question. They submit the PMID and identify the study design for each paper.
- **Study evaluation:**
 - Students are given a vignette that raises a clinical question. They are provided with three abstracts, and select the one that provides the best evidence. They identify reasons why it provides better evidence than the others.

Student Assessment

- Symposium presentation (content, slides, critical thinking, delivery)
- Peer evaluation from small group discussions
- Quizzes on literature searching and critical interpretation skills
- Course exams: epidemiology, biostatistics, and population medicine
- Need to develop formal evaluation of journal club presentations

SPM 200 Clinical Forums: Lessons Learned

- Student feedback/course evaluation has been very positive
- Students appreciate the importance of giving a presentation to their peers
- Student presentation symposia are another form of 'lecture'
- Journal clubs begin before students have had entire lecture series
- Epidemiology and biostatistics questions are embedded in larger exams

Curriculum Changes Underway

- Short course at the end of Year 1: *Introduction to Population Medicine and the Health System*
- Population health modules in each organ system block during Year 2
- During Year 2, every student will:
 - present in 'journal club'
(on disease prevention or health disparities)
 - propose a quality improvement project
(using hospital outcomes data)
 - demonstrate motivational interviewing
(for behavior change)

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Closing Remarks: Malika Fair, M.D., M.P.H.



Director of Public Health Initiatives
Association of American Medical Colleges

Public Health Initiatives at AAMC

- *Diversity Policy and Programs* promotes, advances, and drives diversity and inclusion along the medical education continuum with work in three portfolios:
 - Human Capital
 - Organizational Capacity Building
 - ***Public Health Initiatives***
- Improving the integration of public health concepts into medical education and seeking to enhance and expand a diverse and culturally prepared health workforce.

Public Health Pathways



AAMC is pleased to announce the launch of
Public Health Pathways

A new online searchable database of domestic and international public health training opportunities for:

- ✓ Pre-med Students
- ✓ Medical Students
- ✓ Residents
- ✓ Early Career Physicians

Please visit **Public Health Pathways** at:
www.aamc.org/phpathways

Public Health in Medical Education Online Community of Practice



Engage in an online forum with medical educators, public health practitioners, medical students and residents, and other interprofessional colleagues to improve the public health content along the continuum of medical education.

MedEdPORTAL Public Health Collection

A banner for the MedEdPORTAL Public Health Collection. On the left, there is a graphic of three overlapping, wavy ribbons in shades of green, blue, and purple. The right side of the banner has a dark blue background with white text and logos. At the top left is the APIH logo (Academic Partnerships to Improve Health) with the tagline 'Innovation • Integration • Impact'. To its right is the MedEdPORTAL logo, and further right is the AAMC logo (American Association of Medical Colleges). Below these logos, the text 'Public Health Collection' is written in a large, bold font. Underneath that, a paragraph describes the collection as the online destination for identifying, developing, and sharing resources aimed at improving public health content along the continuum of medical education. At the bottom, the website URL 'www.mededportal.com/icollaborative/publichealth' is provided.

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Public Health Collection

MedEdPORTAL's Public Health Collection is the online destination for identifying, developing, and sharing resources aimed at improving the public health content along the continuum of medical education.

www.mededportal.com/icollaborative/publichealth

Consider submitting your curricular innovation to be included in the **Public Health Collection** of AAMC's MedEdPORTAL®, a free, cross-indexed suite of services that aims to equip healthcare professionals across the continuum with effective and efficient educational tools to improve patient care.



Tomorrow's Doctors, Tomorrow's Cures

Learn

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Lead

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