11-1-2014

Teaching health advocacy to medical students: a comparison study.

Julia Belkowitz
University of Miami School of Medicine

Lee M Sanders
Stanford Center for Health Policy

Chi Zhang
University of Miami School of Medicine

Gauri Agarwal
University of Miami Miller School of Medicine

Daniel Lichtstein
University of Miami Miller School of Medicine

As submitted to:

Journal of Public Health Management and Practice (JPHMP)

And later published as:

Teaching Health Advocacy to Medical Students: A Comparison Study

Volume 20, Issue 5, Nov-Dec 2014 E10-9.

DOI: 10.1097/PHH.0000000000000031

Julia Belkowitz, M.D.
Dr. Belkowitz is an Assistant Professor of Pediatrics and Scholar with the Academic Pediatric Association Educational Scholars Program.
University of Miami Miller School of Medicine Regional Medical Campus
3651 FAU Blvd, Suite 400
Boca Raton, FL 33431
Email: jbelkowitz2@med.miami.edu
(561) 447-6551
Fax (561) 447-6982

Lee M. Sanders, M.D., M.P.H.
Dr. Sanders is an Associate Professor of Pediatrics, Stanford University
Stanford Center for Health Policy
Center for Policy, Outcomes and Prevention
117 Encina Commons
Stanford, CA 94305
Email: leesanders@sanford.edu

Chi Zhang, Ph.D.
Dr. Chi Zhang is an Adjunct Associate Professor, Department of Medicine
University of Miami Miller School of Medicine
PO Box 016960(R-160)
Miami, FL 33101
czhang@med.miami.edu
(305) 243-6180

Gauri Agarwal, M.D.
Dr. Agarwal is an Professor, Department of Medicine
University of Miami Miller School of Medicine Regional Medical Campus
3651 FAU Blvd, Suite 400
Boca Raton, FL 33431
(561) 447-6551
Fax (561) 447-6982

Daniel Lichtstein, M.D.
Dr. Lichtstein is Professor, Department of Medicine
University of Miami Miller School of Medicine Regional Medical Campus
3651 FAU Blvd, Suite 400
Boca Raton, FL 33431
(561) 447-6551
Fax (561) 447-6982

Alex Mechaber, M.D.
Dr. Mechaber is Associate Professor, Department of Medicine
University of Miami Miller School of Medicine
PO Box 016960(R-160)
Miami, FL 33101
amechabe@med.miami.edu
(305) 243.0496

Esther K. Chung, M.D., M.P.H.
Dr. Chung is Professor of Pediatrics at Jefferson Medical College of Thomas Jefferson University and Nemours.
Jefferson Pediatrics/Nemours – Philadelphia
833 Chestnut Street, Suite 300
Philadelphia, PA 19107
e-mail: echung@nemours.org
phone: 267-258-3925
fax: 215-861-8815

None of the authors have any disclosures.

Acknowledgements

The authors wish to thank all of the community based organizations, the University of Miami Miller School medical students, particularly those at the Regional Medical Campus, for their participation in this study. We thank the Academic Pediatric Association Educational Scholars Program. We also thank Stephanie Wragg, Ph.D for her contributions and guidance towards the design of the curriculum and its implementation, and Joseph Sollecito for his assistance with data entry.

Context:

Many encourage service learning and health advocacy training in medical student education, but related evaluation is limited.

Objectives:

To assess 1) impact of a required community health advocacy training for medical students on student attitudes, knowledge, and skills, 2) student characteristics associated with higher advocacy knowledge and skills, and 3) perspectives of community based organizations (CBOs).

Design:

Cross-sectional surveys

Setting:

University of Miami Miller School of Medicine (UMMSM) Regional Medical Campus and main campus

Participants:

Medical students at both UMMSM campuses

Intervention:

Required community health advocacy training for first and second year students including classroom experiences and hands-on project in partnership with a CBO.

Main Outcome Measures:

Student characteristics, health advocacy related attitudes, self-reported and objective knowledge, and skills. Scores were compared between campuses, with multi-variable modeling adjusting for individual student characteristics. CBO perspectives were assessed via separate surveys.

Results:

Ninety-eight (77%) Regional Campus students (intervention group) and 139 (30%) main Campus students (comparison group) completed surveys. Versus the comparison group, the intervention group reported greater: mean knowledge of community health needs: 34.6 vs. 31.1 (range: 11-44, $p<0.01$), knowledge about CBOs: 3.0 vs. 2.7 (range 1-4, $p<0.01$) and knowledge of community resources: 5.4 vs. 2.3 (range, 0-11, $p<0.01$), and mean skills scores: 12.7 vs. 10.5 (score range: 4-16, $p<0.01$), following the intervention. Using adjusted analysis across both groups, female gender was associated with higher attitudes score. High level of previous community involvement was associated with higher attitude and skills scores. Higher self-reported educational debt was associated with higher skills scores. CBO perspectives included high satisfaction and a desire to influence the training of future physicians.

Conclusions:

Medical student advocacy training in partnership with community based organizations could be beneficial in improving student advocacy knowledge and skills in addressing community health issues and in developing sustainable community partnerships.

Introduction

In the age of healthcare reform and globalization, medical educators have a unique opportunity to improve the quality and relevance of social health determinants in modern medical education. There are many fields which promote this including: community health which centers on the community level of engagement by physicians and health workers, public health which targets the population as a whole, and service learning, which provides structured educational strategies using community service.[1,2,3] Health advocacy is a strategy that incorporates components of each of these to address social determinants of health and has been defined by medical educators as “to speak up, to plead, or to champion for a cause while applying professional expertise and

leadership to support efforts on individual (patient or family), community, and legislative/policy levels, which result in the improved quality of life for individuals, families, or communities".[4]

The concept of the physician's role in a broad approach to disease is not new. In the 19th century, Virchow described the effects of social and economic conditions on health and the importance of promoting health at the societal level.[5] Almost two decades ago, the Health Professions Schools in Service to the Nation was created to introduce community based learning for health professionals, and Seifer discussed the concept of service learning in medical education in 1998.[6,7] Many professional organizations place emphasis on the role of the physician advocate. For example, social justice is one of the key fundamental principles in the Physicians Charter created by the American Board of Internal Medicine et al, and the American Academy of Pediatrics includes promotion of health equity as one of its universal principles in its strategic plan.[8,9] Since 1997, the Liaison Committee on Medical Education (LCME) has supported education on the "medical consequences of common societal problems".[10] More recently, the LCME adopted standards encouraging opportunities for service learning and public health education, emphasizing those principles closely tied to physician advocacy.[11]

Medical schools have not yet universally incorporated health advocacy training into their core curricula. However, many institutions have introduced opportunities for service learning and are expanding public and community health initiatives through such efforts as novel curricula, educational tracks, and special certifications. The Association of American Medical Colleges (AAMC) has supported institutions as Regional Medicine Public Health Education Centers and has catalogued medical schools that have incorporated public health into their curricula. [12,13,14,15]

Leading medical educators have emphasized the importance of nurturing "civic professionalism" among medical students, by engaging them in community based educational experiences in order to understand and address societal health care issues. [16] Descriptions of universally required, hands-on, community based projects have been published and vary in their timing in the curriculum and in their intensity at established and new institutions.[17,18,19,20,21]

Despite the national call for increased attention to social determinants of health and an array of curricula to engage medical students in learning about them, little is known about the effects of such curricula on the medical students' attitudes, knowledge and skills. O'Toole et al. (2005) described the impact of a community-based professionalism curriculum among a self-selected group of medical students from across the nation. Included in their results were increased awareness of broader patient needs, community based organization (CBO) dynamics, and the importance of physician advocacy.[22] The majority of medical students participating in the University of Rochester's mandatory experiential community health improvement course reported a positive impact on their future careers.[23] Brush et al. (2006) examined the effects of a required service learning project at Tulane University School of Medicine on outcomes such as class ranking and Alpha Omega Alpha Honor Medical Society (AOA) selection, but not on student attitudes or skills gained.[24] The University of North Carolina at Chapel Hill School of Medicine found that students reported an increase in certain advocacy skills after participating in a leadership elective involving community service experiences.[25] Long et al. (2011) described benefits including enhancement of leadership skills among medical students electing a leadership and advocacy educational track.[26] These limited data leave unanswered the question of whether

the recommendations for undergraduate medical education are likely to cause the desired impact on students' health advocacy attitudes, knowledge and skills.

The aim of this study was to assess the overall impact of a required, community health advocacy training for first- and second-year medical students, as implemented at a Regional Medical Campus. The objectives were to assess 1) the impact the training on student attitudes, knowledge, and skills, 2) student characteristics associated with higher advocacy knowledge and skills, and 3) perspectives of community based organizations (CBOs). We hypothesized that students who participated in the intervention would have better attitudes towards advocacy and higher levels of health advocacy knowledge and skills as compared with students at the institution's main campus, who do not have formal health advocacy training in the curriculum.

Methods

Study Design

This was a cross-sectional study using written surveys to measure the effects of a health advocacy training (the intervention) for first year (M1) and second year (M2) medical students. The study was approved by the Institutional Review Board of the University of Miami. Student consent was obtained.

Participants

Participants included M2, M3 and M4 students enrolled at the Regional Medical Campus (RMC) intervention site and the main campus (MC) comparison site (located approximately 50 miles south of the RMC). All students in the RMC group had completed the community health

advocacy training. Surveys were administered in the spring of 2011, immediately following completion of the RMC student health advocacy project for the M2 students, one year post-completion for the M3 students, and two years post-completion for the M4 students. The MC has a four-year social medicine track with projects similar to the RMC training; therefore these 11students were excluded from this study.

Intervention

Between August 2007 and February 2011, the RMC implemented health advocacy training, the intervention for this study (see Figure 1). This health advocacy training was integrated into the existing overall RMC curriculum and led by pediatric medical education faculty. In the M1 year, the intervention consisted of two hours of didactic sessions and three hours of dedicated time to interact with CBOs during scheduled classroom time. Students then worked in groups of six to design a health advocacy project that could be implemented at individual, community and policy levels in partnership with their designated CBO during their independent study time. In year two, student groups were required to dedicate at least 20 hours to actual implementation of their proposed community level health advocacy project. In the first three iterations, 22 projects were completed in partnership with 15 CBOs.

Overall Medical School Curriculum

Students matriculating at the RMC spend the first three years at the RMC site. The fourth year is spent primarily at the MC site. The two campuses have identical overall curricular objectives delivered via different educational methods. The overall RMC curriculum emphasizes intense, early clinical exposure and small group and problem-based learning. The overall RMC

curriculum is delivered with 10 hours per week each of lecture, small groups, clinical experience and independent study in the first two years. The MC curriculum is a more traditional curriculum using largely didactic methods in an organ system based approach.

Clinical exposure in the curriculum varies between the two campuses. Early and frequent clinical encounters in the form of twice weekly preceptor visits in private practice and health department clinic settings provide RMC students the opportunity to see the effects of various social determinants on health and healthcare access. MC students have defined clinical experiences roughly once monthly in a community preceptor's office starting in year one. Beyond the formal curriculum, students on the main campus have the opportunity to volunteer at weekly clinics for the uninsured and underserved; the vast majority of students participate at least once per year. They, along with RMC students, also plan, manage and staff ten community health fairs per year. All students have the opportunity to participate in health fairs that target the underserved throughout the region.

The admissions criteria and process are identical for students at both campuses. Upon applying to the University of Miami Miller School of Medicine (UMMSM) using the centralized medical school application process, a secondary application was completed by the applicants on which applicants could choose to apply to one or both of the UMMSM campuses. Applicants would then be interviewed by UMMSM faculty at either campus and be evaluated by the single UMMSM admissions committee. Applicants could elect whether to visit the RMC or not during the admission process during which the overall curriculum would be described. The health advocacy curriculum was not included as part of the routine presentation about the campuses at

either site. Applicants could be accepted to one or both campuses and would then select their campus of choice for matriculation.

The intervention, the health advocacy training, was included in multi-year longitudinal courses at the RMC. The overall objectives for these courses are the same as for a parallel group of courses at the MC. Both provide clinical education and include themes such as chronic illness, medical ethics, geriatrics, evidence based medicine, and palliative care. Both groups of students participate in sessions on health literacy, domestic abuse, and tobacco cessation. Sessions included at the RMC but not at the MC include didactic sessions on injury prevention and panel discussions led by individuals from CBOs representing local immigrant groups. The RMC health advocacy training objectives are in addition to the overall course objectives; no similar experience or objectives exist in the MC formal curriculum.

Measures

Survey items were selected or adapted from tools used from previously published[27,28,29] and unpublished research[30] developed by investigators and institutions experienced in health advocacy education. (Surveys are available upon request.) Results were collected online using Survey Monkey. Survey items included questions on attitudes, self-reported knowledge, knowledge of local CBO resources, skills, and specific advocacy skills at individual, community and policy levels.

Attitudes toward Health Advocacy

There were six items assessing attitudes toward health advocacy, each scored from 1- 4, with 4 correlating with more favorable attitudes towards health advocacy. A cumulative, attitude summary score (range 6-24) was calculated for each participant. A change in attitude towards health advocacy was also assessed with one question, with the options of "changed for the better, no change at all, changed for the worse."

Student Knowledge

Self-reported knowledge of community health needs in the county in which their campus was located was assessed in eleven health topics and scored on a four-point scale ranging from "very poor" to "very good" (coded as "1-4"). A cumulative summary score (range 11-44) was calculated for each participant. Self-reported general knowledge of CBOs and self-reported knowledge of the legislative process were scored on a four point Likert-type scale ranging from "very poor" to "very good" to (coded as "1-4"). Similarly, items relating to self-reported knowledge of an individual CBO at present and at the time of medical school matriculation were scored on a four point scale ranging from "not at all" to "very well" (coded from "1 - 4").

We assessed objective knowledge of community resources in eleven community health topics using the following question: "Please name a community based organization to which you could refer a patient struggling with issues related to [specific health issues]". Answers to these open-ended questions were scored independently by two of the authors blinded to student campus using a standard scoring rubric. Consensus was obtained through discussion for items in which the two evaluators were in disagreement. A cumulative score (range: 0-11) was calculated for each participant.

Skills in Advocacy

Survey items relating to self-rated skills in advocacy were solicited using a series of four questions. The answers were scored using a four point scale ranging from "very uncomfortable" to "very comfortable" (coded as a "1-4"). A cumulative, skills summary score (range 4-16), was calculated for each participant.

We assessed objective advocacy skills using three, open-ended response questions. Answers were blinded to campus and scored independently by two of the authors using standardized scoring rubrics. Consensus was obtained through discussion for items in which the two evaluators were in disagreement. Overall scores ranged from 0 – 3 for each item.

Demographic and Other Characteristics

Demographic characteristics consisting of gender, age, ethnicity, race; and profession-related characteristics consisting of graduation year, educational debt, and specialty choice were obtained from all students. Level of community involvement prior to medical school was assessed by the question, "Prior to starting medical school, how much time have you spent working with a community based organization (outside of health fairs and/or providing direct patient care)?"

CBO Perspectives

Study Design

CBO perspectives were assessed using a cross-sectional study using written surveys to assess the experiences of the CBO partners after participating in the medical student program, also in spring, 2011. This portion of the study was also approved by the Institutional Review Board of the University of Miami. Consent was obtained.

Participants

Based upon CBO and/ or student interest, local community based organizations were identified to serve as partners for the student health advocacy projects. One CBO liaison was identified by each agency to serve as the main contact person with whom the students worked. The CBO liaison provided the agency's goals, priorities, and available resources to help guide student projects and on site project oversight. Surveys were administered to the CBO liaison for each site.

Measures

The CBO survey content was compiled from other previously used surveys. [31,32,33, 34, 35] The survey questions centered on three main themes: satisfaction, skills, and reciprocal partnership. Surveys were administered to the main project liaison from each CBO via Survey Monkey during the same time period.

Data Analysis:

SPSS version 19.0 was used to conduct all the data analysis for student surveys.[36] Categories for age, race, educational debt and level of community involvement prior to medical school were collapsed due to the small numbers in individual cells. Descriptive and inferential statistical techniques were used including Student's t-tests for continuous variables comparing two groups, ANOVA for continuous variables when comparing more than two groups, and Chi square tests for categorical variables. An alpha level of 0.05 was used to determine the significance of statistical differences between groups.

An adjusted analysis was done using a multivariate Generalized Linear Model (GLM) to compare the intervention and comparison groups on each of the outcomes – attitudes, knowledge and skills– using the three cumulative summary scores. Gender, class level, educational debt, and level of community involvement prior to medical school were included in the GLM as covariates. Each of the covariates was selected if the association with predicting one of the three summary scores in the bivariate analysis correlated with a p-value of < 0.1.

Results

Demographic and Profession-Related Characteristics

Response rates were 77% for the intervention group (98 of the 127) and 30% for the comparison group (139 of 469). The demographic and profession-related characteristics of the two student populations were comparable (Table 1).

Attitudes toward Health Advocacy

There were no significant differences between the two campuses for any of the individual attitudes toward health advocacy items or for the attitude summary scores (see Figure 2). Intervention group students were more likely to report an improved attitude since the beginning of medical school (61% vs. 54%) and less likely to report a worsening attitude (2% vs. 12%) than the comparison group students (p=0.04).

Student Knowledge

The intervention group scored higher in each topic area of self-reported knowledge of community health needs, except in the areas of obesity, poverty and skin cancer prevention, for which there was no significant difference between the two groups. Intervention group students scored higher in the of self-reported knowledge of community health needs summary score (mean score: 34.6 vs. 31.1, $p< 0.01$) than the comparison group, as shown in Figure 2. Intervention group students had significantly greater self-reported general knowledge about CBOs (3.0 vs. 2.7, $p<0.01$). There was no difference between the intervention and comparison groups about knowledge of the legislative process (2.6 vs. 2.76, p=0.32). There was no significant difference between groups at medical school matriculation by retrospective recall on self-reported knowledge of an individual community based organization (1.9 vs. 2.0, $p = 0.15$), but the intervention group had higher current scores (3.1 vs. 2.3, $p <0.01$).

The intervention group was more likely to have greater objective knowledge of community resources. Mean summary scores for the intervention vs. comparison groups were 5.4 vs. 2.3, (p

<0.01) out of a total of 11 possible points. Intervention group students had higher scores for each area of need except tobacco use and obesity (see Table 2).

Skills in Advocacy

The intervention group students scored higher in each of the individual self-rated skills questions and in the mean skills summary score than the comparison group students (mean 12.7 vs. 10.5 , p< 0.01), distribution shown in Figure 2. On specific skills-related items, the scores of the intervention versus comparison groups were as follows: develop a working knowledge of a specific public health issue affecting your community: 3.26 vs. 2.85 (p<0.01), work with a community-based organization to serve community health needs: 3.32 vs. 2.94 (p<0.01), design a program to address a specific health issue: 3.09 vs. 2.54 (p<0.01), develop a plan to change policy related to a health care issue: 3.04 vs. 2.19 (p<0.01).

Multi-variable Analyses

Table 3 shows the association of predictor variables on the three main outcome variables, adjusting for demographic and profession-related characteristics.

Adjusting for class level, gender, educational debt, and community involvement prior to medical school -- RMC students scored higher on all the three main outcomes (p = 0.01 for attitudes, p = 0.00 for knowledge, and p = 0.01 for skills). Attitude summary scores favorable toward health advocacy were higher among female students and those with higher levels of community involvement prior to medical school. The students at upper classes in the medical school

registered higher knowledge summary scores. Skills summary scores were higher among students with more self-reported educational debt and more community involvement prior to medical school.

CBO Perspectives

Surveys were received from 13 of 15 (87%) partners. The capacity of the agencies varied from small (budgets less than $50,000, fewer than five staff or 100 clients served annually) to very large (budgets over $1 million, more than 100 staff or 50,000 clients served annually). Types of agencies varied among government, school, and not-for-profit faith and non-faith based agencies.

Outcomes relating to satisfaction, efficacy and reciprocal partnership are as follows.
CBO partners were universally satisfied with program, including the program orientation, demands, and student commitment. Enhanced efficacy for the CBOs included the areas of opportunities to network with other CBOs and the benefits from student time and expertise. As per one respondent, "We were able to utilize and share the nutrition guide [developed by the students] with over 30 other agencies in the […] area … increasing the scope of reach that the students had".

CBOs participated in the program for a variety of reasons. The most often expressed reasons were prior favorable experiences with medical students and a desire to influence the training of future physicians. Survey items relating to partnership demonstrated that CBO partners were

universally satisfied with the coordination and communication with the university as exemplified by the following response: "the partnership had a seamless transition from year to year". All but one CBO was willing to partner with the school again. All believed this experience enhanced their understanding of the role of physicians and medical students in the community as summarized by the comments: "Definitely impressed how the faculty wants to engage the students in the needs of the local community" and "very pleased that [the University] understands the importance of public health".

Discussion

This study is the first of its kind suggesting the effectiveness of a health advocacy training on medical students as compared to a cohort of similar students. This study serves as an addition to the evidence base supporting LCME standards relating to community involvement for medical students.

Overall attitudes towards health advocacy were similar between the two campuses, but the students who took part in the advocacy training intervention were more likely to report an attitude change for the better. Some students may not have had a positive a priori outlook on the training and therefore it turned out "better than expected."

Students participating in the advocacy training reported greater self-reported knowledge of community health needs. These students also had greater self-reported knowledge of an individual CBO, which is not surprising as they worked closely with a single agency for over one year to complete their projects. Students in the intervention group did not demonstrate an

increased knowledge of the legislative process, likely because the emphasis of the student projects was at the community level of advocacy. They reported higher levels of self-reported general knowledge of community based organizations and demonstrated greater awareness of community resources. This could be due to the exposure to multiple CBOs during the training and final project presentations as well as a greater sensitivity to the importance of public health issues in general. Nonetheless, there is still an important opportunity to improve knowledge of community resources for all students, especially in key areas such as obesity and health literacy.

Students participating in the intervention scored higher in all skills- related survey items and in skills summary scores. This reflects the effectiveness of the "hands-on" training in which students gained real life experience in acquiring knowledge of the issue, working with a CBO, and developing and implementing plans to address the issue and make policy change. This is consistent with other studies demonstrating the value of experiential activities, such as simulation exercises, in medical education.[37, 38,39]

The perspectives of the partnering CBOs suggest that these organizations find the added workload of taking on student projects worthwhile and are willing to do so again. In addition, the programs appreciate the ability to develop new community networks with both the university and with other local agencies. While a broader evaluation would be important to better understand the CBO experiences, this is similar to findings described by Carney and Hackett (2008): CBO partners have an interest in influencing future health professionals and find such partnerships beneficial.[20] By working closely with partners to address a shared need, community

based health advocacy programs can serve to enhance relationships and the perception of universities entering new communities.

This study has a number of limitations. Our sample size was limited by the class size, and response rates were notably lower at the comparison site. A factor contributing to the lower response rate at the comparison site could be due to the fact that the principle investigator was based at the intervention site and the students in the intervention group were more familiar with the advocacy training and the faculty member. Because of the voluntary nature and context of the survey, we suspect that the comparison group students choosing to participate were more likely to have had an interest in community action; therefore, this bias most likely would be more supportive of the null hypotheses. Selection bias could be a factor in this study as students often had the opportunity to (after acceptance to medical school) choose their medical school campus. However, the advocacy curriculum was a very small component of the overall curriculum, was not explicitly mentioned in presentations to medical school applicants, and likely did not play a role in the campus choice of students. Since the two campuses differ in other aspects of their educational curriculum, it is also very possible that the observed differences represent a carry-over effect from other interventions not primarily meant to be assessed in this study.

Our survey was based on items previously published by other investigators and those experienced in advocacy education, but not tested for reliability or validity. Due to the nature of certain survey items, student responses for some items were subject to recall bias. In addition, many of the measures centered on self-reported data, rather than more objective measures. We

also did not have baseline data for comparison. Finally, the findings in this study may not be generalizable to other institutions since students came from two campuses in one geographic region. Despite these limitations, this study benefits from the use of a comparison site and from the novel approach to service learning that was implemented.

The implementation of health advocacy training appears to be a successful mechanism for raising related student knowledge and skills about community engagement and the role of the physician advocate to use professional expertise to promote solutions to health concerns. The ultimate goal of health advocacy curricula in medical school is to develop a cadre of physician advocates who are committed to and skilled in working in their communities. Further studies will be necessary to determine if the effects of this and other curricula on medical students persist into residency and affect eventual long term career paths.

Figure Legend:

Figure 1: Health Advocacy Training Overview

Table 1: Demographic and Profession-Related Characteristics of Participants from the Intervention Group and the Comparison Group

Figure 2: Score Distribution for the Three Main Outcome Variables of Attitudes, Self-Reported Knowledge of Community Health Needs and Skills Summary Scores by Campus

Table 2: Percentage of Students Correctly Answering Questions Relating to Objective Knowledge of Community Resources for Topic-Specific Needs

Table 3: Attitude Toward Health Advocacy, Self-Reported Knowledge of Community Health Needs, and Skills Mean Summary Scores by Demographic characteristics and physician-related characteristics

References

[1] Council on Community Pediatrics. Community pediatrics: navigating the intersection of medicine, public health, and social determinants on Children's Health. Pediatrics. 2013;131:623-628.

[2] World Health Organization. Public Health. Available at http://www.who.int/trade/glossary/story076/en/. Accessed September 15, 2013.

[3] National Service Learning Clearhinghouse. What is Service Learning? Available at http://www.servicelearning.org/what-is-service-learning. Accessed September 15, 2013. "

[4]Wright CJ, Katcher ML, Blatt SD, Keller DM, Mundt MP, Botash AS, Gjerde CL. Toward the Development of Advocacy Training Curricula for Pediatric Residents: A National Delphi Study. Ambul Pediatr. 2005;5:165-171.

[5] Rosen G. From Medical Police to Social Medicine: Essays on the History of Health Care. New York, NY. Science History Publications; 1974.

[6] Gelmon SB, Holland BA, Shinnamon AF, Health Professions Schools in Service to the Nation: Evaluation Report. November 1998. Available at http://depts.washington.edu/ccph/pdf_files/HPSISN%20Final%20Evaluation%20Report%2019996-1998.pdf. Accessed May 20, 2013.

[7] Seifer SD. Service-Learning: Community-campus partnerships for Health Professions Education. *Acad Med*. 1998; 73:273-277.

[8] ABIM Foundation. American Board of Internal Medicine, ACP-ASIM Foundation. American College of Physicians-American Society of Internal Medicine, European Federation of Internal Medicine. Medical professionalism in the new millennium: a physician charter. *Ann Intern Med*. 2002;136:243-6.

[9] AAP Agenda for Children - Strategic Plan. American Academy of Pediatrics website. http://www.aap.org/en-us/about-the-aap/aap-facts/AAP-Agenda-for-Children-Strategic-Plan/Pages/AAP-Agenda-for-Children-Strategic-Plan.aspx. Accessed June 1, 2013.

[10] Personal communication from LCME secretary Dan Hunt. July 8, 2011.

[11]Liaison Committee on Medical Education. Functions and Structure of a Medical School. Standards for Accreditation of Medical Education Programs Leading to the M.D. Degree. Washington, D.C; 2011.

[12] Regional Medicine-Public Health Education Centers. https://www.aamc.org/initiatives/cdc/aamcbased/rmphec/. Accessed July 26, 2012.

[13] Association of American Medical Colleges. Public Health and Medical Education Bibliography. Washington, D.C.; 2009.

[14] Maeshiro R, Johnson I, Koo D, Parboosingh J, Carney JK, Gesundheit N, Ho ET, Butler-Jones D, Donovan D, Finkelstein JA, Bennett NM, Shore B, McCurdy SA, Novick LF, Velarde LD, Dent MM, Banchoff A, Cohen L. Medical Education for a Healthier Population: Reflections on the Flexner Report From a Public Health Perspective. *Acad Med*. 2010; 85::211-219.

[15] Maeshiro R. Public health practice and academic medicine: promising partnerships. Regional medicine public health education centers- two cycles. *J Public Health Management Practice.* 2006; 12:493-495.

[16] Whitcomb, ME. What community-based education can teach tomorrow's doctors. *Acad Med.* 2005;80:315-316.

[17] Chamberlain LJ, Wang NE, Ho ET, Banchoff AW, Braddock CH, Gesundheit N. Integrating collaborative population health projects into a medical student curriculum at Stanford. *Acad Med*. 2008; 83:338-344.

[18] Simoyan OM, Townsend JM, Tarafder MR, DeJoseph D, Stark RJ, White MV. Public Health and Medical Education: A Natural Alliance for a New Regional Medical School. *Am J Prev Med*. 2011; 41(4S3): S220-S227.

[19] Blumenthal DS, Jones A, McNeal, M. Evaluating a Community-based Multiprofessional Course in Community Health. *Educ Health*. 2001;14:251-255.

[20] Carney JK, Hackett R. Community-Academic Partnerships: A "Community-First" Model to Teach Public Health. *Educ Health*. 2008; 21: 166.

[21] Sava S, Armitage K Kaufman A. It's time to integrate public health into medical education and clinical care. *J Public Health Management Practice*. 2013; 19: 197-198.

[22] O'Tooole TP, Kathura N, Mishra M, Schukart D. Teaching Professionalism within a community context: Perspectives from a national demonstration project. *Acad Med*. 2005;80:339-343.

[23] McIntosh S, Block RC, Kapsak G, PearsonT. Training Medical Students in Community Health: A Novel Required Fourth-Year Clerkship at the University of Rochester. *Acad Med*. 2008;83: 357-364.

[24] Brush DF, Markert RJ, Lazarus CJ. The Relationship Between Service Learning and Medical Student Academic and Professional Outcomes. *Teaching and Learning in Medicine*. 2006; 18:9-13.

[25] Goldstein AO, Calleson D, Bearman R, Steiner BD, Frasier PY, Slatt L. Teaching Advanced Leadership Skills in Community Services (ALSCS) to Medical Students. *Acad Med.* 2009;84:754-764.

[26] Long JA, Lee RS, Federico S, Battaglia C, Wong S, Earnest M. Developing leadership and advocacy skills in medical students through service learning. *J Public Health Management Practice.* 2011; 17: 369-372.

[27] Chamberlain LJ, Wang NE, Ho ET, Banchoff AW, Braddock CH, Gesundheit N. Integrating collaborative population health projects into a medical student curriculum at Stanford. *Acad Med*. 2008; 83:338-344.

[28] Minkovitz CS, Chandra A, Solomon BS, McDonnell KA, Silver GB, Tonniges TF. Community Pediatrics: Gender Differences in Perspectives of Residents. *Ambul Pediatr*. 2006;6:326-331.

[29] US Department of Education. New Race and Ethnicity Guidance for the Collection of Federal Education Data. http://www2.ed.gov/policy/rschstat/guid/raceethnicity/index.html. Accessed July 26, 2012.

[30] Sanders LM. Survey Methods for Students in the Social Medicine Pathway, University of Miami 2007.

[31]Anu F. Shinnamon, Sherril B. Gemon, and Barbara A.Holland. Methods and Strategies for Assessing Service Learning in the Health Professions. San Francisco: Community Campus Partnerships for Health, 1999.

[32] Midwest Consortium for Service Learning in Higher Education.

[33] Otterbein University, Learn and Serve America and The Great Cities, Great Service Consortium. Survey of Community Partners.

[34] The Community Pediatrics and Advocacy Program at The Children's Hospital of Philadelphia. Sponsored by The Dyson Foundation and prepared by the Philadelphia Health Management Corporation, 2003.

[35] This survey is funded in part by the Corporation for National and Community Service, Learn and Serve America and was developed with input from Kirsten Breckinridge, Corporation for National and Community Service; Christine Cress, Portland State University; Peter Levine, Tufts University; Piper McGinley, California Campus Compact; Mary Prentice, New Mexico State University; and Gail Robinson, American Association of Community Colleges

[36] IBM SPSS Advanced Statistics 19. Available at http://www.unt.edu/rss/class/Jon/SPSS_SC/Manuals/v19/IBM%20SPSS%20Advanced%20Statistics%2019.pdf.

[37] Okuda Y, Bryson EO, DeMaria S, Jacobson L, Quinones J, Shen B, Levine AI. The utility of simulation in medical education: What is the evidence? *Mount Sinai Journal of Medicine*, 2009: 76: 330-343.

[38] McGaghie WC, Issenberg SB, Petrusa ER, Scalese RJ. A critical review of simulation-based medical education research: 2003–2009. *Medical Education* .2010; 44: 50–63.

[39] McGaghie WC, Issenberg SB, Cohen ER, Barsuk JH, Wayne DB. Does Simulation-Based Medical Education With Deliberate Practice Yield Better Results Than Traditional Clinical Education? A Meta-Analytic Comparative Review of the Evidence. Acad Med. 2011;86: 706-711.