Teaching Population Health: Innovative Medical School Curricula on Nutrition

January 20, 2016
1:00-2:30 p.m. EST

Housekeeping

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- If you experience any technical or audio issues during the webinar, please send a note through the Chat panel to “AAMC Meetings.”
- Type your questions in the ‘Q&A’ box at the bottom right of your screen and send to “All Participants.”
Welcome & Introductions
Malika Fair, M.D., M.P.H.

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

Webinar Objectives

- Discuss innovative ways to teach nutrition 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 the pre-clinical and clinical years
- Provide a forum for faculty and learners to collaborate and discuss opportunities for curriculum and clinical training improvement moving forward
Moderator: Jennifer Nelson, M.D., M.P.H. 
Centers for Disease Control and Prevention

- Epidemic Intelligence Service (EIS) Officer in the Nutrition Branch, Infant Feeding Team at CDC
- M.D., Morehouse School of Medicine
- Pediatrics Residency, Emory University affiliated hospitals
- M.P.H. in Epidemiology, Emory University

Webinar Panelists

Dr. Martin Kohlmeier

Dr. Virginia Uhley
Martin Kohlmeier, M.D., Ph.D.

- University of North Carolina at Chapel Hill, Department of Nutrition
- UNC Nutrition Research Institute, Kannapolis
- Director of the Nutrition in Medicine (NIM) project
- M.D. and Residency, Heidelberg University

Objectives

- Report on the state of nutrition education at U.S. medical schools
- Present instructional and assessment approaches of the NIM curriculum
- Consider opportunities for building stronger clinical nutrition skills
**Nutrition Training Boosts Population Health**

- Most Americans would benefit from evidence-based nutrition guidance
- Trained physicians achieve better health outcomes and save time
- Nutrition knowledge helps physicians to counter myths and false claims

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**What Needs to be Taught?**

- Dietary Treatment of Disease
- Nutritional Intervention
- Nutrition Assessment
- Basic Nutrition

25 contact hours
Nutrition Education Surveys

- Targeted at all accredited programs in the U.S.
- Medical schools, schools of osteopathic medicine
- Conducted at approximately 4-year intervals
- Online questionnaire, with email/phone alternatives
- Carried out without dedicated funding support
- Needs more permanent support

Nutrition Education in Medical Schools Continues to be Inadequate

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<tr>
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<tbody>
<tr>
<td>Combined Hours (SEM)</td>
<td>20.4 (1.4)</td>
<td>22.3 (1.6)</td>
<td>19.5 (1.4)</td>
<td>19.0 (1.2)</td>
</tr>
<tr>
<td>Response Rates</td>
<td>89%</td>
<td>84%</td>
<td>86%</td>
<td>91%</td>
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An Increasing Number of U.S. Medical Schools Fail to Require any Nutrition Education

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<tbody>
<tr>
<td>No Required Course</td>
<td>5%  (6/112)</td>
<td>7%  (7/106)</td>
<td>5%  (5/109)</td>
<td>10%  (12/121)</td>
</tr>
<tr>
<td>Response Rates</td>
<td>89%</td>
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<td>86%</td>
<td>91%</td>
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Most Medical Schools Fail to Require the Recommended Amount of Nutrition Education

Less than 1/3 provide the 25 hour minimum
Where is Nutrition Taught in the Curriculum?

<table>
<thead>
<tr>
<th>Type of Course</th>
<th>Schools</th>
<th>Hours (SEM)</th>
</tr>
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<tbody>
<tr>
<td>Integrated Course</td>
<td>68%</td>
<td>12.6 (1.3)</td>
</tr>
<tr>
<td>Clinical Practice</td>
<td>45%</td>
<td>6.4 (1.0)</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>37%</td>
<td>6.4 (1.1)</td>
</tr>
<tr>
<td>Physiology/Pathology</td>
<td>29%</td>
<td>4.2 (0.6)</td>
</tr>
<tr>
<td>Nutrition</td>
<td>18%</td>
<td>13.8 (2.1)</td>
</tr>
<tr>
<td>Other</td>
<td>11%</td>
<td>10.0 (3.1)</td>
</tr>
</tbody>
</table>

Nutrition Education in Medical Schools Continues to be Inadequate

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</thead>
<tbody>
<tr>
<td>Required Nutrition Course</td>
<td>35% (39/112)</td>
<td>30% (32/106)</td>
<td>25% (26/105)</td>
<td>18% (22/121)</td>
</tr>
<tr>
<td>Response Rates</td>
<td>89%</td>
<td>84%</td>
<td>86%</td>
<td>91%</td>
</tr>
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</table>
**Nutrition in Medicine**

- **Lessons**
- **Tools**
- **Case studies**
- **Review questions**

**NIM Resources are Widely Available**

- Currently over 40 modules of 15-60 min length
- Evidence-based instruction of clinical skills
- Run on any standard desktop or laptop
- Used by students at 130 of 176 U.S. schools
- Chosen by programs in 23 other countries
- Funded by NCI, ODS, USDA and others
**Nutrition in Medicine (NIM) Online Instruction Works for Medical Schools**

Medical schools with our online courses provide 33% more nutrition education.

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>n</th>
<th>Hours (SEM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using NIM courses</td>
<td>44</td>
<td></td>
<td>22.1 (1.8)</td>
</tr>
<tr>
<td>No NIM Courses</td>
<td>77</td>
<td></td>
<td>17.4 (1.4)</td>
</tr>
</tbody>
</table>

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**Example: Dietary Assessment by Physicians**

**Assessing Vitamin E, C, and Carotenoid Intake**

- **Vitamin E**
  - Are mostly non-fat foods eaten?
  - **Alarm Threshold:** avoids oils, fats, nuts, and seeds

- **Vitamin C**
  - How many servings of fruits and non-starchy vegetables a day?
  - **Alarm Threshold:** fewer than 1 serving

- **Carotenoids**
  - How many servings of orange, yellow or dark-green fruits and vegetables per day?
  - **Alarm Threshold:** fewer than 1 serving

Who is at increased risk for low antioxidant intake?

- **Vitamin E**: Look for people who use mainly fat-free foods and avoid added fat.
- **Vitamin C**: Look for people who eat few fruits and vegetables.
- **Carotenoids**: Look for people who eat few fruits and vegetables.
Reinforcement with Practice Cases

**Interaction: Case Studies**

All of these patients do not regularly use vitamin or mineral supplements. Which nutrient should you be most concerned about?

**Q:** How many servings of fruits or vegetables do you eat on a typical day?

**A:** I have to confess I rarely have any vegetables or fruits, I don’t even like juice.

**Select Nutrient**

- vitamin B12
- vitamin D
- vitamin E
- vitamin C
- thiamin
- calcium

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Emphasizing What they Need to Know

**Key Concept**

You should memorize assessment questions and criteria related to inadequate vitamin E, C, and carotenoid intakes.

People with restricted diets who do not take supplements may be at risk for vitamin deficiency. Vitamin E is found in oils, fats, nuts, and seeds. People who use mainly fat-free foods and avoid added fat are at risk for deficiency. Good sources of vitamin C are fruits and vegetables such as citrus, berries, tomatoes, broccoli, cauliflower, and peppers. A person who eats < 1 serving/d of fruits and vegetables should raise a red flag for potential deficiency. Carotenoids are found in orange, yellow, or dark-green fruits and vegetables. Less than 1 serving/d puts a person at risk.
Use of Assessment Skills in Practice

**Introduction to the Patient**

Patient Information:
Joseph Bradley, age 63
Non-smoker, hypertensive. Excellent compliance to
diet and exercise. Suffered mild myocardial infarction
2 months ago, will start cardiac rehab in 2 weeks.

**Height**: 1.79 m (5'10")
**Weight**: 81.8 kg (180 lb)
**BMI**: 26
**Cholesterol**: 223 mg/dl; **HDL**: 33 mg/dl; **LDL**: 144 mg/dl
**Blood pressure**: 146/88
**Meds**: loop diuretic, ACE-inhibitor, statin

**MISSION**:
Your task is to evaluate Mr. Bradley's antioxidant intake.

Your time spent working with the patient will be displayed on screen. Your use of time will be reflected in your performance evaluation.

Use of Assessment Skills in Practice

**Interview the Patient**

Use time efficiently and be sure to take notes. Ask targeted questions related to antioxidant intake.

- How have you been feeling?
- Have you tried losing weight in the past?
- Tell me about your fruit and vegetable intake.
- Tell me about your typical diet.
- Do you eat at least 5 servings of fruit and non-starchy vegetables a day?
- How often do you eat dark green vegetables?
- Do you use oils in cooking or at the table, like safflower, canola, wheat germ oils, margarine?
- Are you taking any vitamins or other nutritional supplements?
- Do you eat any foods that are fortified with nutrients, like cereals?
Use of Assessment Skills in Practice

Dietary vs Supplement Intake

Assess Mr. Bradley's dietary and supplement intakes separately. Then, press the Check button.

**Dietary Intake**

- Vitamin E
  - Below RDA.
  - At RDA. **X**
  - Above RDA.

- Vitamin C
  - Below RDA.
  - At RDA.
  - Above RDA. **✓**

**Supplement Intake**

- Vitamin E
  - Below RDA.
  - At RDA.
  - Above RDA. **✓**

- Vitamin C
  - Below RDA.
  - At RDA.
  - Above RDA.

Testing of the Learned Skills

Final Exam

Q: Which of the following patients are at increased risk for low antioxidant intake?

- A 6-year-old who won't drink milk. **X**
- A 6-month-old breastfed infant who just started solid foods.
- A 75-year-old woman living in an assisted living facility.
- A 23-year-old college student following a vegetarian diet.
- A picky 10-year-old who doesn't like vegetables and fruit. **✓**

Explanation:
No. People who eat few fruits and vegetables are at risk for low antioxidant intake.
Review of Self-efficacy

Survey

Q: I feel prepared to counsel patients in the areas covered by the module.

A strongly agree
B agree
C neutral
D disagree
E strongly disagree

Clinical Practice

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2012</th>
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<tbody>
<tr>
<td>Clinical Practice</td>
<td>6.4 hours</td>
<td>6.4 hours</td>
</tr>
<tr>
<td>(% of schools offering)</td>
<td>(44%)</td>
<td>(45%)</td>
</tr>
<tr>
<td>Response Rate</td>
<td>86%</td>
<td>91%</td>
</tr>
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</table>
Virtual Cases

Online virtual patient interactions with immediate feedback can strengthen clinical nutrition competencies.

<table>
<thead>
<tr>
<th></th>
<th>Pre-test Average</th>
<th>Post-test Average</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OB – Address nutritional issues</td>
<td>3.14+/-.131</td>
<td>3.06+/-.124</td>
<td>0.723</td>
</tr>
<tr>
<td>OB – Advise re: weight gain</td>
<td>3.28+/-.139</td>
<td>2.81+/-.121</td>
<td>0.081</td>
</tr>
<tr>
<td>OB – Calc BMI</td>
<td>2.44+/-.146</td>
<td>1.77+/-.110</td>
<td>0.029</td>
</tr>
<tr>
<td>OB – Assess readiness to change</td>
<td>3.83+/-.121</td>
<td>3.36+/-.136</td>
<td>0.045</td>
</tr>
<tr>
<td>GYN – Address nutritional issues</td>
<td>4.29+/-.083</td>
<td>3.66+/-.068</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>GYN – Calc BMI</td>
<td>2.92+/-.156</td>
<td>2.42+/-.152</td>
<td>0.110</td>
</tr>
<tr>
<td>GYN – Assess readiness to change</td>
<td>4.03+/-.083</td>
<td>3.53+/-.136</td>
<td>0.014</td>
</tr>
<tr>
<td>GYN – Discuss weight loss methods</td>
<td>3.92+/-.125</td>
<td>3.67+/-.119</td>
<td>0.22</td>
</tr>
</tbody>
</table>

In your last four patient encounters, how often did you…

Kaplan et al., 2013
Challenges and Lessons Learned

- Too few medical schools prepare their students for everyday nutrition challenges in clinical practice
- The biggest barrier to getting more nutrition into the curriculum is the lacking sense of urgency
- Clinical training with common patient scenarios is almost non-existent and needs to be added
- Multi-layered, repeated nutrition exercises and learning opportunities are needed across all 4 years
- Students need more role modeling of clinical nutrition practice in all relevant medical disciplines

The Really Hard Parts

- Building good nutrition education tools is expensive
- Materials need to be overhauled every 4-5 years
- Support of online learners is resource-intensive
- Few funding sources for development and delivery
- Everyone assumes that online materials are free
Virginia Uhley, M.S., Ph.D., R.D.N.

- Appointment in Biomedical Sciences at Oakland University William Beaumont (OUWB) SOM
- Fellowship in medical education and a medical education certificate at OUWB SOM
- Former Director of the Longitudinal Nutrition Curriculum at the University of Michigan Medical School
- Graduate degrees in Nutrition and Food Science, Wayne State University
Objective

To provide an overview of longitudinal integration of nutrition education in the medical school curriculum

Assessment of the Curriculum

Critical Review

• Where does nutrition need to be integrated?
• Are nutrition topics already addressed within existing courses/clerkships?
• Are there knowledge or application gaps that need to be addressed?
• Do you have faculty with the necessary expertise to teach clinical and community nutrition education?
• Is there a mechanism that would allow for maintenance of the nutrition education curricula components?
Lessons Learned: Integrating Nutrition in the Medical School Curriculum

1. Meet with the Dean, Associate Dean of Medical Education, and Curriculum Committee.
2. Identify curricular mapping tools that will identify subject content.
3. Look for opportunities to co-teach/interprofessional education.
   - Find out if there are discipline teams.
4. Survey or use focus groups of faculty and students.
5. Use published resources as guides to develop vertical and horizontal integration.

Overall: Document recommendations, support with evidence, document specific short-term and long-term goals. Make sure to focus on longitudinal curricula design.

Core Medical School Nutrition Concepts

- Basic nutrition science
- Clinical Nutrition assessment techniques
- Practical Nutrition Consultation and Medical Nutrition Therapy
- Prevention and lifestyle recommendations
- Community Nutrition: public health and population health

Nutrition Academic Award: https://www.nhlbi.nih.gov/research/training/naa/
Epidemiology, the core discipline of public health, is essential to understanding the cause and distribution of disease.

- Independently interpret the medical literature
- Apply findings to individual patients
- Central to sound medical care and health policy and public health practices

Public health teaches the influence of environmental, nutritional, social, and behavioral factors on health, illness, recovery, and wellness.

- Understand the etiology and optimal management of disease
- Appreciate multiple origins of illness
- Integrative explanation of illness that embraces genetic, molecular, biochemical, and physiological factors with behavioral, social, nutritional, and environmental factors

AAMC: Public Health Matters to Medical Care and to Medical Education

Understanding the role and potential for public health interventions better positions physicians to improve patient health and foster interdisciplinary collaboration.

Interventions include: public health education, social campaigns, ordinances and laws, standards and regulations, surveillance and preparedness.

Gain a deeper understanding of the conditions that preserve health, of the primacy of disease prevention, and of the interfaces between personal medical care and community health protection.


Developing Nutrition Application Skills

To address population health, medical students need the opportunity to develop nutrition application skills that address chronic disease issues:

- DASH (Dietary Approaches to Stop Hypertension) diet to reduce hypertension
- Carbohydrate counting to help manage diabetes
- Therapeutic lifestyle changes/Mediterranean diet to better control hyperlipidemia
- Caloric control and lifestyle changes to better control overweight, pre-diabetes, and obesity
Need to Integrate Nutrition Competencies

• NIH Guidelines for the prevention and treatment of obesity, diabetes, hypertension, coronary artery disease, cancer, osteoporosis
• U.S. Dietary Guidelines
• Healthy People 2020

Collaborate with Other Medical School Faculty Involved in Nutrition Education: Local, Regional, National Groups

Michigan Medical Nutrition Education Consortium (MMNEC)

• Established by the Michigan State Medical Society in 1997 to support and advance nutrition education in the medical school curriculum.
  ▪ Members are designated nutrition faculty appointed by the Dean of each medical school and representatives from state and community health agencies in Michigan.
    – They collaborate on common curriculum development and public health concerns.
  ▪ Mission: share instructional/research resources and promote visibility/enhance the recognition of nutrition in medical training and practice.
  ▪ Provide an ongoing comprehensive review of nutrition content in medical school curricula.
Highlights of MMNEC National and Regional Accomplishments

- MMNEC made the first nationwide impact on nutrition in the medical school curriculum by initiating the first formal application to the National Board of Medical Examiners Step 1 committee
  - Established nutrition as the first integrated topic to be considered; Step 1 nutrition sub-score was first reported in 2002
- MMNEC received grant funding to develop medical student nutrition training resources:

University of Michigan Medical School Standardized Patient Case

The Nutrition and Physical Activity (NPA) scenario:
- Incorporates a single mother in her mid-fifties, working full-time and struggling with two teenagers.
- She has just received a diagnosis of pre-diabetes and is now seeking help with weight loss and improved eating habits.

Professional Skill Builder (PSB) Web-based modules:
- Interactive clinical cases.
- Video clips show patients at various levels of confidence and conviction associated with healthy lifestyle behavior changes.
- Case vignettes also provide a physician “role-model” their counseling approach based on the patient’s current state of readiness for behavior change.
University of Michigan Medical School Nutrition Education Curriculum

- http://www.med.umich.edu/lrc/nutrition/
- A webpage resource for medical students to identify nutrition related education sessions and topics.

Examples: Oakland University William Beaumont School of Medicine Nutrition Education Curriculum

- Educational philosophy: holistic approach to health promotion, including an emphasis on social determinants of health and community engagement
- Innovative nutrition curriculum examples:
  - Biochemistry:
    - Interprofessional Blood Glucose Laboratory: [https://www.mededportal.org/publication/9978](https://www.mededportal.org/publication/9978)
  - Longitudinal Promotion and Maintenance of Health and Medical Humanities/Clinical Ethics:
    - Food Insecurity: [http://www.oakland.edu/medicine/compass](http://www.oakland.edu/medicine/compass) (community-based assignments, research, and engagement)
  - Vertical and horizontal integration of nutrition curriculum themes within basic science, organ system-based courses, and clerkships (Family Medicine, Pediatrics, OB/GYN)
**Nutrition Education Integrated in M1 OUWB Medical School Curriculum**

- **Promotion and Maintenance of Health**: Nutrition Assessment, Interprofessional Glucose Lab
- **Medical Humanities and Clinical Bioethics**: Medical Interviewing
- **Art and Practice of Medicine**: Standardized Patient Overweight/Obesity
- **Biomedical Clinical Foundations of Practice**: Nutrition Pathology
- **Biomedical Clinical Foundations of Practice**: Problem Solving Clinical Nutrition/Biochemistry
- **Biomedical Clinical Foundations of Practice**: Nutrition in Practice - Inborn Errors of Metabolism
- **Cardiovascular**: Nutrition in Practice - Cardiovascular Disease
- **Capstone Research (M1-M2)**: Nutrition Ed/Food Insecurity/Diabetes/Obesity

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**Longitudinal Integrative Case Studies**

- Integrate knowledge of basic science, clinical medicine, public health, and population health.
- Allow medical students the opportunity to apply and demonstrate strategies that integrate clinical care with public health approaches to improve the health of individuals and communities.
- Allow medical students to expand their knowledge of community resources that impact the health of individuals and populations.
Nutrition Education Integrated in M2 OUWB Medical School Curriculum

• Promotion and Maintenance of Health
  • Food insecurity, dietary supplements, fad diets
  • Longitudinal case studies
• Renal and Urinary
  • Chronic kidney disease medical nutrition therapy
• Male and Female Reproductive
  • Pregnancy nutrition guidelines
• Medical Humanities and Clinical Bioethics
  • Integrative medicine elective

Other Initiatives to Enhance Nutrition Education

• Nutrition and Medicine: University of North Carolina
• Fellowship and Residency online curricula: University of Arizona Center for Integrative Medicine
• Healthy Kitchens, Healthy Lives: Harvard T.H. Chan School of Public Health
• Fellowship in Pediatric Nutrition: University of Colorado School of Medicine
• Student Nutrition Awareness and Action Council (SNAAC): Boston University School of Medicine
• Wholesome Wave’s Fruit and Vegetable Prescription Program (FVRx)
• Promotion of Maintenance of Health longitudinal course: OUWB School of Medicine
• The Goldring Center for Culinary Medicine: Tulane School of Medicine
• Medical Nutrition Program for Health Professionals: Columbia University Medical Center
• Food as Medicine: Center for Mind-Body Medicine
National Organizations/Groups

- American Nutrition Society (ANS)
  - http://www.nutrition.org/education-and-professional-development/medical-professional-development/

- Society of Teachers of Family Medicine (STFM) - Nutrition Education Group
  - http://www.stfm.org/Groups/GroupPagesandDiscussionForums/NutritionEducation

- The Obesity Society (TOS)
  - http://www.obesity.org/home

- Academy of Nutrition and Dietetics
  - http://www.eatright.org/

- Teaching Nutrition and Physical Activity in Medical School: Training Doctors for Prevention-Oriented Care

- American College of Lifestyle Medicine (ACLM)
  - http://www.lifestylemedicine.org/

Challenges

- Time/hours in the curriculum
- Available expertise
- Ability to maintain and update curriculum
- Lack of nutrition-related professional competencies
- New curriculum changes
- New EPA development
- Need for CME that includes topics in nutrition science and health promotion
- Need consistent and sufficient reimbursement for services that target lifestyle factors like nutrition and exercise
- Need to integrate nutrition skills that address continuum of care concepts
- Need interprofessional education models that integrate nutrition and promote team-oriented care
Q&A Session
Type your questions in the ‘Q&A’ box at the bottom right of your screen and send to “All Participants”

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.

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- Pre-med/Pre-health Students
- Medical/Graduate Students
- Residents/Postdocs
- Early Career Physicians & Scientists

Visit Public Health Pathways at:
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