Integration of Early Clinical Experience and Population Health in Undergraduate Medical Education

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Abstract

Objective: In order to better prepare physicians to face the challenges in health care delivery today, educators have pushed for the integration of core population health competencies into undergraduate medical education. The goal is to equip future physicians with the necessary skills to not only improve the health of an individual, but also be able to advocate for a community and meet the health needs of a population. The purpose of this research study is to propose a plan to evaluate the pilot program Early Meaningful Clinical Experience (EMCE) at the Boonshoft School of Medicine at Wright State University.

Methods: The program is comprised of clinical experience coupled with case-based education which emphasizes both self-directed and problem-based learning. Paired students participated in clinical experiences weekly at their assigned preceptor sites. Faculty members were responsible for drafting and formulating case-studies. Student-led discussions were held each month, giving members a chance to share what they have learned.

Proposed Program Evaluation & Student Assessment: Initial evaluations were conducted through surveys. Short-term evaluations also include questionnaires, student reflections, and a pre/post survey. Long-term evaluations may include Step 1, Step 2, and OSCE scores.

Limitations: The study limitations included a small sample size with n=18. In addition, the students were selected from a group of highly motivated individuals which lends to selection bias. Finally, potential confounding factors exists which make it impossible to infer a causal relationship between participants and standardized test scores.

Keywords: Medical Curriculum Reform, Kolb’s Learning Theory, Case-Based Learning, Program Evaluation, Student Assessment
Integration of Early Clinical Experience and Population Health in Undergraduate Medical Education

The United States has the world’s highest per capita costs regarding health care delivery, yet the gap in health disparities continues to widen and the resulting health outcomes leave much to be desired (Kaprielian et al., 2013). Health disparities remain widespread based on social determinants such as gender, income, education, and ethnicity (Maeshiro et al., 2010). The nation incurs substantial health expenditures without the corresponding improvements made to health status (Maeshiro et al., 2010). Changes must be made to the health system in order to improve both the quality of health care delivery and reduce its rising costs (Kaprielian et al., 2013).

In order to better prepare physicians to face the growing health challenges in society today, organizations such as the Institute of Medicine (IOM) and the Association of American Medical Colleges (AAMC) recommend that core competencies and key concepts in public health be integrated into undergraduate medical education (Finkelstein et al., 2008). The intent is to train and develop a physician workforce that is not only capable of treating the patient in front of them, but also improve community health by using a population-based approach (Finkelstein et al., 2008). Appreciation of population health will allow physicians to not only treat a patient, but to understand and address the social context of the disease as well (Ornt et al., 2008).

As the U.S. demographics shifts to an aging society, and transitions away from acute infectious diseases to chronic non-communicable ones linked to environmental and behavioral risk factors, it is important to incorporate public health concepts and a population-based approach with traditional one-on-one clinical skills in order to better address the overall health concerns of the nation (Kaprielian et al., 2013). Educators within the U.S. called for the
incorporation of population health into medical curricula as early as 1939; and a 2006 medical graduate survey by the AAMC reports that 32.1% of students felt that their medical school spent inadequate time devoted to public health (Maeshiro et al., 2010; McIntosh, Block, Kapsak, & Pearson, 2008). The environment within which physicians practice today is remarkably different than that surrounding Abraham Flexner’s report in 1910, and population needs must be considered in addition to the care and treatment of individuals (Maeshiro et al., 2010). The integration of population health concepts into medical education curriculum would expose medical students to public health infrastructure, placing emphasis on the significance of prevention, disease surveillance, preparedness for disasters, and intervening on the community level (Chamberlain et al., 2008).

**Statement of Purpose**

The purpose of this project is to describe how population health concepts can be better integrated in an undergraduate medical education curriculum and to propose a plan that would evaluate the success of such a program.

**Literature Review**

**The Need for Population Health Instruction in Medical Education**

Population health focuses on the consequences of health outcomes among individuals within a population. Understanding patterns of outcomes distribution is a critical antecedent to addressing health concerns in communities. While public health has broadened its scope of activity since its inception to include health disparities and chronic illnesses linked to social, behavioral, and environmental factors, much of public health infrastructure remains poorly funded (Maeshiro et al., 2010).
To prepare clinicians to be competent in providing healthcare, the Jefferson School of Population Health designed an interdisciplinary curriculum that allows students with different experiences and backgrounds to take classes together, to assist in the preparation for and comprehension of areas related to health policy, public health and health care quality (Maeshiro et al., 2010).

Changes in the health care system in areas in disease management and treatment have affected the medical education curriculum in the United States, and medical educators are emphasizing the need for clinicians to receive training in population-based preventive health care, in order to provide quality care to individuals and communities. The inclusion of public health education within the context of medical curricula, however, remains very limited (Maeshiro et al., 2010).

**The Traditional Medical Education Model in the U.S.**

In the beginning of the 20th century, the Hopkins Circle, a group of learned men, commenced a project that influenced medical education in the United States. Their efforts resulted in the science-based foundation of medical training that has made the United States the prestigious leader in medical education and medical research presently. Majority of the transformation of medical training has been attributed to Abraham Flexner and his critique of medical education in his Report in 1910 (Duffy, 2011).

It has been over a century since Abraham Flexner’s 1910 report made recommendations on medical education, placing emphasis on scientific evidence (Maeshiro et al., 2010). Flexner mentioned that medical education should be based on science and clinical experiences to prepare students to meet the demands of the population after the completion of medical school (Maeshiro et al., 2011). Flexner criticized the poor quality of many medical school curriculums and the
non-scientific approach used to prepare students for the medical profession (Cooke, Irby, Sullivan, & Ludmerer, 2006). Flexner’s report paved the way for critical medical reforms and standardized the traditional model of medical education, consisting of basic sciences and clinical experiences, that is still used today (Maeshiro et al., 2010). Although not explicitly using the term public health, Flexner identified three important principles oriented around population health: physicians are trained to meet the needs of the community, physicians are obligated to educate and promote health while preventing diseases, and that medicine and public health can benefit each other through joint efforts and collaboration (Maeshiro et al., 2010). As early as 1939, reports suggest that educators in the United States emphasized the importance about improving and incorporated population health concepts into medical education (Maeshiro et al., 2011). A shortcoming of the traditional medical school curriculum is that it focuses primarily on the biomedical model, which places emphasis on only the individual, rather than the entire population or community.

**Broadening the Perspective of Medical Practice and Medical Education**

In the United States, the design of the health care system fails to incorporate population health concepts into a physician’s medical training. The system rather emphasizes diagnostic and traditional services, and this may fail to appreciate both individual and community-level preventive services (Maeshiro et al., 2011). To effectively practice medicine, physicians must understand the determinants of population health and acquire an understanding of concepts like advocacy, prevention, health promotion, and engaging in community (Chamberlain et al., 2008). Population health concepts must be introduced and reinforced in the medical school curriculum. Physicians must be trained to apply principles in epidemiology along with concepts in health economics in order to understand how the rates of diseases and infections in a population might
affect and be affected by influences locally and globally. It is important that Physicians participate actively in shaping health policy as well. Physicians must understand and function in diverse roles in the broad health system in order to address issues at the population level.

Clinicians with diverse roles in prevention and population health efforts, could partner more efficiently with public health colleagues to improve the health of people in the community (Maeshiro et al., 2011). The public health and the clinical community can address health issues and challenges in the population. In addition, physicians need to be trained in improving communication skills. The skills required to treat patients include the ability to critically assess evidence and apply results practically is needed to decide on the best drug for treatment and to explain the outcomes of different prevention and treatment options available to patients (Maeshiro et al., 2011).

Physicians must be educated to function in leadership roles in community efforts focused on addressing population health, in regards to improving access to health care; this emphasizes the need for population health content and community-based experiences to be incorporated into the medical education curriculum. Incorporation of population health concepts into medical education would develop physicians’ quantitative skills and knowledge based on contexts within the community, which would further prepare physicians to participate in effective health system reform (Maeshiro et al., 2011).

Traditionally, health care delivery has primarily focused on providing care for individual persons. Preventive care and factors that determines a patients’ health must continue to be incorporated into medical school curriculum (Gourevitch, 2014). Despite the fact that successful health care delivery is influenced by multiple factors on the population level, focus on these determinants is lacking in medical education. Population health covers different areas related to
the society, economics, health disparities in the community, advocacy and the effect of the
environment on health. Recent years have seen educators argue for greater incorporation of
population health concepts into medical education in order to improve the health of the
population.

Prevention, one of the core concepts of population health, plays a significant role in the
health care system. Emphasis has been placed on the importance of transforming the treatment-oriented focus in the present health care sector to become more prevention oriented (Fincham, 2008).

The Affordable Health Care Act (ACA) was a law enacted in the United States in March
2010 aimed at reforming the health care system and improving the quality of health care for
Americans. In practice, population health under the Affordable Health Care Act has assumed a
more clinical implication in which the population is defined as a group of persons receiving
health care from a patient-centered medical home (Gourevitch, 2014). This brings attention to
the triple aim paradigm; a paradigm for improving health care quality, which defines three goals
for the delivery of health care as; promoting health care for the patient, improving the health
status of populations and reducing the costs of care for the benefit of communities. Integrating
population health concepts into medical curriculum will help medical students to apply the goals
of the triple aim paradigm in order to promote health in their clinical practice (Gourevitch,
2014).

Additionally, for new delivery system paradigms like medical homes and accountable
care organizations (ACOs) to succeed, future medical practitioners must combine clinical care
and population health concepts into managing care to maximize the benefits of health promotion
and prevention efforts (Gourevitch, 2014). Educating medical students based on both primary care and population health provides an opportunity for experiential learning.

Incorporating population health concepts into medical education have been reported to promote active learning since it encourages students to be more involved in the education they receive (Mitrakrishnan, Dilushi, & Senaka, 2011). Concentrating on population health in medical curriculum encourages problem-based learning. Problem-based learning prepares medical students for medical practice by helping in the development in the ability to search for and assimilate new knowledge. Medical education requires a lifelong commitment to learning; therefore, the undergraduate medical education should be suitable and adequate to prepare medical school graduates to cope with the rapid changes in medical knowledge and the health care environment.

In the last 40 years, medical schools have been directed to educate students to be competent in regards to responding to the needs of the community (Chastonay, Vu, Humair, Mpinga, & Bernheim, 2012). Medical schools have been encouraged to consider the development of an appropriate curriculum that would address both local and national health concerns (Barss, 2008). Students’ exposure and practice in the community is an effective learning approach to broaden students’ knowledge by offering them a community perspective of health and disease. A thorough knowledge-base, established through robust undergraduate training for medical students in population health, is essential for all future practicing doctors. Training in population health will additionally enable medical students become better clinicians.

Population health has an important role in undergraduate medical training and clinical practice, thereby, strengthening the clinician’s understanding of health and disease (Dare & Bullen, 2008). Incorporating population health concepts into health care delivery will provide an
opportunity for medical schools to emphasize important components of patient care. An agreement between the Association of American Medical Colleges (AAMC) and the Centers for Disease Control and Prevention (CDC) aims to integrate education in population health content areas into medical school curriculum (Gourevitch, 2014).

Recognized institutions such as the IOM and the AAMC have recommended that various public health competencies be taught to all students in undergraduate medical education (Finkelstein et al., 2008). The intent is for physicians to view their practice from a framework of population health while developing the necessary critical thinking and qualitative skills to not only diagnose and treat an individual, but be capable of addressing and improving the health of a population as a whole (Ornt et al., 2008). An important element that could help produce change in the health care system must be the education of clinicians who will practice new approaches in new contexts. Emphasis on individual and population-based prevention must be part of the medical school curriculum (Allan et al., 2004).

In 2002, the Healthy People Curriculum Task Force encouraged the implementation of the Healthy People 2010 objective 1.7: To increase the proportion of schools of Medicine, schools of Nursing and health profession training schools whose basic curriculum for health care providers includes the core competencies in health promotion and disease prevention (Maeshiro et al., 2011). With the current challenges in health care, physicians can no longer primarily rely on clinical skills alone, but they must also incorporate principles of public health and its population-based approach (Kaprielian et al., 2013).

The objective of Healthy People 2010 was to improve the health of all Americans. Healthy People 2010 has emphasized the promotion of education efforts to enhance clinical prevention and population health by including an objective that is focused on increasing the
proportion of schools of medicine, schools of nursing and health care professional training schools whose basic curriculum for healthcare providers include the core competencies in health promotion and disease prevention (Fincham, 2008). Calls have been made to shift collective health care from treatment–oriented focus to prevention–oriented. The current shift of emphasis from curative to preventive medicine makes population-centered medical education of utmost importance (Mitrakrishnan et al., 2011). As recently as 2006, a medical graduate survey by the AAMC reports that 32.1% of students felt that their medical school spent inadequate time devoted to public health (McIntosh et al., 2008; Maeshiro et al., 2011).

In 2011, faculty from Case Western Reserve University, Harvard Medical School, University of Colorado School of Medicine and University of Vermont College of Medicine, collaborated on a workshop to assist other medical educators in developing scenario–based learning experiences as a practical and effective mechanism for teaching public health concepts to medical school students. Diverse strategies to be used to engage students were described in the workshop (Carney et al., 2011).

Learning Styles and Curriculum Development

As the health care delivery system faces rapid changes, physicians today must play a bigger and more active role. The field of medicine is constantly evolving with a plethora of new knowledge and research being added each day. Educators and curriculum planners are seeking ways to design and develop medical education programs that have a profound impact. Several questions arise when tasked with such a goal: What should the content of medical education be? What should be the methods of training and instruction? How does learning occur? (Armstrong & Parsa-Parsi, 2005). Research has shown that new knowledge does not ultimately result in a change in behavior (Armstrong & Parsa-Parsi, 2005). The current literature suggests that by
implementing learning methods that involve both active and self-directed strategies, educators
would better produce the necessary change in behavior (Armstrong & Parsa-Parsi, 2005).

One of the several theories that has shaped education and curriculum planning is Kolb’s
theory posits that “Learning is a process whereby knowledge is created through the
students learn by perceiving the new material and processing that information, resulting in a
modification to the existing cognitive framework and concluding in the new information being
acquired as personal knowledge (Armstrong & Parsa-Parsi, 2005). This can lead to a further
change in thought and promote new desired behaviors, while fostering a learning environment
that encourages and develops critical thinking skills (Lisko & O’Dell, 2010). Experiential
learning, or learning through direct experience, offers an opportunity for individuals to use their
critical thinking, decision making and problem-solving skills in relevant contexts (Armstrong &

Kolb’s Learning Theory can facilitate and accommodate for individuals with various
learning styles (Lisko & O’Dell, 2010). Initially the perception of the new materials can be
separated into two categories: concrete experience and abstract conceptualization (Armstrong &
Parsa-Parsi, 2005). Individuals then process the new information either by active
experimentation or reflective observation (Armstrong & Parsa-Parsi, 2005). This model
proposes that there are four major types of learning styles and individuals can be labeled as an
Accommodating, Diverging, Converging, or Assimilating (see Figure 1) (Armstrong & Parsa-
Parsi, 2005).
Figure 1. Kolb’s learning theory: 4 styles of learning.

The ideal environment is one where all these styles are incorporated into a sequence of educational encounter, moving from Quadrant 1 to Quadrant 4, involving the concrete experience, personal reflection, conceptualization of new ideas, and finally to active engagement (Armstrong & Parsa-Parsi, 2005).

Applying the principles of Kolb’s Learning Theory to the design of medical education curriculum can benefit medical students immensely. Experience is critical to the learning process and through experiential learning, medical students have the ability to reflect upon clinical experiences and observe from diverse perspectives. Students have the ability to integrate their observations into logically sound theories, and use them to make decisions and solve problems during their medical practice. It is important to apply Kolb’s theory on experiential learning to curriculum design because it will help influence how the curriculum is designed,
placing emphasis on the promotion of active learning through self-reflection and practice on the part of the student.

In medical education research, Kolb’s Learning Theory has been used as the foundation for several U.S. studies, with varying conclusions. Lisko and O’Dell (2010) stated that students reported that scenario-based evaluation served as an important element of learning and combined knowledge obtained in the classroom with skills learned in the laboratory, and in clinical experience. This integration required students to think critically and motivated students to think for themselves and to intervene. Reports also suggested a correlation between medical students’ learning style and medical specialty choice (Plovnick, 1975).

**How Other Medical Schools Have Approached Integration**

Medical schools are actively developing and adjusting their programs in order to effectively educate and assist their students in acquiring core competencies, allowing them to be leaders within the community capable of providing patient care to meet the needs of a population. The integration of population health principles into undergraduate medical school education, however, can be a challenging and daunting task for educators. The changes must make population health a more prominent part of the curriculum while introducing key topic areas such as preventive medicine, health disparities, health promotion, and social determinants of health in a way that would facilitate student learning (Trevena & Clark, 2002).

One promising method that allows educators to bring about the necessary change while encouraging active student engagement and participation is Case-Based Learning (Hoover, Wong, & Azzam, 2012). Cased-Based Learning is a derivative of Problem-Based Learning (PBL), allowing medical students to develop problem solving and critical thinking skills as lifelong learner (Hoover et al., 2012). By using PBL, students engage in self-directed learning that
promotes student-led groups, discussions, and interactions. The foundation of PBL is experiential learning theory whereby students acquire knowledge by seeking answers to the problems that they encounter. After careful reflection and comprehension of the process, students can use this learning experience and apply it to similar ones that they may encounter in the future (Hoover et al., 2012).

Several medical schools have integrated population health concepts and incorporated those changes to their curriculum through the use of case studies that focus on Problem-Based Learning. A joint medical program between UC Berkeley and UCSF implemented a population health case study centered around the “ecological model” among two groups of eight students each in 2010 (Hoover et al., 2012). The case study, using the “ecological model” as its paradigm, began with a patient visit to the clinic, developing further into a city-level where surveillance and use of epidemiology data is involved, finally progressing into a political meeting with health groups where the physician serves as an advocate for the community (Hoover et al., 2012). The model allows students to “conceptualize the continuum of health from the individual to the community to larger social and political forces” (Hoover et al., 2012, p. 649). By employing this method, students generated their own learning objectives and presented their individual research and findings at a subsequent date. The researchers believed that this study allowed the students to better understand the expanding roles and responsibilities of the physician within the community (Hoover et al., 2012). Students were better able to recognize, understand, and develop potential strategies to address the plethora of health concerns today (Hoover et al., 2012). The researchers believe that this experience also provided students with a strong foundation as they explore population health in subsequent cases of the curriculum. Finally, the authors noted that after the introduction of the case, at least 69% of the LO reports
generated by the students contained information related to one of the 12 population health core competencies, which shows increase familiarity and understanding (Hoover et al., 2012).

Moreover, the University of Wisconsin School of Medicine and Public Health also piloted a similar study in 2008. Designated as “Integrative Cases” students engaged in activities that incorporated various elements of basic sciences, clinical application, and population health concepts within a two day time frame (Schapiro, Stickford-Becker, Foertsch, Remington, & Seibert, 2011). Each semester would contain either one or two cases that would occur at the end of each block after examination. First- and second-year medical students were obligated to attend and although grades were not assigned, students were required to submit written assignments, self-reflections, or provide a presentation. On the first day, students would obtain a brief overview of the case and then divide into small groups that would research on one domain about the case including: “basic science, clinical care, population health, healthcare systems, and social/ethical issues” (Schapiro et al., 2011, p. S188). The students would spend the rest of the day speaking with health professionals, patients, advocates, researchers, and physicians across campus and within the community. On the second day, the students would return and discuss their findings within their specific domain, then separate into mixed groups of 35 students for further discussions. These discussions and activities were assisted by physician facilitators. The majority of students felt that these cases enhanced their understanding of population health issues and allowed greater understanding and application to patient care. The researchers noted that by presenting case studies to students in this manner, it would highlight the importance of an interdisciplinary team and foster collaborative work in the future (Schapiro et al., 2011).

Similarly, the University of Sydney Medical Program initiated a PBL style learning component into their curriculum. During the first two years, medical students would receive
PBL topics, lectures, and a 90 minute theme session all related to the case study that week (Trevena & Clarke, 2002). In their third year, this would continue and expand into a two hour discussion that features student-led group sessions every other week. By their fourth year, students would also incorporate an assessment project and submit papers on topics related to population health. The goal of the program was to incorporate population health concepts in a way that would be easily understood and applied to everyday clinical settings. Students were expected not only to understand the basic sciences, but comprehend other factors that affect patient care such as demographics, socioeconomic status, psychosocial well-being, environmental factors, healthcare systems, and factors affecting continuity of care and management. The student-led discussion group lasted for two hours and began with a 20-minute discussion trigger that potentially involved guest speakers or videos. The students reported their findings and guide their peers through the discussion with population health tutors acting as facilitators when needed. These facilitators also critiqued each student’s performance and provide comments as an assessment. In addition, students were tested on the materials that they have learned through multiple choice questions and essay based prompts incorporated into their exams (Trevena & Clarke, 2002).

Furthermore, the Case Western Reserve University School of Medicine implemented their revised curriculum in 2006, emphasizing an organ-based approach interspersed with case-based studies and early clinical experience throughout (Ornt et al., 2008). The six block curriculum encompasses the basic sciences that are classically taught during the first two years of medical school while successively introducing key population health concepts each week through the use of small-group discussions. Students are introduced to the concept of the disease through the broader concept of society with the goal of understanding issues such as social
determinants of health, health disparities, epidemiology, burden of disease, and prevention. Student groups convene three times per week while having the afternoons as time for self-directed learning. These student group discussions are further enhanced by lectures and enriched by interactive sessions led by content experts. In addition, learning is supplemented by post-discussion readings, current literature, and seminal publications. Current assessments include multiple-choice and essay examinations pertaining to relevant case-study learning objectives. Evaluations include student and faculty surveys to ascertain program efficacy and outcomes (Ornt et al., 2008).

Additionally, the Brody School of Medicine at East Carolina University initiated their “curriculum enhancement” by integrating population medicine into their curriculum in 2005-2006 (Kerkering & Novick, 2008). Using the “Clinical Prevention and Population Health Curriculum Framework developed by the Health People Curriculum Task Force”, the school was able to identify four areas with insufficient instructions: Evidence Base of Practice, Clinical Prevention Services – Health Promotion, Health Systems and Health Policy, and Community Aspects of Practice (Kerkering & Novick, 2008, p. 345). The school employed the use of four total Case-Based Series in Population-Oriented Prevention (C-POP) into the first two years of basic sciences (Kerkering & Novick, 2008). Instructors and co-facilitators taught cases to students. Subsequently, students would receive access to a preceptor version for further review in preparation of the exam. During the clinical years, students would perform home visits and community assessments. The goal of the former would be to identify key areas such as financial, emotional, and spiritual support systems, health history, and family view of healthcare providers while the goal of the latter dealt with important issues such as comprehension of determinants of health, burden of disease, available interventions, and challenges to behavioral change. The
students are assessed in various ways including examinations, grading of assignments, and oral presentations. Long-term evaluations are obtained through the use of Objective Structured Clinical Examinations (OSCE) and Clinical Performance Examinations (CPX) in order to see how effectively students incorporate preventive measures and population health skills into patient encounters (Kerkering & Novick, 2008).

Overall, medical schools are adjusting and adapting their curriculum to meet the healthcare challenges of today. Schools are implementing unique strategies that would integrate key public health concepts in order to meet the needs of the population. Further investigation is necessary to develop evaluations and assessments that ensure program goals are being met. Medical schools are moving in the right direction by preparing and producing physicians who can be future leaders and advocate for their community.

Methods

Early Meaningful Clinical Experience (EMCE)

One demonstration of the incorporation of Kolb’s Learning Theory into medical education is the Early Meaningful Clinical Experience (EMCE). EMCE is an elective course designed by the faculty at the Boonshoft School of Medicine, and piloted with a small group of students in 2013-14. One of the driving factors behind the creation of the EMCE is to encourage medical students to think critically and improve problem-solving skills. Incorporating Kolb’s Learning Theory into EMCE can promote active learning through self-reflection and participation in case discussions. The students’ direct involvement in the learning process develops their ability to possess and use analytical skills to conceptualize experiences and to utilize their decision-making skills when presented with cases during their clinical practice, as
suggested by Lisko and O'Dell (2010). EMCE will also boost students’ confidence in working with patients at their clinical sites.

The faculty-derived educational objectives for the course are:

1. Improve medical students’ ability to build a Patient History.
2. Improve medical students’ ability to perform basic Physical Examination skills.
3. Improve medical students’ comprehension of basic science knowledge as it relates to a patient’s condition in the clinical setting.
4. Improve medical students’ comprehension of population health as it relates to a patient’s condition in the clinical setting.
5. Improve medical students’ ability to identify critical information needs as they relate to a patient's condition in the clinical setting.
6. Improve medical students’ ability to use problem-solving and critical thinking skills in a clinical application.
7. Improve medical students’ ability to engage in self-directed learning.
8. Improving medical students’ leadership skills as they relate to an interdisciplinary team.
9. Improve medical students’ communication and teaching skills peer-to-peer.
10. Improve medical students’ communication and teaching skills with patients.

**Early meaningful clinical experience.**

One MS1 (first year medical student) and one MS2 (second year medical student) were paired and assigned to a primary care clinic, to work with a physician preceptor. At these clinics, students encountered a diversity of patients, giving them invaluable "real world" experience. The weekly clinic experience also allowed students to improve history-taking and physical exam
skills they were learning. Students are expected to be at their clinical sites each Friday unless otherwise noted. The experiences gained were shared with other group members, enhancing the overall experience of the pullback sessions.

**Structure of pullback sessions.**

The format in these pullback sessions was a modified version of the Case IQ tutorial method, developed by the Case Western Reserve Medical School. The Case Inquiry Team includes a small, student-centered learning team that uses elaborate patient cases and discussion to learn, retain, synthesize and integrate knowledge. Students prepare for the case discussions, and do most of the talking (Ricanati, 2011).

The EMCE pullback sessions were held approximately once per month, and each session lasted about three hours. Each small group was comprised of six students (three MS1 and MS2), one clinical faculty facilitator, and one population health facilitator. During the pullback sessions, students would discuss what they learned from the patient case presented in the previous pullback, and would also receive a new patient case and formulate their learning objectives for the subsequent session. An online discussion board (Pilot) was used as a place for some students to discuss and share information about the case in between pullback sessions. Students could upload relevant information, provide links to related resources, converse with members of the same group regarding the case study, or reflect on their clinical experiences thus far.

**Student roles during pullback sessions.**

- Leader – officiates the meeting and delegates tasks
- Scribe – takes notes for the group as a whole
Time-keeper – ensures that the group is on track to complete tasks within the time limit

Format of pullback sessions.

1. Check-in (10 Minutes): Gives a chance for students to talk and discuss their personal lives, updating their peers on their status, school, or well-being.

2. Clinical Experience Discussion (20 Minutes): Each group member shared what they have encountered or learned from their clinical experiences.

3. 1st Case Study (approximately 70 Minutes): During this discussion, students shared what they researched with other group members, relative to the learning objectives for the patient case given during the previous pullback session.

4. Break (5 Minutes):

5. 2nd Case Study (approximately 65 Minutes): Group members read the new case aloud while noting key points and formalizing their own learning objectives for the case. The facilitator’s job was to guide the students should they deviate from relevant discussion, and insure the discussion included the development of learning objectives determined by the faculty.

6. Check-out (10 Minutes): Students self-reflected and commented on their own, and each others’ efforts during the pullback session. Constructive critique was encouraged in order to promote a healthy learning environment.

Writing and formalizing the case-studies.

Two meetings were held between each pullback session by the faculty members and one of the MPH students. The goal and intent of the first meeting was to write a draft for the
subsequent case study. The goal of the second meeting was to make final revisions and officially
formalize the case study.

**Case-study topics.**

1. Robert Johnson - Obesity
2. Robert Johnson - Hypertension
3. Bobby Johnson - Asthma
4. James Johnson - Chronic Kidney Disease
5. Rita Johnson - Diabetes
6. Victoria - Polycystic Ovary Syndrome

**Faculty learning objectives for each case.**

1. Define the Disease
2. Pathophysiology of the Disease
3. Typical signs and symptoms
4. Diagnostic Criteria
5. Population Health issues:
   a. Prevalence in population
   b. Burden to health care system
   c. Cost of medication of treatment
6. Risk Factors
   a. Genetic
   b. Environmental
   c. Lifestyle
7. Management of the Disease  
   a. Medication  
   b. Monitoring  
   c. Lifestyle changes  
8. Long- vs. Short-term Consequences  
   a. Effects on patient and society  
   b. Link with management  
9. Prognosis  
   a. End organ effects  
   b. Comorbidity  
10. Prevention & Health Promotion  

**Educational Program Evaluation and Assessment**  

It is necessary to evaluate an educational program in order to ascertain whether the time and resources invested produces the intended results (Cook, 2010). In order to properly evaluate a program, an educator must first determine who is the intended audience and what piece of information or data would be most meaningful and relevant to them (Cook, 2010). Determining what should be evaluated can be challenging, as different stages of a program require different methodologies. A program in its initial stages might require satisfaction and subjective evaluations, whereas a firmly established program might focus more on content and learner knowledge (Cook, 2010). From there evaluations may be used in a variety of ways including evaluating its overall efficacy, determining areas for improvement, and proper resource management (Cook, 2010).
It is important to note that there is a distinction between evaluation and assessment. An evaluation focuses on the program while an assessment focuses on the learners (Cook, 2010). Program evaluations are separated into two categories: formative and summative (Cook, 2010). Formative evaluations can occur at any point in time during the timeline of the program. It is an ongoing process and seeks to identify areas that require improvements as opposed to summative evaluation, which occurs at the end of a program, and whose sole purpose to ascertain whether or not a program works. Although evaluating a program is an arduous task, by researching the current literature and seeking the advice of others, an educator can identify models from which to emulate, determine mistakes to avoid, and employ specific measures that were previously successful (Cook, 2010).

Educators can utilize one of three evaluation paradigms from the following: objective-oriented, process-oriented, and participant-oriented (Cook, 2010). Each of these methods has its own strengths and weaknesses, and it will be up to the educator to determine which one is appropriate. In an objective-oriented approach, objectives are clearly defined in the initial stages and are evaluated at the end to ascertain if they are satisfied (Cook, 2010). The strength of this approach lies in its ability to easily interpret the data, coupled with its simplicity. However, the drawbacks include its inflexible nature and if objectives aren’t carefully selected, then the outcomes may become irrelevant (Cook, 2010).

The process-oriented approach provides the most comprehensive data from start to finish (Cook, 2010). It identifies a need and tracks its implementation and development. The drawbacks to this approach include its complexity, difficulty in interpreting the data, and its intensive use of resources (Cook, 2010).
Finally, the participant-oriented approach determines the perception of the program by the people involved (Cook, 2010). It can capture the complexity of the program with its ongoing data collection and qualitative results, catering to the needs of the participants; however, the drawback of this method is its subjectivity.

Cook (2010) also delineates the proper procedure for evaluating an outcome: first is the selection of the outcome, followed by measurement method, then the proper instrument, and finally to the correct modality. Four classes of program outcomes have been noted including reaction, learning, behaviors, and results; however, it is noted that an educator will have greater success if the outcomes align with the program’s learning objectives and if the sample size for measurement is sufficiently large statistically. Cook (2010) suggests that an educator plans ahead as they are limited to the amount of outcomes that can be measured.

Proposed Assessment and Evaluation of EMCE

Program evaluations and student assessments are important “because we want to know the value of the activity into which we have invested time, energy, and other resources” (Cook, 2010, p. 296). One challenging aspect of integrating population health principles into a medical education curriculum is determining the outcomes to be measured and the appropriate method to collect data. The EMCE pilot program is the first of its kind at the Boonshoft School of Medicine, and as such most of the initial evaluations of the program will be conducted through surveys. Such evaluations can offer critical insight for program refinement and development. The evaluations can guide future decisions by determining effectiveness, optimizing resources, identify areas for improvement, and determining how best to utilize individuals in their respective roles (Cook, 2010). In addition, assessment of the students is beneficial because it enables the educators to determine how well the students are doing (Cook, 2010).
I. Short-term Evaluation & Assessment

A. Survey: Students will be asked to complete both pre- and post-test surveys that will enable educators to measure whether the faculty-derived learning objectives for the program have been met. The survey would assess the students’ own perceived abilities and track this change as they progress through the program. The students would rate their abilities using a Likert Scale from ‘1’ (not confident) to ‘5’ (very confident) (see Appendix A).

B. Reflection: Students will also submit personal reflection essays at the end of the pilot program regarding their experience. Reflections are helpful because they provide feedback, highlight the positive and negative aspects of the program, and offer educators insight on ways to improve.

C. Clinical Experience Questionnaire: A questionnaire will be administered by the faculty to allow students the opportunity to evaluate their clinical experiences. Students rate their overall experience and give suggestions on how to improve this aspect of the program. Vice versa, preceptors at the clinical sites will also be given the chance to take part in this questionnaire. These questionnaires provide the faculty with the necessary feedback to improve both the students’ and the preceptors’ clinical experience and work towards meeting the program’s goals and objectives (see Appendices B and C).

D. Exams: One way to ascertain the comprehension level and whether or not students understand the materials being presented would be objective tests or exams over biomedical and clinical concepts. Educators can assess
knowledge through the use of multiple-choice and essay questions
administered at the end of each case study.

E. Facilitator Assessment: Small group facilitators can evaluate students’
preparation, participation, and performance during the pullback sessions.
This evaluation combined with examination results could be incorporated
into an overall grade for each participant.

F. Peer Assessment: Students should have the opportunity to perform formal
peer assessments in order to critique each member and enhance group
dynamics. This will give students insight on how they can individually
improve and increase overall efficiency and effectiveness of student-led
discussions.

G. Recommendation: Inclusion of student survey published in Hirsh et al.
(2012), “Assessment of Students’ Preparation for Practice” (p. 646). The
survey can assess how well students feel they are prepared to deal with the
multi-faceted issues in clinical practice including patient care, ethical
dilemmas, and decision-making (see Appendix F).

II. Long-term Evaluation & Assessment

Scores from a Control Group

A. Biomedical Science Classes: Educators can also obtain student
examination scores in classes that are directly related to the respective
case studies. The comparison of these scores against those of a control
group would enable educators to see if the program has any effect on
learning, knowledge retention, and class performance.
B. Step 1 & Step 2 Exam Scores: Educators can compare the United States Medical Licensing Examination (USMLE) Step 1 and Step 2 CK & CS (Clinical Knowledge and Clinical Skills) scores between the students who participated in the EMCE versus a control group. Although it would not be indicative of a causal relationship, these scores would potentially offer insight as to the direction the program is taking and whether it has increased the students’ understanding of medical knowledge and increased their clinical skills.

C. Objective Structured Clinical Examination (OSCE): By evaluating Objective Structured Clinical Examinations (OSCE) scores of these participants, educators can determine how students apply clinical skills, population health knowledge, and preventive measures that they have learned.

**Evaluation Implementation**

To successfully evaluate the effectiveness of the Early Meaningful Clinical Experience (EMCE) program, students completed a pre-/post-test survey, clinical evaluation questionnaires, reflection papers on personal experience with the program, and a debrief discussion after the final pullback session.

**Pre-/Post-Test Survey**

The pre-test survey was conducted with an online questionnaire prior to the start of the pilot program. Seventeen participants completed the ten-question survey that reflected the overall educational objectives of the program (see Appendix A).
Items assessed student confidence in their ability to:

- Take a patient’s history
- Perform basic physical exam skills
  - Relate basic science knowledge to a patient’s condition
  - Relate population health knowledge to a patient's condition
  - Identify critical information needs related to a patient's condition
  - Use problem-solving skills
- Engage in self-directed learning
- Exert leadership skills
- Communicate effectively with patients and peers.

The online post-survey used the same ten questions and was completed at the end of the program. The purpose of the pre-/post-test survey was to track changes in students' knowledge and skills over time. Survey responses can also be used to evaluate the impact of the program and its benefit for students.

**Clinical Evaluation**

Students completed a written questionnaire evaluating their experience in their clinical sites (see Appendix B). Students were asked to evaluate both their preceptor and the impact of the clinical experience. The goal of the questionnaire was to provide faculty with feedback on clinical experience for students and preceptors, to evaluate the impact of the EMCE program, and to get insight into areas of the program that require improvement.

**Reflection Paper**

Students were also asked to personally reflect on their overall experience at the end of the program. This was an excellent mechanism used to obtain useful information and feedback on
their experience with the EMCE program. Students were asked to indicate positive aspects of their experience, both in clinic and in pullback sessions, and to suggest further ideas for improvement, if necessary. Students were also given the opportunity to give other comments on their experience. We analyzed student reflection papers and identified common themes from their experiences and also unique ideas from individuals.

Debrief Discussion

In order to provide faculty, facilitators and students an opportunity to reflect on the Early Meaningful Clinical Experience (EMCE) and to identify what was learned and achieved, a debrief discussion was held following completion of the project. The discussion was for one hour and the entire team fully participated and gave direct feedback about how they felt the experience went. Students gave a detailed description of their personal experiences during the pullback sessions and of their clinical sites. They also mentioned what was accomplished, what needs were met or unmet.

Results

Pre-/Post-Test Surveys

Seventeen students completed both the pre-and post-test survey. Responses were anonymous, so matching was impossible, as was differentiation of responses from MS1 and MS2 students. The sample size (n=18) was too small to test for statistical significant differences. Students indicated their confidence in the ability to perform skills that reflected faculty-desired educational objectives based on a Likert scale from ‘1’ (Not at all confident) to ‘5’ (Very confident).

Individual responses were grouped into the following categories for analysis:

• Responses #1 and #2: Not confident
Question #1. How confident do you feel about performing basic physical exam skills?

In the pre-test survey, 35% of students reported lack of confidence in their ability to perform basic physical exam skills, 29% was neutral and 35% of students reported feeling confident in performing basic physical exam skills. After completion of the program, none (0%) reported a lack of confidence, 41% were neutral and 35% of students reported feeling confident about performing basic physical exam skills; 6% changed from not confident to neutral (see Figure 1).

![Figure 1. Confidence level of medical students’ ability to perform basic physical exam skills.](image)

Question #2. How confident do you feel in your ability to take a patient’s history?

In the pre-test survey, none of the students (0%) reported a lack of confidence in the ability to take a patient’s history, 12% reported being neutral, and 88% were confident. The proportion of students who reported being confident in their ability to take a patient’s history
increased from 88% to 100%, indicating a 12% increase in confidence after the EMCE program (see Figure 2).

**Figure 2.** Confidence level of medical students’ ability to take a patient’s history.

Question #3. How confident are you in your ability to integrate basic science knowledge as it relates to a patient’s condition in the clinical setting?

In the pre-test survey, almost half of the students, (41%) reported not being confident in their ability to integrate basic science knowledge as it relates to a patient condition in a clinical setting, while 17% reported being able to do so. The remaining percentages of students, (41%) were neutral as to whether they had confidence in their ability or not. By the end of the program, no student reported lack of confidence, and those who were neutral increased from 41% to 47%. The largest gain was in the percentage of students indicating confidence, increasing from 17% in the pre-test survey to 52% in the post-test survey (see Figure 3).
Question #4. How confident are you in your understanding of population health as it relates to a patient’s condition in the clinical setting?

In the pre-test survey, 17% of students reported not being confident in their understanding of the relation between population health and a patient’s condition, 52% were neutral and 29% were confident. In the post-test survey, none of the students lacked confidence, neutral responses decreased to 29% and confidence in students’ understanding of how population health relates to a patient condition in a clinical setting increased from 29% to 64% (see Figure 4).
Question #5. How confident are you in your ability to identify critical information needs as it relates to a patient’s condition in the clinical setting?

Before EMCE, 35% of students said they were not confident in their ability to identify information critical to a patient in a clinical setting, 52% were neutral and only 11% were confident. By the end of the program, 11% reported being neutral and 88% reported increased confidence in their ability to identify critical information as it relates to a patient’s clinical condition (see Figure 5).
Question #6. How confident are you in your ability to use problem-solving and critical thinking skills in a clinical application?

In the pre-test survey, 11% of the students did not feel confident in using problem-solving and critical thinking skills in the clinic, 52% were neutral, and 35% felt confident in using such skills in a clinical setting. By the end of the program, none of the students lacked confidence. Seventeen percent were neutral and the percentage of students who had confidence in their problem-solving and critical thinking skills to address issues in a clinical setting increased from 35% to 82% (see Figure 6).

*Figure 5. Confidence level of medical students’ ability to identify critical information needs as it relates to a patient’s condition.*
Figure 6. Confidence level of medical students’ ability to use problem-solving and critical thinking skills in a clinical application.

Question #7. How confident are you in your ability to engage in self-directed learning?

In the pre-test survey, none of the students reported a lack of confidence in the ability to engage in self-directed learning, 35% were neutral and 58% felt confident. In the post-test survey, neutrality decreased to 5% and 88% of students reported being confident in their ability to engage in self-directed learning (see Figure 7).
Figure 7. Confidence level of medical students’ ability to engage in self-directed learning.

**Question #8.** How confident are you in your leadership skills as it relates to an interdisciplinary team?

Before the program, only 5% of students reported a lack of confidence in possessing leadership skills as it relates to an interdisciplinary team, 35% were neutral and 58% were confident. By the end of the program, none of them lacked confidence, 5% were neutral and students who said they were confident in their leadership skills as it relates to an interdisciplinary team increased from 58% to 88% (see Figure 8).
Question #9. How confident are you with your communication and teaching skills peer to peer?

In the pre-test survey, 5% of students felt they were not confident in communicating and teaching their peers, 17% were neutral, while 76% were confident in that ability. In the post-test survey, none of the students lacked confidence, those who were neutral remained at 17% and there was an increase from 76% to 82% in the number of students who acquired confidence in the ability to teach and communicate with their peers (see Figure 9).
Figure 9. Confidence level of medical students’ ability in communication and teaching skills peer to peer.

Question #10. How confident are you with your communication and teaching skills with a patient?

Before EMCE, 5% of students reported a lack of confidence in the ability to teach and communicate with a patient, 58% were neutral and 29% said they were confident. By the end of the program, none of the students lacked confidence or were neutral. All students (100%) reported that they were able to effectively teach and communicate with a patient within a clinical setting (see Figure 10).
Figure 10. Confidence level of medical students’ ability in communication and teaching skills with a patient.

Clinical Evaluation

Students reported that this aspect of the EMCE program allowed for the acquisition of hands-on clinical experience in a low risk educational setting that made them better prepared for clinical rotation in the coming year. Students were exposed to a wide variety of patients and had the opportunity to learn, improve and reflect on that exposure. This enabled students to easily interact with patients. The experience allowed students to see the high prevalence of medical conditions such as diabetes and back pain. They appreciated having the opportunity to get in the clinic and experience how a primary care office is run. Students gained a whole new perspective on family medicine that they had no knowledge of previously. Students felt they learned skills at a much deeper and effective level than they would have learned by traditional ICM, and advocated that EMCE should continue in the future in order for other medical students to benefit from the experience.
Themes from Reflection Papers

Students were asked to reflect on the single most valuable aspect of the clinic experience, the pullback session experience and to describe how participation in EMCE impacted their learning in Medical School. Students reported the following:

1. What was the single most valuable aspect of the clinic experience?
   - Improved interviewing and physical examination skills
   - Enabled patient interaction
   - Exposure to Family Medicine and primary care
   - Served as a weekly reminder as to why they came to medical school
   - Learned how to properly present a patient case

2. What was the single most valuable aspect of the pullback experience?
   - Ability to synthesize the basic sciences into the story of a patient case
   - The group interaction
   - Was a motivation to learn and do research independently
   - Learned extra information about the health conditions discussed
   - Mixture of the MS1 and MS2 students during the sessions added a variety of information and interpretation to the discussions

3. Describe how participation in EMCE has impacted your learning in medical school.
   - Increased my ability to engage in self-directed learning
   - Increased my ability to interview patients and perform physical examinations
   - Introduced me to case-based learning
   - Group setting made me appreciate active learning
Debrief discussion.

Both MS1 and MS2 students reported that they enjoyed the experience and appreciated working with each other. Students reported that they got a lot of access to patients, but not a lot of precepting. When asked about expanding the process to include the entire class, a majority of students supported the expansion of the program because not only will the experience benefit other students academically, but it will also promote the inclusion of many more students with totally different personalities into the process. Students suggested that in the future, facilitators of the process would have to be at the pullback sessions at the beginning to help train and keep students on track to prevent deviations from the discussion.

Discussion

The goal of this project was to propose a plan to assess medical students and evaluate the Early Meaningful Clinical Experience (EMCE) pilot program at the Boonshoft School of Medicine at Wright State University. This program was comprised of a combination of case-based discussions and hands-on clinical experiences. Students were assessed according to faculty-derived educational objectives (see Appendix A) and the program was evaluated based on its impact on students’ increase in confidence and ability to incorporate population health, as well as other foundational concepts, into medicine.

Faculty paired one MS1 and one MS2 student and assigned them to a weekly experience at a primary care clinic, to work with a physician preceptor. The weekly clinic experience was an opportunity for students to improve history-taking and physical examination skills, as well as increase exposure to patients and practicing physicians. The EMCE pullback sessions were held
approximately once per month, and each session lasted about three hours. During the pullback sessions, students would discuss what they learned from the patient case presented in the previous pullback, and would also receive a new patient case and formulate their learning objectives for the subsequent session. The cases discussed during the pullback sessions were on Obesity, Hypertension, Asthma, Chronic Kidney Disease, Diabetes, and Polycystic Ovary Syndrome.

Program evaluation results indicate that students benefited immensely from the EMCE program. Students demonstrated a substantial increase in confidence in their ability to identify critical information needs as it relates to a patient condition in a clinical setting after participation in the program. Students’ confidence also increased in each of the other educational objectives: the ability to take a patient’s history, integrate basic science knowledge in relation to a patient condition, understand how population health relates to a patient’s condition, use problem-solving and critical thinking skills, leadership skills and communicating effectively with peers and patients. More than half of the students (58%) were confident in their ability to engage in self-directed learning before EMCE, and 88% of students reported confidence by the end of the program. In regards to performing basic physical examination on patients, students did not report a significant increase in confidence in the ability to do so after the program, though some students changed from not being confident to neutral after the program.

Students were asked to report on the most valuable aspects of the clinical experience derived from the EMCE program. Some students reported that time spent in the clinics was the most valuable. Students felt a tremendous improvement in the ability to effectively interview patients and utilize physical examinations skills, based on the patient’s complaints. These patients, students said, were every-day, ordinary individuals whom they would expect to see
when actually practicing medicine in the future. Students reported that the multiple and continual exposure to real patients gave them the ability to experience a variety of patients with different health conditions. Interaction with patients helped them focus on doing things right and increased their confidence in the ability to perform a better patient exam. One student mentioned the satisfaction felt by becoming more comfortable entering a patient’s room, having conversations and establishing relationships with them. Another valuable aspect of the clinical experience for some students was getting to see the doctor-patient relationship in a setting where there is continuity of care. This experience enabled students to learn how to properly present a patient case, and students reported that they learned from the way their preceptors approached difficult conversations with patients, from motivational interviewing to unplanned pregnancies.

Another important aspect of EMCE was that it presented an exposure to the practice of family medicine. Students reported becoming more familiar with how the doctors and nurses worked together with patients, how doctors communicated with pharmacies to work out prescriptions, and how doctors worked with insurance companies to make sure their patients were well taken care of. Being in the clinic every week reminded students of why they chose to be in medical school. Additionally, it gave some MS2 students an idea of what their third year of medical school would be like. As a result, they felt slightly more prepared and less nervous for third year to commence.

Students were asked to report on the most valuable aspects of the pullback experience derived from the EMCE program. Experiencing learning in the pullback format, as opposed to TBL format or lecture format, was reportedly enjoyable. Creating their own objectives, researching them, and discussing with peers were more rewarding experiences than the average lecture or TBL. Students thought it was crucial that, as future physicians, they begin to
experience non-lecture-based methods of learning, as this would be of benefit for the rest of their medical careers. The ability to synthesize the basic sciences into the story of a patient case was valuable.

The pullback sessions were seen as a great time to connect clinical science with the basic sciences, creating a synergy between the MS1 students and MS2 students. Some students reported that the group interaction was valuable, and they learned tremendously more from the pullback format than they did from lecture. Students enjoyed listening to different ideas from each other and figuring things out as a group, and used this as a mechanism to practice collaborating with members as a team to share information. EMCE provided students with the opportunity to appreciate active learning. Students said they learned and remembered much more in a group setting. They appreciated the way the group researched every learning objective for the cases and how group leaders called on every member to explain different ideas. This ensured that every member actually participated in researching the patient cases. Group members were always ready to help with explanations if a member needed clarification on any aspect of the discussion. Students reported that they felt that in a future group setting, they would be prepared to discuss patients with their medical team in an interactive and constructive manner. The pullback sessions made studying for the topics remarkably easy because students felt they had a solid understanding of the topic area before studying the subject in class. One student discovered that in his/her preparation for the USLME Step 1 examination, he/she had a surprisingly good recollection of the cases that were discussed during the pullback sessions. The process of research, followed by the lively discussions during the pullbacks, created memorable moments, which in turn helped the student to remember a surprising amount of each detail about each disease.
The dynamic between the MS1 students and MS2 students was reported to be phenomenal. The group dynamic added variety of information and interpretation to the discussion. Students appreciated the in-depth knowledge of basic biochemical pathways and histology from the MS1s’ as well as unique studies and insights they found, and said it would have been a poorer experience without the inclusion of the MS1 students.

There was variability in response regarding how much was learned however; some students reported not learning as much about the diseases during the pullback sessions, while other students felt they learned extra information about the health issues discussed in the pullback sessions. A final valuable aspect of the pullback sessions was how students were motivated to find and learn from their own resources. The pullbacks taught students how to critically evaluate resources, such as determining what was most important and learning how to resolve conflicting sources of literature on a topic. Students realized how important, challenging and fun researching information on their own could be and would be throughout the future as a medical student and practicing physician.

Participation in the Early Meaningful Clinical Experience program (EMCE) impacted students’ learning in medical school in a variety of ways. Students reported that EMCE was one of the best learning experiences they have had in medical school so far. Students identified that they learned much better through self-directed learning and that EMCE gave them more confidence and a foundation necessary to successfully and efficiently participate in self-directed learning. Students felt enthusiastic about utilizing such skills as they move forward in medical school and in their medical profession.
The experience increased student’s confidence in the ability to interview a patient. Some students believed they would not have the interviewing skills they have now, had they not participated in the clinical portion of the EMCE program.

Students felt strongly that the program set them above other students in medical school because of the additional learning, pullback sessions and clinical experiences provided. One student said the program helped him/her mature as an aspiring physician, opened their eyes to how medicine is really practiced, and was a great reminder as to why he/she was in medical school.

EMCE introduced students to case-based learning. Within that experience, students explored various ways to approach group learning, and testing those different methods was extremely insightful. The program was beneficial and motivated students to think with a much more clinical mindset.

Although this was a rewarding experience, some students reported that the process was quite time consuming and appeared to take away study time that could have been used to improve scores in their real classes. Another student reported that the downside of the experience was that he/she felt behind on regular ICM activities in which they still had to participate. Nevertheless, all students reported that the opportunity to practice clinical skills at an actual office, the pullback sessions, and learning as a team was a great experience.

Some students reported that they would have appreciated being taught more physical examination skills from their preceptors. There appeared to be some variation between preceptors, and so students’ clinical learning varied widely. Nevertheless, students felt that the program was of immense benefit and said it would be worth expanding to the next year, because
it was a unique learning experience. Students reported being enthusiastic about the future of medical education and were thrilled to be a small part of shaping the process.

**Recommendations**

The following recommendations are suggested:

1. Expand the EMCE program over the next year and in the future to benefit other medical students.

2. Retain the case-based learning format during the pullback sessions. The format gave students the opportunity to think critically, solve problems, evaluate solutions and make decisions that promoted active learning.

3. Include patient cases on mental health in pullback sessions in the future.

4. Maximize preceptorship to students. Some students reported experiencing a limited access to their preceptors in the clinic. Students would like to learn more from preceptors.

5. Program should be structured in a manner that would help students in EMCE reduce the burden/workload experienced by balancing EMCE requirements with ICM activities and regular coursework.

6. Physical examination skills were the weakest aspect of the program. In the future, students should have more opportunities to practice with more patients at the clinic to improve physical examination skills.

7. Preceptors should enforce stricter guidelines because students reported that there were variations between preceptors that caused clinical learning to vary widely among students.
8. Facilitators should help train students before pullback sessions to prevent deviations from case discussions and desired learning objectives.

Limitations

The greatest limitation of the project and the proposed assessment and evaluation plan is the small sample size of student participants. A total of 18 students (nine MS1 and nine MS2) participated in the EMCE pilot program. In addition, the students were selected from a group of highly motivated individuals, which may not be an accurate representation of the student body at other medical schools. Finally, potential confounding factors exist which make it impossible to assume a causal relationship between EMCE participation and student score results.

Conclusion

The health care delivery system is constantly confronted with rapid changes in knowledge and research. In order to equip physicians to adequately prepare for challenges, it is necessary to incorporate core population health competencies into medical education. It is important to train physicians and medical students based on a workforce that focuses on improving individual health and community health using a population-based approach.

The purpose of this study was to propose a plan to evaluate the Early Meaningful Clinical Experience (EMCE) program at the Boonshoft School of Medicine at Wright State University, to integrate population health competencies into medical education. Further goals of the program included the desire to motivate students to think critically, improve problem-solving skills and gain confidence in working with patients at the clinical sites. The Kolb’s learning theory was incorporated into the program to promote active learning through self-reflection and participation in case discussions. EMCE was comprised of clinical experiences coupled with case-based education which emphasized patient interaction, self-directed learning, critical thinking and
problem-based learning. Students were evaluated based on faculty-derived educational objectives, using a pre/post survey, reflection essays and a clinical questionnaire. The EMCE program was very successful in integrating population health competencies into medical education. Students’ direct involvement in the learning process made EMCE a fulfilling experience and helped students appreciate patient interaction, acquire interviewing skills, learn basic physical examination skills, communicate with patients and peers effectively and understand the relationship of population health to a patient’s condition in a clinical setting. In the future, the Early Meaningful Clinical Experience (EMCE) program should be expanded to continuously benefit medical students, improve medical education and positively impact health care delivery. The appreciation of population health concepts in medical school education would ensure that clinicians provide quality care to individuals and the community.
References


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Appendix A

EMCE Pre- and Post-Test Survey

Please rate on a scale of 1 (Not at all confident) to 5 (Very confident) how much confidence you feel in your ability to do the following things:

1. How confident do you feel in your ability to take a patient's History?
2. How confident do you feel about performing basic Physical Exam skills?
3. How confident are you in your ability to integrate basic science knowledge as it relates to a patient's condition in the clinical setting?
4. How confident are you in your understanding of population health as it relates to a patient's condition in the clinical setting?
5. How confident are you in your ability to identify critical information needs as it relates to a patient's condition in the clinical setting?
6. How confident are you in your ability to use problem-solving and critical thinking skills in a clinical application?
7. How confident are you in your ability to engage in self-directed learning?
8. How confident are you in your leadership skills as it relates to an interdisciplinary team?
9. How confident are you with your communication and teaching skills peer to peer?
10. How confident are you with your communication and teaching skills with a patient?
Appendix B

FMD 616 – EARLY MEANINGFUL CLINICAL EXPERIENCE

PRECEPTOR EVALUATION OF STUDENT PERFORMANCE

STUDENT NAME: ________________________________

PRECEPTOR NAME: ________________________________

DIRECTIONS: Please use the following scale to evaluate the performance of the student participating in the Early Meaningful Clinical Experience (EMCE). Consider carefully the experience level of the student in your evaluation. Place responses on the blank lines.

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<tr>
<td>Excellent</td>
<td>Above Average</td>
<td>Average</td>
<td>Below Average</td>
<td>Poor</td>
<td>Not Observed</td>
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1. Ability to obtain accurate subjective information (history) from patient. _______
2. Ability to perform elements of the physical examination. _______
3. Ability to organize data and communicate information effectively. _______
4. Basic and clinical knowledge _______
5. Relationships with patients and their family members. _______
6. Relationships with medical and allied health professionals. _______
7. Reliability (including attendance). _______
8. Interest and attitude toward learning. _______
9. Initiative. _______
10. Professional demeanor. _______
11. Understanding of Primary Care and Primary Care Physician roles and responsibilities. _______
12. Overall progress or improvement during preceptorship.

13. Overall competence.

14. Please indicate what you feel is (are) the student's greatest asset(s).

15. Please indicate the area(s) which you feel the student needs to develop.

15. Taking the previous information into consideration, please evaluate the student's overall performance using the scale below. (Circle rating).

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<tr>
<th>Rating</th>
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<tr>
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<td>Above Average</td>
</tr>
<tr>
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<td>Average</td>
</tr>
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<td>Poor</td>
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Comments:

Preceptor’s Signature ___________________________ Date ___________________________
Appendix C

FMD 616 – EARLY MEANINGFUL CLINICAL EXPERIENCE

STUDENT EVALUATION OF PRECEPTOR

STUDENT NAME:  _____________________________________
PRECEPTOR NAME:  _____________________________________

DIRECTIONS: Please use the following scale to evaluate items 1 – 11 below. Place your response on the blank line.

5  4  3  2  1
Strongly Agree        Agree        Neutral       Disagree   Strongly Disagree

My Preceptor:
1. Initially discussed their expectations of me in the office.  _____

2. Solicited my own expectations for the experience.  _____

3. Initially discussed my background and experience with me.  _____

4. Exhibited supportive behavior.  _____

5. Encouraged interaction with other medical/allied health professionals  _____

6. Allowed for me to have responsibility in managing patients and procedures, consistent with my level of experience.  _____

7. Encouraged independent thinking.  _____

8. Determined, in conjunction with me, areas of strength and weakness.  _____

9. Exhibited enthusiasm for teaching.  _____

10. Shared her/his philosophy of primary care with me.  _____

11. Using the scale below, please rate the overall performance of your Preceptor. Place your response on the blank line.  _____

5  4  3  2  1
Excellent    Above Average     Average        Below Average       Poor
DIRECTIONS: Please use the following scale to evaluate items 13-26 below. Place your response on the blank line.

5  4  3  2  1
Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

This selective:

12. Increased my knowledge of Primary Care
   _____

13. Gave me the opportunity to practice history and physical examination skills.
   _____

14. Allowed me to observe the Primary Care physician’s roles and responsibilities as health care provider and community leader.
   _____

15. Provided exposure to the community and community health/medicine.
   _____

16. Allowed me to understand the physician’s office organization and problem solving.
   _____

   _____

18. Enabled correlation of academic experience with practice.
   _____

19. Allowed me to interact closely with individual physicians and other health care personnel.
   _____

20. Allowed me to strengthen areas of weakness.
    _____

21. Allowed a change of pace and style of learning for me.
    _____

22. Had appropriate teaching-learning formats.
    _____

23. Was well organized.
    _____

24. Was relevant to my academic/professional interests.
    _____

25. Gave me the opportunity to see how social determinants affect the health of individuals.

26. Gave me the opportunity to see how disparities affect the health of individuals
27. Using the scale below, please rate this selective overall. Place your response on the blank line. 

<table>
<thead>
<tr>
<th>5</th>
<th>4</th>
<th>3</th>
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<th>1</th>
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</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>Above Average</td>
<td>Average</td>
<td>Below Average</td>
<td>Poor</td>
</tr>
</tbody>
</table>

28. Should this selective be offered again? (Please check Yes/No below.)

YES_____    NO_____

29. What were POSITIVE aspects of this selective?

30. How might we improve this selective?

31. Please list three (3) things about your preceptor that you think other students should know before participating in a preceptorship with her/him.

1. ____________________________________________________________________________

   ____________________________________________________________________________

   ____________________________________________________________________________

2. ____________________________________________________________________________

   ____________________________________________________________________________

   ____________________________________________________________________________

3. ____________________________________________________________________________

   ____________________________________________________________________________

   ____________________________________________________________________________

Other Comments:
Appendix D

EMCE Pullback #1 November 1, 2013
Robert Johnson – Obesity

Robert Johnson is a 48 year-old male who presents to your office for a general checkup “because my wife made the appointment for me”. He is mildly concerned about his weight. He notes he was reading a newspaper article about obesity “and the numbers they used in the example were my exact height and weight. I know I’m heavier than I should be but I never considered myself to be ‘obese’. I just can’t seem to get below 200 pounds.”

Mr. Johnson expresses frustration with his weight, specifically with the fact that his twin brother is thin and “it seems to be easy for him. All he does is walk with his wife after dinner. I’m active at my job all day and I try to walk in the evening with my wife, but we’re only able to do it once a week generally because we are both so busy with work and the kids’ activities.” Mr. Johnson notes that he was in good shape as a child, and “I even had to bulk up to play football in high school and college.”

Mr. Johnson’s social history reveals that he lives with his wife and their 2 children, Laura (age 14) and Bobby (age 8). He is manager of a large warehouse and says he is “on my feet all day”. His leisure time is spent helping coach Bobby’s soccer team.

Being an astute history builder, you obtain the following dietary history:

- Breakfast – coffee, maybe a muffin. “I try not to eat too much in the morning.”
- Lunch – “I pack a sandwich two or three times a week” (usually deli turkey and cheese on white bread with a small bag of chips). The other days “I grab something with the guys from work” (typically a sub or other sandwich combo
- Dinner – whatever his wife fixes or plans. Always a meat (chicken, beef stew, “I grill a lot”). Not a salad fan except for potato salad. Refried beans and corn are his favorite vegetables. Dessert is usually something from the freezer – ice cream is the favorite.
- Eating out – about once a week for dinner usually as a family – Chipotle, pizza (deep dish preferred), Italian
- Alcohol – “a few” beers a week. Maybe “a couple” when watching football on weekends, and maybe “a couple” with the other coaches if the soccer team goes out together for pizza
- Other drinks – “I really like Mountain Dew, but try to limit to a couple a day. I like Powerades or Gatorade”

He does take a Centrum for Men multivitamin daily (wife’s idea).

He is 5’10” and 215# today. His blood pressure is 138/88. You complete a thorough physical exam and find nothing abnormal except mild truncal obesity.
Robert Johnson presents for a follow up appointment to discuss his weight. He tells the nurse he is also concerned about his blood pressure.

Ht 70 in  Wt 212 lbs  BP 150/94 L arm sitting  HR 90

Robert checked his blood pressure at Walmart and by the chart on the machine it was high. He can’t remember the exact number but it was over 150. His wife was worried so she encouraged him to get it checked by the occupational health nurse at work. He did and shows you his card.

Day 1  160/92  415 pm
Day 2  148/90  11 am
Day 3  150/94  4 pm
Day 4  156/94  430 pm
Day 5  146/92  1130 am

You bring up his 3 lb wt loss since last visit and he states “I am trying.” He reports he has switched to diet Mt. Dew but still gets one Gatorade or Powerade daily for the nutrients. He still is not much of a breakfast eater, gets his morning coffee and an occasional granola bar if his wife gives it to him as he runs out the door. Lunch hasn’t changed too much; he has gone down to the small combo from the large one. Dinner is the about the same. Still eating out once a week. He and his wife have both decided to try to skip dessert and not eat after 8 pm. She heard that was a good plan in the past from Oprah. He admits that he has not changed his activity level but hopes to now that soccer season are over.

For the next 2 paragraphs we want to ask the students first what they would ask, like the “approach to the pt with . . .” cases in ICM 2. Then provide a separate sheet with the answers. For this week, we as facilitators will step in and lead this section to model for the students what will come in future cases.

What specific questions regarding the patient’s social and family history would you like to ask as they relate to a patient with obesity and hypertension?
Robert Johnson – Hypertension

SHx: Robert stated smoking in college but only socially and during the football off season. Once he graduated he got married and his wife smoked so he picked up the habit at 1 ppd. They were married six years before they divorced. He entered his second marriage four years later and then quit smoking at the insistence of his new wife. (TOTAL = 1 ppd x 10 yrs). He still occasionally sneaks one at work “when he is stressed”. His ETOH use is unchanged at a few beers per week. Denies drug use. Things at work are stressful. With the economy everyone has to do more with less. He lost two positions that management did not replace. There are rumors about big changes in his company health insurance. (Less coverage higher cost).

FHx: Father age 71, had MI at 55, HTN “for as long as I remember”
   Mother age 69, overweight
   Brother age 48, twin, healthy
   Daughter age 25, healthy (just got married)
   Daughter 14, healthy
   Son age 8, he has asthma sometimes uses his inhaler

PE: HEENT: TMs clear with good visualization of bony landmarks; throat pink mucosa, some clear drainage in the posterior pharynx; mouth free of lesions, membranes moist and pink; PERRLA, EOMI, funduscopic exam reveals minimal AV nicking
   Neck: thick and hard to examine thyroid
   Cardio: RRR s MRG
   Lungs: diminished air exchange but CTA
   Abd: striae noted, protuberant (beer gut), abd aorta palpated at 6-7 cm
   Ext: no CCE
   Neuro: DTRs +1 in LE
   Skin: few ocular xanthomas

Labs in the office: The patient has an EKG and urine dipstick done in the office. The EKG is entirely normal. Urine dip shows a SG of 1.015 with negative protein, glucose, leukocytes, nitrite, and urobilinogen.

How would you end this encounter?
Additional information (in response to the above): “So it looks like I have high blood pressure like my dad. Does this mean I need to take blood pressure medication?”

What preventive services does this patient need?
**Bobby Johnson-Asthma**

Bobby Johnson is an 8 year old boy (the son of Robert Johnson, our previous patient) who presents for follow-up of his asthma. His asthma was diagnosed at age 5 and has been stable since that time on just a ProAir inhaler when he needs it. He is here with his mother, Maria. He needs a refill on his asthma inhaler.

Maria reports that he has been having more problems with indoor soccer this year. She thinks his symptoms started getting worse this fall. He is using his inhaler before soccer but wants to use it in the car where his friends can’t see. (Even then, he uses it quickly and puts it away before anyone has a chance to see him). She has to give the inhaler about two other times during the week as well. She also has heard him coughing at night. It has never been bad enough to go to ER, and has always responded well to the inhaler.

Mom is worried because Bobby’s best friend Jawon also has asthma and has been admitted to Children’s twice since school started. Since Bobby’s asthma seems to be getting worse, she wants to know if this is what is in store for him?

SHx: His mother states that he is not exposed to any direct cigarette smoke. Bobby likes to play video games and trade Pokemon cards. He is a good eater and sleeps well. The family has an indoor dog, Scoobie.

FHX: No one with asthma.

PE:  Ht 50 inches  Wt 60 #  BP 108/58  P 78  T 37.2
     • general – healthy 8 year old
     • HEENT – Nasal mucosa pale, no lesions or rhinorrhea; TMs clear with bony landmarks visible; throat pink, tonsils not enlarged, no discharge or exudate
     • Lungs CTA with no wheezes or crackles
     • Heart – RRR without murmurs
     • Ext without cyanosis or clubbi
Peak flows are done in your office. On three attempts, he “blows” 200 (L/min), 220, and 220.

Maria is concerned that “his inhaler just isn’t holding him like it used to. Is there something else you can give him?” She also notes that their insurance just changed to an HSA with a high deductible, and they have to pay out of pocket for medications. She would like “something that is going to work and not be expensive”.

**How would you end this encounter?**

**What preventive services does this patient need?**
James Johnson is a 71 year old man who comes to see you because his Medicare HMO changed and prior PCP doesn’t take his new one. His son, Robert, is one of your patients and recommended that his father see you. James’ prior PCP diagnosed him with kidney problems in late November and told him to come in for follow up to discuss his labs. He couldn’t get an appointment before the holiday so now is here to see you. He states, “My doctor said I had early signs of kidney failure. I’ve tried to take good care of myself since my heart attack. I don’t understand how this happened.”

He shows you the labs he brought with him (done in September). Along with normal electrolytes and liver function tests, a fasting glucose of 86 and cholesterol of 184 (LDL 92; HDL 44), he has a creatinine of 1.7, and a BUN of 38.

HX
PMH: He has “had high blood pressure for so long I don’t even remember when it started”, and had a heart attack at age 55
 SHx: James is a retired welder. He enlisted in the Army at age18 and served for 8 yrs including a tour in Vietnam. After discharge, he got a job with GM and continued to work as a welder until he retired at age 66. He has been married to Rita for 51 years and has two sons. He started smoking in Army boot camp (max of 2 ppd), and quit after his MI. He denies any tobacco consumption since then. He denies past or present drug use. He drinks a glass or two of red wine with supper because he’s read it’s “good for my heart”.
 FHx: His father died from an MI in his 50’s. His mother died from Alzheimer’s disease in her 80’s.

DIET: He drinks “high octane” coffee in the morning, but his wife has him drinking decaf tea the rest of the day. He avoids drinking a lot of water because he doesn’t like to go to the restroom when he’s out, “you know, with the water pill my doctor gave me and my prostate”. A typical breakfast is Cheerios and maybe a banana or glass of orange juice if he is still hungry. Lunch is usually a ham or turkey sandwich (no cheese because his wife says the fat is bad for him), lettuce and tomato, on wheat bread. He might have an apple with lunch, if his wife gives it to him. Supper is usually grilled chicken, some type of cooked vegetables, and maybe rice. His wife “really tries to cook healthy since my heart attack.” He loves ice cream, but his wife doesn’t keep it in the house.

EXERCISE: He tries to walk with his wife during the day, maybe ½ to 1 mile. He stays busy around the house doing yard work and he always has a pretty long “Honey-Do” list. He enjoys spending time working on restoring his old car, a 1965 Mustang, and “that’s pretty strenuous at times.”
His medications are:
Lisinopril/HCTZ 20/12.5 mg 2 po qd
Atorvastatin 20 mg po qhs
Metoprolol 25 mg po bid
EC Aspirin 81 mg po qd
Aleve as needed for knee pain (1-2 tabs about twice a week on average)
A daily multivitamin most days (when he remembers it)

PE
HT 5-9, WT 170, BP 130/86, HR 60, T 97.3
Gen- In NAD, talkative, dressed for the weather
Eyes-early cataracts, PERRL
Ears-TM’s clear, couldn’t hear finger rub bilateral at 1 ft away
Nose-clear
Throat-clear
Neck-supple, thyroid without enlargement or mass, no LAD, no JVD
Lungs-diminished breath sounds in the bases otherwise CTA
CV-bradycardic, regular rhythm, no MRG
Abd-soft, NT, ND, no HSM, no bruits
Ext-no clubbing or cyanosis, trace edema of the feet, absent DP pulses,
Skin-purplish discolorations on lower legs above the ankles bilateral, no hair growth on lower
legs and feet
Neuro-DTRs +1 in patellar and Achilles bilateral, MS 5/5 symmetric in UE and LE

After completing your history and physical exam, you ask the patient what concerns he has. His
response is that he had a good friend from work who had to start dialysis last month, and “I don’t
want to have to go through that.”

How would you close this encounter?

What preventive services does this patient need?
Rita Johnson is the 69 year old wife of James. You are seeing Rita as a new patient. Since you’re following James for his kidney problem, she came to see you. Two weeks ago she was diagnosed with a UTI at urgent care. While there they found sugar in her urine. They stuck her finger and her sugar was 240. They told her she was diabetic and gave her a prescription for Januvia. She didn’t fill it because it was $300 at Walmart (for a month’s worth). She was also given an antibiotic for her UTI. Those symptoms are gone. She asks you “Am I really diabetic? I volunteer at the Senior Center and drive people to their medical appointments. It seems like everyone I know has diabetes.”

Rita’s been more tired over the past month, taking an afternoon nap which she’s never really done much before. She has noticed some blurry vision which seems to come and go, but she hasn’t had time to go see the eye doctor yet to check her prescription. Rita has otherwise been “the picture of health”. She is really concerned about the blurry vision in the context of being told she is diabetic, since her mother went blind because of her “sugar”.

Her family history is significant only for the diabetes (and blindness) in her mother, who ultimately died from a stroke at 75. Rita smoked for a brief time and stopped when she got pregnant with the twins. Rita worked as a secretary for the car dealership in town until James retired. She has been married to James for 51 years. Her current medications are a daily women’s multivitamin and a calcium tablet with vitamin D.

**Physical exam**
5’3” 165 lb BP 118/76 HR 72 T 97.8
Gen: NAD
HEENT: TMs clear, throat clear
Neck: supple, no LAD, thyroid nontender
Lungs: CTA
CV: RRR s MRG
Ext: no edema, monofilament exam showed 3/10 on Lt, 4/10 on Rt
Neuro: 1/4 B Achilles reflexes
You tell Rita that you need to do some additional testing, and then conclude with “What other questions can I answer for you today?” She responds that she and James live on a fixed income and she is very worried about the cost of this disease. She asks if she has to buy a monitor to check her sugar like her friends. She is also concerned that her friends can’t eat some of the things she does, and is concerned that changing her diet would be expensive as well.

James, who accompanied her to this visit, says “I have a couple of questions too, doc. Is she going to need to go on insulin? Her mom hated giving herself insulin shots. And speaking of her mom, what are the chances she’ll go blind like her mom did?” Rita chimes in, “And some of the senior center folks are on dialysis from their diabetes. Do I need to worry about that?”

What preventive services does this patient need?
As you are in-between patients one day, one of your young administrative staff asks if she can ask you a medical question. She confides she is concerned that she and her husband have not gotten pregnant after almost a year of trying.

As you observe her, you notice she is short and overweight with some noticeable facial hair and acne.

You catch up with her later in the day and ask about her menstrual cycles. She tells you she has always had irregular periods and is frustrated it was always so different from her sister and friends. She can skip two or three months then have two cycles in one month and at times they can be really heavy. A doctor put her on OCPs for a while and she had light regular cycles while on the pill. A year ago she stopped taking them when they decided to try and get pregnant. You ask about her family and she tells you there are multiple family members with high cholesterol and diabetes.

You tell Victoria you are concerned she could have PCOS. You explain there are some tests that can help make the diagnosis and encourage her to speak to her personal physician or schedule an official appointment with you.

Victoria is visibly upset by your diagnostic suggestion. She asks you, “Is this serious? I’ve never even heard of this? Is this common? Can I ever get pregnant?”

Two months later she stops you again to thank you for your help. She saw her physician and reports she is taking Metformin but has one last favor to ask. She passes you her lab tests and asks what you think.

If she asks, what preventive services does this young lady need?

What could have been done to prevent this medical situation?
Robert Johnson is a 48 year old male who presents to your office for a general checkup “because my wife made the appointment for me”. He is mildly concerned about his weight. He notes he was reading a newspaper article about obesity “and the numbers they used in the example were my exact height and weight. I know I’m heavier than I should be but I never considered myself to be ‘obese’. I just can’t seem to get below 200 pounds.”

What is obesity?

Mr. Johnson expresses frustration with his weight, specifically with the fact that his twin brother is thin and “it seems to be easy for him. All he does is walk with his wife after dinner. I’m active at my job all day and I try to walk in the evening with my wife, but we’re only able to do it once a week generally because we are both so busy with work and the kids’ activities.” Mr. Johnson notes that he was in good shape as a child, and “I even had to bulk up to play football in high school and college.”

How does a body become obese? What do you think about his twin?

Mr. Johnson’s social history reveals that he lives with his wife and their 2 children, Laura (age 14) and Bobby (age 8). He is manager of a large warehouse and says he is “on my feet all day”. His leisure time is spent helping coach Bobby’s soccer team.

How would you characterize his activity level with regard to energy expenditure?

Being an astute history builder, you obtain the following dietary history:

- Breakfast – coffee, maybe a muffin. “I try not to eat too much in the morning.”
- Lunch – “I pack a sandwich two or three times a week” (usually deli turkey and cheese on white bread with a small bag of chips). The other days “I grab something with the guys from work” (typically a sub or other sandwich combo
- Dinner – whatever his wife fixes or plans. Always a meat (chicken, beef stew, “I grill a lot”). Not a salad fan except for potato salad. Refried beans and corn are his favorite vegetables. Dessert is usually something from the freezer – ice cream is the favorite.
- Eating out – about once a week for dinner usually as a family – Chipotle, pizza (deep dish preferred), Italian
- Alcohol – “a few” beers a week. Maybe “a couple” when watching football on weekends, and maybe “a couple” with the other coaches if the soccer team goes out together for pizza
- Other drinks – “I really like Mountain Dew, but try to limit to a couple a day. I like Powerades or Gatorade”

He does take a Centrum for Men multivitamin daily (wife’s idea).

How does his diet figure into the picture?
He is 5’10” and 215# today. His blood pressure is 138/88. You complete a thorough physical exam and find nothing abnormal except mild truncal obesity.

How would you end this encounter? Talk about open/closed ended – “Do you have any questions?” vs. “What questions can I answer for you?”

Additional information (in response to the above): “In the newspaper article, it mentioned that obese people have a shortened life expectancy. Am I OK or should I be concerned?”

Objectives/Questions for this session
1. What is obesity? How is it defined? How is it measured?
2. What is the biochemical basis of obesity?
3. Describe the environmental and genetic interplay. What is the role of each?
4. What is the impact of a patient’s lifestyle – home, work, leisure?
5. How does energy balance play a role in obesity? What is the role of diet in that?
6. What are the clinical risks associated with obesity?

Other directions we think they might go (which would actually be good):
1. What is good nutrition? What do we need to know about recommendations?
2. How does one define hypertension and how is he classified?

Tasks:
1. Describe how the session should go to the group.
2. Have them choose a leader, a scribe, and a timekeeper.
3. Discuss how the leader from today will lead the discussion of this case next time, but there will be a new leader to run the overall session. (along with a new scribe and timekeeper)
Robert Johnson presents for a follow up appointment to discuss his weight. He tells the nurse he is also concerned about his blood pressure.

Ht 70 in  Wt 212 lbs  BP 150/94 L arm sitting  HR 90

Robert checked his blood pressure at Walmart and by the chart on the machine it was high. He can’t remember the exact number but it was over 150. His wife was worried so she encouraged him to get it checked by the occupational health nurse at work. He did and shows you his card.

Day 1  160/92  415 pm
Day 2  148/90  11 am
Day 3  150/94  4 pm
Day 4  156/94  430 pm
Day 5  146/92  1130 am

Can he be diagnosed with hypertension based on this data? How does one become hypertensive? What effects does hypertension have on the body?

You bring up his 3 lb wt loss since last visit and he states “I am trying.” He reports he has switched to diet Mt. Dew but still gets one Gatorade or Powerade daily for the nutrients. He still is not much of a breakfast eater, gets his morning coffee and an occasional granola bar if his wife gives it to him as he runs out the door. Lunch hasn’t changed too much; he has gone down to the small combo from the large one. Dinner is the about the same. Still eating out once a week. He and his wife have both decided to try to skip dessert and not eat after 8 pm. She heard that was a good plan in the past from Oprah. He admits that he has not changed his activity level but hopes to now that soccer season are over.

What is the relationship between diet, exercise and hypertension?

For the next 2 paragraphs we want to ask the students first what they would ask, like the “approach to the pt with . . .” cases. Then provide a separate sheet with the answers. For this week, we as facilitators will step in and lead this section to model for the students what will come in future cases.

What specific questions regarding the patient’s social and family history would you like to ask as they relate to a patient with obesity and hypertension?
Robert Johnson – Hypertension

SHx: Robert stated smoking in college but only socially and during the football off season. Once he graduated he got married and his wife smoked so he picked up the habit at 1 ppd. They were married six years before they divorced. He entered his second marriage four years later and then quit smoking at the insistence of his new wife. (TOTAL = 1 ppd x 10 yrs). He still occasionally sneaks one at work “when he is stressed”. His ETOH use is unchanged at a few beers per week. Denies drug use. Things at work are stressful. With the economy everyone has to do more with less. He lost two positions that management did not replace. There are rumors about big changes in his company health insurance. (Less coverage higher cost).  
FHx: Father age 71, had MI at 55, HTN “for as long as I remember”  
Mother age 69, overweight  
Brother age 48, twin, healthy  
Daughter age 25, healthy (just got married)  
Daughter 14, healthy  
Son age 8, he has asthma sometimes uses his inhaler

What are the other individual risk factors for hypertension? What are the other population risk factors for hypertension?

PE: HEENT: TMs clear with good visualization of bony landmarks; throat pink mucosa, some clear drainage in the posterior pharynx; mouth free of lesions, membranes moist and pink; PERRLA, EOMI, funduscopic exam reveals minimal AV nicking  
Neck: thick and hard to examine thyroid  
Cardio: RRR s MRG  
Lungs: diminished air exchange but CTA  
Abd: striae noted, protuberant (beer gut), abd aorta palpated at 6-7 cm  
Ext: no CCE  
Neuro: DTRs +1 in LE  
Skin: few ocular xanthomas

What are the complications of hypertension that one can find on physical exam? What would be the next step in dealing with the aortic findings?

Labs in the office: The patient has an EKG and urine dipstick done in the office. The EKG is entirely normal. Urine dip shows a SG of 1.015 with negative protein, glucose, leukocytes, nitrite, and urobilinogen.

Next time we will try to have an actual EKG. What is the recommended initial workup/evaluation for a patient with newly diagnosed hypertension?
How would you end this encounter? Continue discussion regarding “What questions can I answer for you?”

Additional information (in response to the above): “So it looks like I have high blood pressure like my dad. Does this mean I need to take blood pressure medication?”

What preventive services does this patient need? (final question to be included in all cases to get the students in practice of thinking along these lines).

Objectives/Questions for his session:

1. What is hypertension? How is it classified?
   a. FHX
   b. Obesity
   c. Diet
   d. Smoking
   e. ETOH
   f. Stress
   g. Ethnicity
   h. Age
   i. Gender
3. Relationship between obesity and hypertension?
4. Foundational science components of hypertension? Pathophysiology of complications? What affect does it have on the body? (HERB)
5. Physical exam findings expected in a patient with longstanding hypertension.
6. Work up and initial management of new onset hypertension. (pharmacology for classes of meds, side effects, cost)

How the session should run: (Initially with leader, scribe and timekeeper from last week)

1. Check-in
2. Share experiences at practices – opportunities to work with obese patients? Opportunities to build dietary histories? Other specific questions??
3. Discussion of Case #1 same scribe as well
4. Choose a leader, scribe and timekeeper for this session.
5. Discuss Case #2 and generate objectives.
6. Check out.
Bobby Johnson is an 8 year old boy (the son of Robert Johnson, our previous patient) who presents for follow-up of his asthma. His asthma was diagnosed at age 5 and has been stable since that time on just a ProAir inhaler when he needs it. He is here with his mother, Maria. He needs a refill on his asthma inhaler.

What do we know about asthma?

Maria reports that he has been having more problems with indoor soccer this year. She thinks his symptoms started getting worse this fall. He is using his inhaler before soccer but wants to use it in the car where his friends can’t see. (Even then, he uses it quickly and puts it away before anyone has a chance to see him). She has to give the inhaler about two other times during the week as well. She also has heard him coughing at night. It has never been bad enough to go to ER, and has always responded well to the inhaler.

Why do you think he is getting worse? Could his inhaler technique have anything to do with it?

Mom is worried because Bobby’s best friend Jawon also has asthma and has been admitted to Children’s twice since school started. Since Bobby’s asthma seems to be getting worse, she wants to know if this is what is in store for him?

What might explain the difference between these two 8 year old boys with asthma?

SHx: His mother states that he is not exposed to any direct cigarette smoke. Bobby likes to play video games and trade Pokemon cards. He is a good eater and sleeps well. The family has an indoor dog, Scoobie.

FHX: No one with asthma.

Is there anything that might be related to his worsening asthma? Recall from last visit with his dad that his dad sneaks cigarettes at work. Is this important, and if so, how would you handle this information during today’s visit?)

PE: Ht 50 inches Wt 60 # BP 108/58 P 78 T 37.2
• general – healthy 8 year old
• HEENT – Nasal mucosa pale, no lesions or rhinorrhea; TMs clear with bony landmarks visible; throat pink, tonsils not enlarged, no discharge or exudates
Bobby Johnson - Asthma

- Lungs CTA with no wheezes or crackles
- Heart – RRR without murmurs
- Ext without cyanosis or clubbing

What would you expect to find on his PE?

Peak flows are done in your office. On three attempts, he “blows” 200 (L/min), 220, and 220.

What are normal peak flows for this age (predicted 240)? What does this tell us?

Maria is concerned that “his inhaler just isn’t holding him like it used to. Is there something else you can give him?” She also notes that their insurance just changed to an HSA with a high deductible, and they have to pay out of pocket for medications. She would like “something that is going to work and not be expensive”.

How are you going to treat this child’s asthma? Is he taking the medications properly? (Using spacer, rinsing mouth out, washing spacer, asthma control plan) What does the Mom need to know about treatment?

How would you end this encounter?

What preventive services does this patient need?

Objectives/Questions for this session:
1. Describe the pathophysiology of asthma. (bronchospasm, inflammation, immune response and relationship between each)
2. Triggers/Risk factors
3. Pop health: disparities in incidence/prevalence, care, cost, morbidity/mortality
4. Classification
5. Treatment: control vs rescue, proper use of a spacer
6. Health Maintenance: flu shot
James Johnson is a 71 year old man who comes to see you because his Medicare HMO changed and prior PCP doesn’t take his new one. His son, Robert, is one of your patients and recommended that his father see you. James’ prior PCP diagnosed him with kidney problems in late November and told him to come in for follow up to discuss his labs. He couldn’t get an appointment before the holiday so now is here to see you. He states, “My doctor said I had early signs of kidney failure. I’ve tried to take good care of myself since my heart attack. I don’t understand how this happened.”

**What is his question? What do we need to know to help him?**

*(What is pathophysiology? What causes CKD?)*

He shows you the labs he brought with him (done in September). Along with normal electrolytes and liver function tests, a fasting glucose of 86 and cholesterol of 184 (LDL 92; HDL 44), he has a creatinine of 1.7, and a BUN of 38.

**Why did they tell him he has kidney failure?**

*(What are Creatinine and BUN? How are they markers for kidney disease? Given his numbers, how severe is his kidney disease? What is the classification?)*

**HX**

**PMH:** He has “had high blood pressure for so long I don’t even remember when it started”, and had a heart attack at age 55

**SHx:** James is a retired welder. He enlisted in the Army at age 18 and served for 8 yrs including a tour in Vietnam. After discharge, he got a job with GM and continued to work as a welder until he retired at age 66. He has been married to Rita for 51 years and has two sons. He started smoking in Army boot camp (max of 2 ppd), and quit after his MI. He denies any tobacco consumption since then. He denies past or present drug use. He drinks a glass or two of red wine with supper because he’s read it’s “good for my heart”.

**FHx:** His father died from an MI in his 50’s. His mother died from Alzheimer’s disease in her 80’s.

**DIET:** He drinks “high octane” coffee in the morning, but his wife has him drinking decaf tea the rest of the day. He avoids drinking a lot of water because he doesn’t like to go to the restroom when he’s out, “you know, with the water pill my doctor gave me and my prostate”. A typical breakfast is Cheerios and maybe a banana or glass of orange juice if he is still hungry. Lunch is usually a ham or turkey sandwich (no cheese because his wife says the fat is bad for him), lettuce and tomato, on wheat bread. He might have an apple with lunch, if his wife gives it to him. Supper is usually grilled chicken, some type of cooked vegetables, and maybe rice. His
wife “really tries to cook healthy since my heart attack.” He loves ice cream, but his wife doesn’t keep it in the house.

EXERCISE: He tries to walk with his wife during the day, maybe ½ to 1 mile. He stays busy around the house doing yard work and he always has a pretty long “Honey-Do” list. He enjoys spending time working on restoring his old car, a 1965 Mustang, and “that’s pretty strenuous at times.”

What parts of the history are relevant to the problem?
(What “history” items make you more prone to kidney disease (e.g. are welders more likely)? What behaviors will need to be modified given his current status?)

His medications are:
Lisinopril/HCTZ 20/12.5 mg 2 po qd
Atorvastatin 20 mg po qhs
Metoprolol 25 mg po bid
EC Aspirin 81 mg po qd
Aleve as needed for knee pain (1-2 tabs about twice a week on average)
A daily multivitamin most days (when he remembers it)

How might medications be relevant in a patient with kidney disease?
(What relationship is there between medications and kidney disease? Do certain meds make it worse or lead to kidney disease? Do medications need to be modified in a patient with kidney disease?)

PE
HT 5-9, WT 170, BP 130/86, HR 60, T 97.3
Gen- In NAD, talkative, dressed for the weather
Eyes-early cataracts, PERRL
Ears-TM’s clear, couldn’t hear finger rub bilateral at 1 ft away
Nose-clear
Throat-clear
Neck-supple, thyroid without enlargement or mass, no LAD, no JVD
Lungs-diminished breath sounds in the bases otherwise CTA
CV-bradycardic, regular rhythm, no MRG
Abd-soft, NT, ND, no HSM, no bruits
Ext-no clubbing or cyanosis, trace edema of the feet, absent DP pulses,
Skin-purplish discolorations on lower legs above the ankles bilateral, no hair growth on lower legs and feet
Neuro-DTRs +1 in patellar and Achilles bilateral, MS 5/5 symmetric in UE and LE

What parts of the physical exam are relevant to his problem?
(What physical findings would one expect in a patient with kidney disease?)
After completing your history and physical exam, you ask the patient what concerns he has. His response is that he had a good friend from work who had to start dialysis last month, and “I don’t want to have to go through that.”

What are treatments for kidney disease? What is dialysis? How does it come into play (and at what point)?

How would you close this encounter?

What preventive services does this patient need?

Objectives/Questions for this session:

1. How is “kidney disease” defined? What is the difference between acute and chronic?
2. What is the pathophysiology of kidney disease?
3. How is chronic kidney disease staged?
4. What are the risk factors for kidney disease? What are causes of kidney failure? What are common precursors and/or concomitant illnesses?
5. What is the prevalence of kidney disease? How does it vary between various groups (socioeconomic, regional, ethnic, racial, etc.)
6. What target organ damage does it cause?
7. How does it affect medication use (which meds must be avoided, how are dosages adjusted)?
8. What is the treatment for kidney disease (meds, monitoring, lifestyle, other e.g. dialysis)?
Rita Johnson is the 69 year old wife of James. You are seeing Rita as a new patient. Since you’re following James for his kidney problem, she came to see you. Two weeks ago she was diagnosed with a UTI at urgent care. While there they found sugar in her urine. They stuck her finger and her sugar was 240. They told her she was diabetic and gave her a prescription for Januvia. She didn’t fill it because it was $300 at Walmart (for a month’s worth). She was also given an antibiotic for her UTI. Those symptoms are gone. She asks you “Am I really diabetic? I volunteer at the Senior Center and drive people to their medical appointments. It seems like everyone I know has diabetes.”

Is this a common way for patient’s to find out they are diabetic? What are the diagnostic criteria for diabetes? How common is diabetes? How do the types of diabetes differ? Are there cheaper options for treating diabetes? Was Januvia a reasonable first line medication?

Rita’s been more tired over the past month, taking an afternoon nap which she’s never really done much before. She has noticed some blurry vision which seems to come and go, but she hasn’t had time to go see the eye doctor yet to check her prescription. Rita has otherwise been “the picture of health”. She is really concerned about the blurry vision in the context of being told she is diabetic, since her mother went blind because of her “sugar”.

What are the common symptoms of diabetes? Is there a relationship between her blurry vision and the potential blindness that can occur? What end organ effects are there in diabetes?

Her family history is significant only for the diabetes (and blindness) in her mother, who ultimately died from a stroke at 75. Rita smoked for a brief time and stopped when she got pregnant with the twins. Rita worked as a secretary for the car dealership in town until James retired. She has been married to James for 51 years. Her current medications are a daily women’s multivitamin and a calcium tablet with vitamin D.

What are risk factors (family history, social history) for diabetes?
**Physical exam**
5'3” 165 lb  BP 118/76  HR 72  T 97.8  
Gen:  NAD  
HEENT:  TMs clear, throat clear  
Neck:  supple, no LAD, thyroid nontender  
Lungs:  CTA  
CV:  RRR s MRG  
Ext:  no edema, monofilament exam showed 3/10 on Lt, 4/10 on Rt  
Neuro:  1/4 B Achilles reflexes  

*What are the common physical findings of diabetes?  What is a monofilament anyway?*

You tell Rita that you need to do some additional testing, and then conclude with “What other questions can I answer for you today?” She responds that she and James live on a fixed income and she is very worried about the cost of this disease. She asks if she has to buy a monitor to check her sugar like her friends. She is also concerned that her friends can’t eat some of the things she does, and is concerned that changing her diet would be expensive as well.  

*What testing should be done for a new diabetic?  What kind of monitoring is recommended for a new type 2 diabetic?  What is available?  What dietary changes are recommended for diabetics?  How does cost figure into the equation – monitoring, meds, diet, etc.?*

James, who accompanied her to this visit, says “I have a couple of questions too, doc.  Is she going to need to go on insulin?  Her mom hated giving herself insulin shots.  And speaking of her mom, what are the chances she’ll go blind like her mom did?” Rita chimes in, “And some of the senior center folks are on dialysis from their diabetes.  Do I need to worry about that?”

*How does insulin figure into type 2 diabetes?  What medications are used to treat diabetes?  What are the common sequelae of diabetes and how preventable are they?  How can they be prevented?***

*What preventive services does this patient need?*
Objectives

- Define diabetes
- Pathophysiology – T1 vs T2
- Typical signs and symptoms of diabetes
- Diagnostic criteria for each
- Public health issues:
  - Prevalence in population
  - Burden to health care system
  - Cost for meds, supplies, etc.
- Risk factors for developing DM
  - Genetic
  - Environmental
  - Lifestyle
- Management
  - Medications for T1 vs T2
  - Monitoring – individual vs laboratory
  - Lifestyle changes (diet + exercise)
- Long / short-term consequences
  - Effects on patient and society
  - Link w/ management
- Prognosis
  - End organ effects
  - Co-morbid diagnoses for DM: consequence of or caused by
As you are in-between patients one day, one of your young administrative staff asks if she can ask you a medical question. She confides she is concerned that she and her husband have not gotten pregnant after almost a year of trying.

**What are reasons she might not be getting pregnant? Is this considered infertility? Is this an appropriate interaction with a staff member?**

As you observe her, you notice she is short and overweight with some noticeable facial hair and acne.

**Does her appearance suggest anything to you? Is there any relation between her appearance and her lack of getting pregnant?**

You catch up with her later in the day and ask about her menstrual cycles. She tells you she has always had irregular periods and frustrated it was always so different from her sister and friends. She can skip two or three months then have two cycles in one month and at times can be really heavy. A doctor put her on OCPs for a while and she had light regular cycles while on the pill. A year ago she stopped taking them when they decided to try and get pregnant. You ask about her family and she tells you there are multiple family members with high cholesterol and diabetes.

**What does the irregularity of her cycles tell you? Is there any significance to her sister having normal cycles and her not? Is the fact that she “normalized” while on OCPs significant? Are any of the causes you have been considering related to hyperlipidemia and diabetes? Is this a significant FH?**

You tell Victoria you are concerned she could have PCOS. You explain there are some tests that can help make the diagnosis and encourage her to speak to her personal physician or schedule an official appointment with you.

**What is PCOS (usual litany of issues)? How is it diagnosed? Could you have saved her some $$ in copay by just ordering the tests for her?**

Victoria is visibly upset by your diagnostic suggestion. She asks you, “Is this serious? I’ve never even heard of this? Is this common? Can I ever get pregnant?”

Victoria’s questions are pretty much the biggies here. **What is Victoria’s prognosis?**
Two months later she stops you again to thank you for your help. She saw her physician and reports she is taking Metformin but has one last favor to ask. She passes you her lab tests and asks what you think.

**Why metformin? Was her glucose likely elevated? Is this appropriate management? What other management is there?**

If she asks, what preventive services does this young lady need?

What could have been done to prevent this medical situation?

**Objectives**
- Define PCOS
- Pathophysiology of PCOS
- Typical signs and symptoms of PCOS
- Diagnostic criteria of PCOS
- Public health issues:
  - Prevalence
  - Burden to health system
  - Cost
- Risk factors
  - Genetic
  - Lifestyle
  - Environmental
- Management
  - Medications
  - Monitoring
  - Lifestyle changes
- Long/short term consequences
  - Effect on pt and society
  - Link with management
- Prognosis
  - End organ effects
  - Co-morbid diagnoses or consequences of or caused by
Appendix F

Hirsh Survey

Using a Likert scale from one to six, with one being “prepared me very poorly” and six being “prepared me very well”, students were asked to rate how they felt this program prepared them for clinical practice.

1. How well do you feel this program has prepared you to practice in a hospital setting?
2. How well do you feel this program has prepared you to practice in the ambulatory setting?
3. How well do you feel this program has prepared you to have the knowledge base necessary to be a competent practitioner?
4. How well do you feel this program has prepared you to be truly caring in dealing with patients?
5. How well do you feel this program has prepared you to deal with ethical dilemmas?
6. How well do you feel this program has prepared you to know your strengths and limitations?
7. How well do you feel this program has prepared you to deal with patient problems that do not have clear answers?
8. How well do you feel this program has prepared you to be a self-reflective practitioner?
9. How well do you feel this program has prepared you to see how the social context affects patients and their problems?
10. How well do you feel this program has prepared you to involve patients in decision making?
11. How well do you feel this program has prepared you to relate well to a diverse patient population?
12. How well do you feel this program has prepared you to relate to people at different stages of the life cycle?
13. How well do you feel this program has prepared you to understand how the health care system works?
14. How well do you feel this program has prepared you to practice evidence-based medicine?
Appendix G

IRB Approval

DATE: March 26, 2014
TO: Sabrina Neeley, Ph.D.
FROM: Wright State University IRB
RE: SC# 5477 – Early Meaningful Clinical Experience: An Undergraduate Medical Education Pilot Program

The above-listed project was reviewed by the Chair of the IRB/authorized designee. The project was determined to be “Not Human Subjects Research (NHSR)” per the federal definition checked below. Projects that do not meet the definition of research or human subject do not fall under the purview of the IRB.

Projects that do not meet the definition of research involving human subject under 45 CFR 46.102:

- IRB review of the project is not required because it does not meet the definition of research in 45 CFR 46.102(d) which defines ‘research’ as “a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge.” Examples of projects that may not be research include quality improvement programs or required program evaluations that will not be published or disseminated formally.

- IRB review of the project is not required because it does not involve human subjects as recognized by 45 CFR 46.102(f) which defines a ‘human subject’ as “a living individual about whom an investigator (whether professional or student) conducting research obtains (1) data through intervention or interaction with the individual, or (2) identifiable private information.”

If you are consenting participants for your project, please remove all references to research and the IRB so as not to confuse the participants.

If you have questions about this determination, please call the Jodi Blackledge at (937) 775-3974.

Best wishes for a successful project.

[Signature]

Date: 03/26/14
## Tier 1 Core Public Health Competencies

<table>
<thead>
<tr>
<th>Domain #1: Analytic/Assessment</th>
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<tbody>
<tr>
<td>Identify the health status of populations and their related determinants of health and illness (e.g., factors contributing to health promotion and disease prevention, the quality, availability and use of health services)</td>
</tr>
<tr>
<td>Describe the characteristics of a population-based health problem (e.g., equity, social determinants, environment)</td>
</tr>
<tr>
<td>Identify sources of public health data and information</td>
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<tr>
<td>Identify gaps in data sources</td>
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<tr>
<td>Adhere to ethical principles in the collection, maintenance, use, and dissemination of data and information</td>
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<tr>
<td>Describe how data are used to address scientific, political, ethical, and social public health issues</td>
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<table>
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<tr>
<th>Domain #2: Policy Development and Program Planning</th>
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<td>Participate in program planning processes</td>
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<td>Incorporate policies and procedures into program plans and structures</td>
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<tr>
<td>Identify mechanisms to monitor and evaluate programs for their effectiveness and quality</td>
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<tr>
<td>Apply strategies for continuous quality improvement</td>
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<th>Domain #3: Communication</th>
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<td>Communicate in writing and orally, in person, and through electronic means, with linguistic and cultural proficiency</td>
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<td>Apply communication and group dynamic strategies (e.g., principled negotiation, conflict resolution, active listening, risk communication) in interactions with individuals and groups</td>
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<th>Domain #4: Cultural Competency</th>
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<tbody>
<tr>
<td>Recognize the role of cultural, social, and behavioral factors in the accessibility, availability, acceptability and delivery of public health services</td>
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<td>Respond to diverse needs that are the result of cultural differences</td>
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<td>Describe the dynamic forces that contribute to cultural diversity</td>
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<tr>
<th>Domain #5: Community Dimensions of Practice</th>
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<tbody>
<tr>
<td>Recognize community linkages and relationships among multiple factors (or determinants) affecting health (e.g., The Socio-Ecological Model)</td>
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<tr>
<td>Identify stakeholders</td>
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<tr>
<td>Describe the role of governmental and non-governmental organizations in the delivery of community health services</td>
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<tr>
<th>Domain #6: Public Health Sciences</th>
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<tbody>
<tr>
<td>Identify the basic public health sciences (including, but not limited to biostatistics, epidemiology, environmental health sciences, health services administration, and social and behavioral health sciences)</td>
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<tr>
<td>Describe the scientific evidence related to a public health issue, concern, or, intervention</td>
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<tr>
<td>Retrieve scientific evidence from a variety of text and electronic sources</td>
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<tr>
<td>Discuss the limitations of research findings (e.g., limitations of data sources, importance of observations and interrelationships)</td>
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<tr>
<td>Partner with other public health professionals in building the scientific base of public health</td>
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<th>Domain #7: Financial Planning and Management</th>
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<tr>
<td>Report program performance</td>
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<tr>
<td>Translate evaluation report information into program performance improvement action steps</td>
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<tr>
<td>Demonstrate public health informatics skills to improve program and business operations (e.g., performance management and improvement)</td>
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<tr>
<th>Domain #8: Leadership and Systems Thinking</th>
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</table>
Describe how public health operates within a larger system
Use individual, team and organizational learning opportunities for personal and professional development
Participate in mentoring and peer review or coaching opportunities
Participate in the measuring, reporting and continuous improvement of organizational performance
Describe the impact of changes in the public health system, and larger social, political, economic environment on organizational practices

Concentration Competencies

<table>
<thead>
<tr>
<th>Health Promotion and Education:</th>
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<tbody>
<tr>
<td><strong>Area 1: Assess Needs, Assets and Capacity for Health Education</strong></td>
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<td><strong>Area 2: Plan Health Education Programs</strong></td>
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<td><strong>Area 3: Implement Health Education</strong></td>
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<td><strong>Area 4: Conduct Evaluation and Research Related to Health Education</strong></td>
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<td><strong>Area 5: Manage Health Education Programs</strong></td>
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<td><strong>Area 6: Serve as a health education resource person</strong></td>
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<td><strong>Area 7: Communicate and advocate for health and health education</strong></td>
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Appendix I

List of Competencies Met in CE – J. Mensah-Dapaah

**Tier 1 Core Public Health Competencies**

<table>
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<tr>
<th>Domain #1: Analytic/Assessment</th>
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<tbody>
<tr>
<td>Identify the health status of populations and their related determinants of health and illness (e.g., factors contributing to health promotion and disease prevention, the quality, availability and use of health services)</td>
</tr>
<tr>
<td>Use variables that measure public health conditions</td>
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<tr>
<td>Use methods and instruments for collecting valid and reliable quantitative and qualitative data</td>
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<tr>
<td>Adhere to ethical principles in the collection, maintenance, use, and dissemination of data and information</td>
</tr>
<tr>
<td>Describe the public health applications of quantitative and qualitative data</td>
</tr>
<tr>
<td>Use information technology to collect, store, and retrieve data</td>
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<tr>
<th>Domain #2: Policy Development and Program Planning</th>
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<tbody>
<tr>
<td>Gather information that will inform policy decisions (e.g., health, fiscal, administrative, legal, ethical, social, political)</td>
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<tr>
<td>Participate in program planning processes</td>
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<td>Incorporate policies and procedures into program plans and structures</td>
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<td>Identify the health literacy of populations served</td>
</tr>
<tr>
<td>Communicate in writing and orally, in person, and through electronic means, with linguistic and cultural proficiency</td>
</tr>
<tr>
<td>Solicit community-based input from individuals and organizations</td>
</tr>
<tr>
<td>Convey public health information using a variety of approaches (e.g., social networks, media, blogs)</td>
</tr>
<tr>
<td>Participate in the development of demographic, statistical, programmatic and scientific presentations</td>
</tr>
<tr>
<td>Apply communication and group dynamic strategies (e.g., principled negotiation, conflict resolution, active listening, risk communication) in interactions with individuals and groups</td>
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<th>Domain #4: Cultural Competency</th>
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<tr>
<td>Incorporate strategies for interacting with persons from diverse backgrounds (e.g., cultural, socioeconomic, educational, racial, gender, age, ethnic, sexual orientation, professional, religious affiliation, mental and physical capabilities)</td>
</tr>
<tr>
<td>Recognize the role of cultural, social, and behavioral factors in the accessibility, availability, acceptability and delivery of public health services</td>
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<td>Respond to diverse needs that are the result of cultural differences</td>
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<td>Recognize community linkages and relationships among multiple factors (or determinants) affecting health (e.g., The Socio-Ecological Model)</td>
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<tr>
<td>Demonstrate the capacity to work in community-based participatory research efforts</td>
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<td>Identify stakeholders</td>
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<tr>
<td>Collaborate with community partners to promote the health of the population</td>
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<tr>
<td>Maintain partnerships with key stakeholders</td>
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<tr>
<td>Use group processes to advance community involvement</td>
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<tr>
<td>Describe the role of governmental and non-governmental organizations in the delivery of community health services</td>
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<tr>
<td>Identify community assets and resources</td>
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<tr>
<td>Gather input from the community to inform the development of public health policy and programs</td>
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<tr>
<td>Inform the public about policies, programs, and resources</td>
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</table>
### Domain #6: Public Health Sciences

- Describe the scientific foundation of the field of public health
- Identify prominent events in the history of the public health profession
- Relate public health science skills to the Core Public Health Functions and Ten Essential Services of Public Health
- Identify the basic public health sciences (including, but not limited to biostatistics, epidemiology, environmental health sciences, health services administration, and social and behavioral health sciences)
- Describe the scientific evidence related to a public health issue, concern, or intervention
- Discuss the limitations of research findings (e.g., limitations of data sources, importance of observations and interrelationships)
- Describe the laws, regulations, policies and procedures for the ethical conduct of research (e.g., patient confidentiality, human subject processes)
- Partner with other public health professionals in building the scientific base of public health

### Domain #7: Financial Planning and Management

- Describe the local, state, and federal public health and health care systems
- Describe the organizational structures, functions, and authorities of local, state, and federal public health agencies
- Adhere to the organization’s policies and procedures
- Participate in the development of a programmatic budget
- Operate programs within current and forecasted budget constraints
- Identify strategies for determining budget priorities based on federal, state, and local financial contributions
- Report program performance
- Translate evaluation report information into program performance improvement action steps
- Contribute to the preparation of proposals for funding from external sources
- Apply basic human relations skills to internal collaborations, motivation of colleagues, and resolution of conflicts
- Demonstrate public health informatics skills to improve program and business operations (e.g., performance management and improvement)
- Describe how cost-effectiveness, cost-benefit, and cost-utility analyses affect programmatic prioritization and decision making

### Domain #8: Leadership and Systems Thinking

- Incorporate ethical standards of practice as the basis of all interactions with organizations, communities, and individuals
- Describe how public health operates within a larger system
- Participate with stakeholders in identifying key public health values and a shared public health vision as guiding principles for community action
- Identify internal and external problems that may affect the delivery of Essential Public Health Services
- Use individual, team and organizational learning opportunities for personal and professional development
- Participate in mentoring and peer review or coaching opportunities
- Participate in the measuring, reporting and continuous improvement of organizational performance
- Describe the impact of changes in the public health system, and larger social, political, economic environment on organizational practices
## Concentration Competencies

<table>
<thead>
<tr>
<th>Health Promotion and Education:</th>
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<tbody>
<tr>
<td><strong>Area 1: Assess Needs, Assets and Capacity for Health Education</strong></td>
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<tr>
<td>1.1 Identify stakeholders to participate in the assessment process</td>
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<tr>
<td>1.2 Engage stakeholders to participate in the assessment process</td>
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<tr>
<td>1.3 Analyze factors that foster or hinder the learning process</td>
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<td>1.4 Identify factors that foster or hinder skill building</td>
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<tr>
<td>1.5 Analyze factors that foster or hinder skill building</td>
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<td>1.6 Synthesize assessment findings</td>
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<td><strong>Area 2: Plan Health Education Programs</strong></td>
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<tr>
<td>2.1 Use assessment results to inform the planning process</td>
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<td>2.2 Select planning model(s) for health education</td>
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<td>2.3 Develop goal statements</td>
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<tr>
<td>2.4 Formulate specific, measurable, attainable, realistic, and time-sensitive objectives</td>
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<td>2.5 Assess efficacy of various strategies to ensure consistency with objectives</td>
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<td>2.6 Select a variety of strategies and interventions to achieve stated objectives</td>
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<tr>
<td>2.7 Organize health education into a logical sequence</td>
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<td>2.8 Develop a timeline for the delivery of health education</td>
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<tr>
<td><strong>Area 3: Implement Health Education</strong></td>
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<tr>
<td>3.1 Identify training needs</td>
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<tr>
<td>3.2 Develop training objectives</td>
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<td>3.3 Create training using best practices</td>
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<tr>
<td>3.4 Evaluate training</td>
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<tr>
<td>3.5 Use evaluation findings to plan future training</td>
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<tr>
<td><strong>Area 4: Conduct Evaluation and Research Related to Health Education</strong></td>
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<tr>
<td>4.1 Create purpose statement</td>
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<td>4.2 Develop evaluation/research questions</td>
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<td>4.3 Assess the merits and limitations of qualitative and quantitative data collection for research</td>
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<td>4.6 Develop data analysis plan for research</td>
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