



October 2017

# Lifestyle Medicine Professionals in Training: A Survey of Behaviors, Knowledge and Needs

Camille A. Clarke

*Loma Linda University, [mme.cclarke@gmail.com](mailto:mme.cclarke@gmail.com)*

Jonathan P. Bonnet

*[jonathanbonnet@gmail.com](mailto:jonathanbonnet@gmail.com)*

Marsha Gail Davis

*Yale University, [gail.marsha@gmail.com](mailto:gail.marsha@gmail.com)*

Elizabeth P. Frates

*Harvard University Medical School, [bethfrates@gmail.com](mailto:bethfrates@gmail.com)*

Follow this and additional works at: <https://nsuworks.nova.edu/ijahsp>



Part of the [Interprofessional Education Commons](#)

## Recommended Citation

Clarke CA, Bonnet JP, Gail Davis M, Frates EP. Lifestyle Medicine Professionals in Training: A Survey of Behaviors, Knowledge and Needs. The Internet Journal of Allied Health Sciences and Practice. 2017 Oct 09;15(4), Article 11.

This Manuscript is brought to you for free and open access by the College of Health Care Sciences at NSUWorks. It has been accepted for inclusion in Internet Journal of Allied Health Sciences and Practice by an authorized editor of NSUWorks. For more information, please contact [nsuworks@nova.edu](mailto:nsuworks@nova.edu).

---

## **Lifestyle Medicine Professionals in Training: A Survey of Behaviors, Knowledge and Needs**

**Background/Purpose:** It is well known that healthy lifestyle habits can influence chronic disease risk and outcomes. The effective practice of Lifestyle Medicine (LM), however, goes beyond general recommendations and has been encapsulated in well-defined clinical competencies. While it has been documented that graduating medical students feel inadequately prepared to counsel patients in nutrition and exercise, the purpose of this study is to explore the perceptions and experiences of Lifestyle Medicine in a group of interdisciplinary healthcare trainees. **Methods:** A pilot survey of trainees at the 2015 Annual American College of Lifestyle Medicine (ACLM) Conference assessed perspectives on the inclusion of nutrition and exercise in their educational curricula, knowledge of core LM competencies and personal health habits. **Results:** Of the 37 trainees registered, 22 surveys were completed. Twenty-six percent indicated they were exposed to courses in exercise; sixty-five percent reported having a nutrition block and fifty percent received instruction on counseling about LM behaviors. Relative importance using Likert scale (1-not important, 5-very important) ascribed similar levels of importance to exercise (4.44), nutrition (4.31), and behavioral counseling (4.58) training. Ninety-five percent reported personal engagement in physical activity, however only forty-two percent were familiar with the Lifestyle Medicine core competencies. Ninety-four percent indicated that the current medical model was insufficient in educating trainees to address lifestyle related diseases. **Conclusion:** In a select multidisciplinary sample of trainees, there is recognition of the importance of Lifestyle Medicine training. Although trainees surveyed practice healthful behaviors, the majority were not familiar with core Lifestyle Medicine competences and express strong interest in increased Lifestyle Medicine in their training experience.

---

### **Author Bio(s)**

**Camille A Clarke, MD** Currently works an Assistant Professor of Medicine at Loma Linda University in the Departments of Preventive and Internal Medicine. She was a 2015 graduate of Cambridge Health Alliance-Harvard Internal Medicine-Primary Care Residency Program.

**Jonathan Bonnet, MD** Currently a Teaching Assistant at the Harvard University Extension School. He Graduated from the Sports Medicine Fellowship at the University of Florida and the Family Medicine Residency at Duke University.

**Marsha Gail Davis MD** Is a resident in the Primary Care Internal Medicine Program Candidate at Yale University. She is a graduate of the University of California San Diego School of Medicine.

**Elizabeth P. Frates, MD** Currently a part-time Assistant Professor at Harvard Medical School. Also serves as the director of Wellness Programming at the Stroke Institute for Research and Recovery in Spaulding Rehabilitation Hospital.

---

### **Acknowledgements**

N/A.



---

## Lifestyle Medicine Professionals in Training: A Survey of Behaviors, Knowledge and Needs

---

Camille A. Clarke, MD<sup>1</sup>  
Jonathan P. Bonnet, MD  
Marsha Gail Davis, MD<sup>2</sup>  
Elizabeth P. Frates, MD<sup>3</sup>

1. Loma Linda University
2. Yale University
3. Harvard Medical School

United States

---

### Abstract

**Background/Purpose:** It is well known that healthy lifestyle habits can influence chronic disease risk and outcomes. The effective practice of Lifestyle Medicine (LM), however, goes beyond general recommendations and has been encapsulated in well-defined clinical competencies. While it has been documented that graduating medical students feel inadequately prepared to counsel patients in nutrition and exercise, the purpose of this study is to explore the perceptions and experiences of LM in a group of interdisciplinary healthcare trainees. **Methods:** A pilot survey of trainees at the 2015 Annual American College of Lifestyle Medicine (ACLM) Conference assessed perspectives on the inclusion of nutrition and exercise in their educational curricula, knowledge of core LM competencies, and personal health habits. **Results:** Of the 37 trainees registered, 22 surveys were returned with 18 completed surveys. All 22 surveys were included in the data analysis. Twenty-six (5/19) percent indicated they were exposed to courses in exercise; sixty-five percent (13/20) reported having a nutrition block, and fifty percent (10/20) received instruction on counseling about LM behaviors. Relative importance using Likert scale (1-not important, 5-very important) ascribed similar levels of importance to exercise (4.44), nutrition (4.31), and behavioral counseling training (4.58). Ninety-five percent (21/22) reported personal engagement in physical activity, however only forty-two percent (8/19) were familiar with the LM core competencies. Ninety-four percent (17/18) indicated that the current medical model was insufficient in educating trainees to address lifestyle related diseases. **Conclusion:** In a select multidisciplinary sample of trainees, there is recognition of the importance of LM training. Although trainees surveyed practice healthful behaviors, the majority were not familiar with core LM competences and express strong interest in increased LM in their training experience.

---

### BACKGROUND

The startling global rise of non-communicable disease over the past years has been declared an epidemic.<sup>1</sup> Death rates from preventable diseases are on the rise, and it is reported that 60 to 70% of health care visits in industrialized countries are correlated with lifestyle-induced and preventable disease.<sup>2,3</sup> It is well known that lifestyle interventions are important strategies to address this rising problem, however, research shows that though effective modalities of Lifestyle Medicine (LM) have been largely underutilized.<sup>4-6</sup> Barss et al rationale for this underutilization is the dearth of training that exists in the current medical education curricula.<sup>7</sup> While the effectiveness of lifestyle medicine in the management of chronic disease is well known and an expectation in practice as first line treatment for a variety of conditions, it is not routinely a part of undergraduate healthcare education.<sup>8,9</sup>

Lifestyle Medicine is defined as the “evidence-based practice of assisting individuals and families adopt and sustain behaviors that can improve health and quality of life.”<sup>10</sup> While many presume that counseling on health behaviors is becoming mainstream, the effective practice of lifestyle medicine goes beyond basic recommendations for weight loss and eating five fruits and

vegetables per day. LM practitioners need to collaborate with and coach their patients in a partnership style that involves a long-term relationship. The successful practice of LM includes well-defined competencies with leadership, knowledge, and management along with the effective use of office and community based support in making the implementation of healthful lifestyle principles most effective.<sup>10</sup>

The prevalence of lifestyle related diseases substantiates the argument to ensure healthcare providers are familiar with evidence-based competencies in the prevention and treatment of chronic disease. In fact, twenty years ago, national surveys of deans across United States (US) medical schools revealed that health promotion and disease prevention rank among the top three areas of education that should be emphasized in medical school curricula by both allopathic and osteopathic medical school deans.<sup>11</sup> Despite this acknowledgement, studies looking at exercise and nutrition, two main branches in LM, show that only 28 out of 105 medical schools meet the minimum required 25 hours set by the National Academy of Science.<sup>12</sup> In addition, only 13% of 102 medical school assistant deans of education reported a curriculum in physical activity.<sup>12</sup> Inadequate medical training has been cited as the major reason for inadequate physical activity counseling during physician office visits when physicians were surveyed.<sup>13,14</sup> In terms of trainee evaluation, most graduating medical students rate their nutrition preparation as inadequate according to recent National Institute of Health nutritional education status analysis.<sup>13,14</sup>

Given the paucity of LM exposure for most medical students, it is not surprising that the majority of physicians do not routinely counsel patients in lifestyle related diseases. Knowledge of core LM principles among healthcare professionals has been lacking for years.<sup>5</sup> Recent expert panel discussions convened and called for more intensive efforts to integrate LM education competencies into Graduate Medical School Educational curricula.<sup>15</sup> Attention has also been given to undergraduate medical education. The Lifestyle Medicine Education Collaborative was formed in 2014 by the Institute of Lifestyle Medicine and the University of South Carolina-Greenville. Their mission is to provide resources and curricular materials to medical schools to incorporate into medical student education.<sup>16</sup>

To carry out effective sustainable long-term chronic health lifestyle modification, a multi-disciplinary approach is needed. Current literature suggests that a multidisciplinary lifestyle interventional approach is most effective for the optimal management of a variety of chronic diseases and metabolic illness.<sup>17</sup> Multiple confirmatory impacts from different health care providers bring about the best results in behavioral change.<sup>18</sup> While the aforementioned evidence creates a convincing case for the inclusion of interdisciplinary LM programs, no literature has been produced that evaluates interdisciplinary trainee perspective on the importance and prevalence of lifestyle medicine training in the educational curricula. Our pilot study sought to evaluate trainees' perspectives on the inclusion of key LM principles in their current training curricula along with assessing their knowledge of core LM competencies, and their personal practice of these principles.

## **METHODS**

### **Study Population**

The American College of Lifestyle Medicine (ACLM) is a professional interdisciplinary medical association geared towards medical and allied health professionals who are committed to enhancing the clinical practice of LM. At its 2015 annual national conference in Nashville, TN, subjects who consented filled out the survey. There were over 700 attendees, 37 of which were trainees. The study was reviewed by the Institutional Review Board at Harvard Medical School and found to be exempt.

### **Survey Instrument**

The survey covered 5 broad domains: 1) Inclusion of nutrition and exercise training in healthcare curricula, 2) Modeling of healthcare behaviors by instructors, 3) Familiarity with LM core competencies for Physicians, 4) Personal health behaviors, and 5) Important topics to include in educational curricula.

The survey was available throughout the 4-day conference at the trainee booth and it was also distributed at trainee sponsored events. The survey consisted of two pages of closed and open-ended questions. Trainees were asked if they had a course on exercise prescription, nutrition, and LM counseling. Also, there was a Likert scale of 1-5 (1-not important, 5-very important) for participants to rate how important the following topics were: exercise, nutrition, and counseling patients on healthy behavioral habits. Questions about trainee experience with LM oriented faculty or instructors at their institution were also asked. The personal exercise habits of trainees were assessed through questions regarding their participation in aerobic exercise and strength training. Respondents were asked to indicate, by marking 'yes' or 'no' if they were familiar with published LM competencies. Then, there was an open-ended question to assess their perception of what would be the most worthwhile inclusion into their current educational curricula.

Participants returned the survey to members of the Professionals in Training Executive Board, a branch of the ACLM. A data set from the entries was generated and Microsoft Excel was used for its analysis.

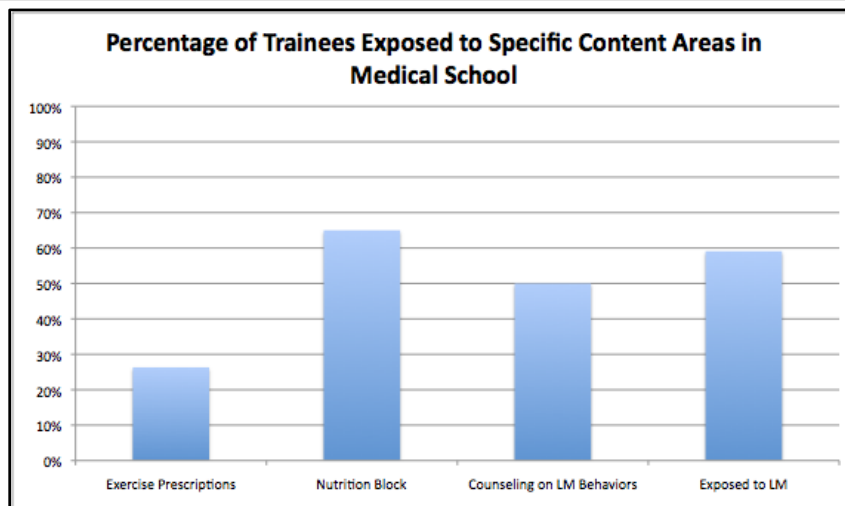
## RESULTS

Thirty-seven trainees attended the national ACLM Conference. Twenty-two surveys were returned with 18 of the 22 being fully completed. Four of the 22 surveys did not have all of the questions answered. All responses were included in the analysis. Response rates for questions ranged from 82 to 100%.

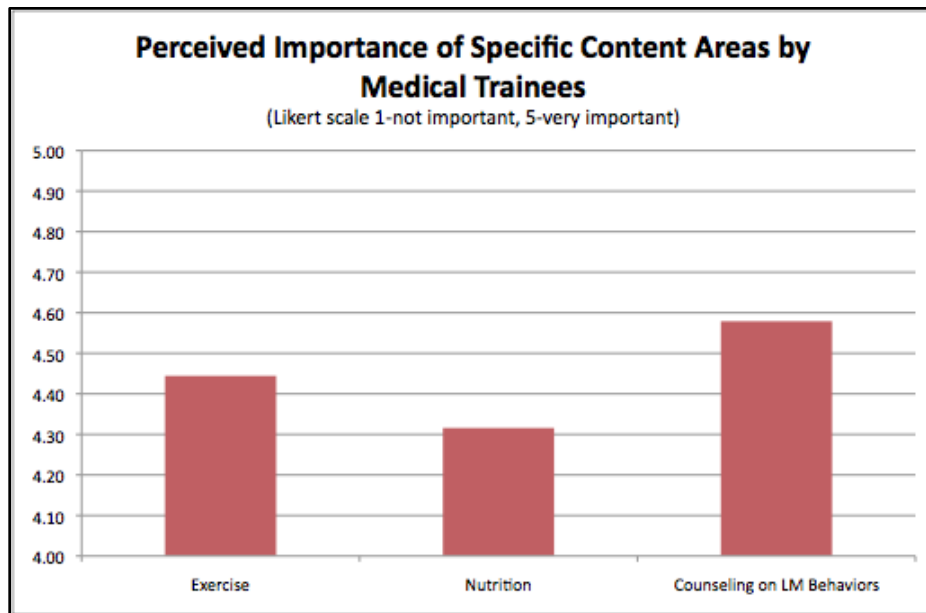
No demographic information was collected on the surveys, however, conference registration from the 37 trainees indicated the following fields of study: residents-MD/DOs (18), medical students (9), nursing students (3), doctoral students (3), master's students (1), occupational therapy students (1), physician assistant students (1), and undergraduate students (1).

### Trainee LM Content Exposure

Twenty-six percent (5/19) of trainees indicated they were exposed to exercise in medical school. Sixty-five percent (13/20) had a nutrition block. Fifty percent (10/20) received instruction on counseling about LM behaviors, and fifty nine percent (13/22) indicated that they were exposed to some aspect of LM (Figure 1). Relative importance (Likert scale: 1-not important, 5-very important) ascribed to exercise (4.44), nutrition (4.31), and behavioral counseling (4.58) were similar (Figure 2).



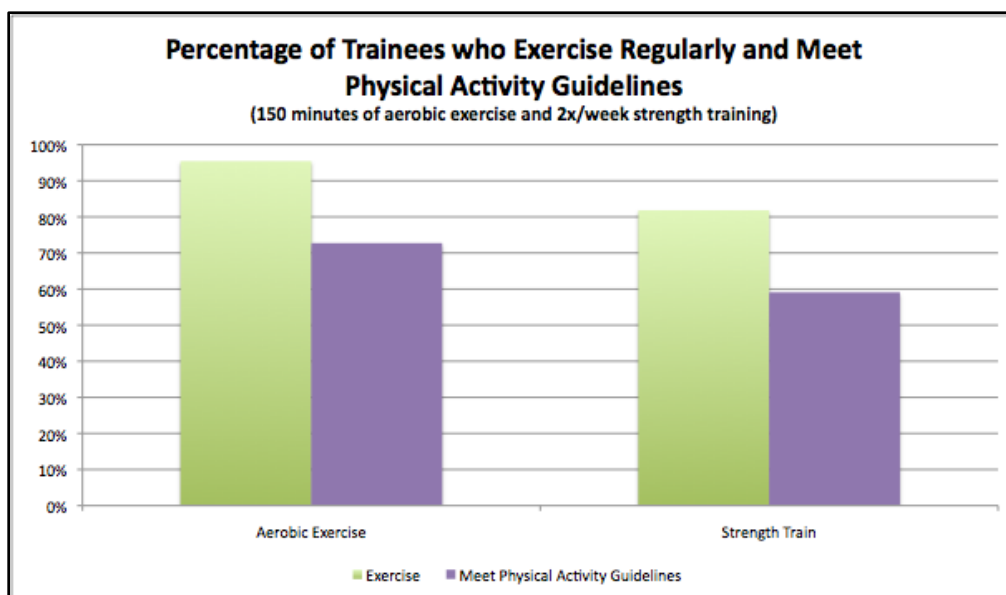
**Figure 1:** Percentage of trainees exposed to various LM related content in medical professional education (N=Number of respondents) Exercise Prescriptions (N=19), Nutrition Block (N=20), Counseling on LM Behaviors (N=20), Exposed to LM (N=22)



**Figure 2:** Perceived importance of specific LM content areas by trainees (N=Number of respondents) (Exercise (N=18), Nutrition (N=19), Counseling on LM Behaviors (N=19))

### Trainee Exercise Behaviors

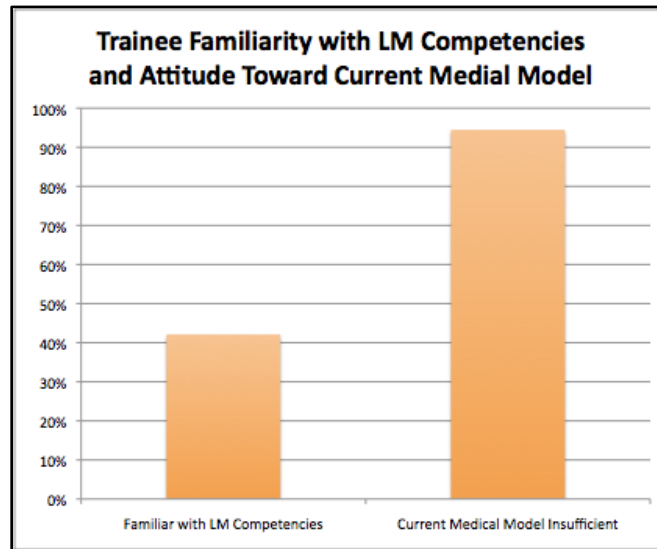
Ninety-five percent (21/22) of trainees engage in aerobic activity regularly, with 72% (16/22) obtaining at least 150 minutes per week. Eighty-one percent (18/22) of trainees engage in strength train regularly, with 59% (N=22) doing so at least 2 times per week (Figure 3). The American College of Sports Medicine (ACSM) guidelines for healthy adults recommends 150 minutes of moderate intensity exercise weekly and strength training two to three times per week for the healthy adult.<sup>19</sup>



**Figure 3:** Percentage of trainees (N=22) who exercise regularly (green) and meet ACSM guidelines (purple)

### Familiarity with LM

Forty-two percent (8/19) of trainees indicated that they were familiar with the LM competencies published in *The Journal of the American Medical Association*.<sup>10</sup> Ninety-four percent (17/18) of trainees indicated that the current medical model was insufficient in training students to treat lifestyle related diseases. (Figure 4)



**Figure 4:** Trainee Familiarity with LM competencies and attitude toward current medical model

#### Trainee Comments

Trainee comments around the inclusion of LM in their educational curricula highlighted their perceived need to address the root cause of chronic disease and underlined the role of lifestyle inclusion in sustaining the current healthcare system. Participants further contrasted their attitudes with those of some of their peers, stating that many believe it is easier to give drugs than counsel on positive lifestyle behavioral practices. They called for LM to be used as a first line treatment modality for addressing chronic disease and state that patients can change if health professionals and trainees believe that they can.

Trainees indicated that prior LM experiences have ranged from clinical experience, ACLM conferences, research, or online resources (e.g. [www.nutritionfacts.org](http://www.nutritionfacts.org)). Trainees defined LM in a variety of ways, with most focusing on health promotion, disease prevention through lifestyle behavior change in areas such as: diet, physical activity, stress, sleep, and social support.

Virtually all trainees remarked that they intend to use LM in some capacity in their future careers. Some indicated using it for individual counseling, group visits, designing interventions, research, and weaving it into everything they do.

Proposed solutions to address the insufficient LM training in the current medical model included: adding specific LM tracks, LM modules, finding interested LM faculty, and complete integration of LM into currently existing curricula.

#### DISCUSSION:

Our study was designed to evaluate multidisciplinary trainees on three elements: perspective on the inclusion of key LM principles in their current training curriculum, knowledge of the core LM competencies, and personal practice of these principles. The results suggest the majority of trainees have been exposed to some aspect of LM in their training. More specifically, among content areas, trainees were exposed to nutrition and LM counseling more than exercise prescriptions. Exposure to exercise prescriptions was considerably lower than other content areas.

This finding appears to be consistent with past trends in medical education studies that have focused more on nutrition than exercise. Additionally, trainees assigned a high level of importance to these three content areas. Among these content areas, LM counseling was assigned the highest importance while nutrition was assigned the lowest importance. Review of curriculum accreditation documents provided by the American College of Nursing, the Accreditation Review Commission on Education of the Physician Assistant, and the Commission on Accreditation in Physical Therapy Education revealed nutrition as either a component of a sample curriculum or a required element of the overall curriculum.<sup>20-22</sup> The extent of that educational exposure,



however, was unclear. Difficulty in finding a standardized nutritional education requirement among interdisciplinary programs may arguably offer some explanation. Most exercise-related curriculum were also without specific detail regarding required coursework with the exception of physical therapy training programs, which requires physiology, exercise science, kinesiology, and biomechanics.

These results highlight a deficiency of exercise-specific curriculum that may lead trainees to have a stronger desire for this content area and place higher importance on it. A recent study by Oregon State University suggests that exercise is largely absent in medical school curriculum.<sup>23</sup> Additionally, medical student competency or perceived competency in exercise prescriptions has been shown to be inadequate.<sup>24,25</sup> Most funding initiatives have been supportive of the incorporation of nutrition material but not exercise.<sup>26</sup>

Trainees strongly considered the current medical trainee education model to be insufficient in effectively training students with the skills to treat lifestyle diseases. There continues to be a strong desire for adequate lifestyle medicine education among multidisciplinary trainees though current curriculum structure has not reflected a similar level of importance in the past two decades.<sup>27-29</sup> Furthermore, initiatives have been led by students to develop LM interest groups and training programs across the nation.<sup>30,31</sup> This supports the long-standing commentary on the need for more LM education, especially, in the areas of nutrition and exercise.<sup>32,33</sup> More recently, faculty and medical students have been voicing their concerns of insufficient nutrition education.<sup>34,35</sup>

Less than 50% of participants were familiar with the LM core competencies. These competencies were published in 2010 and set the groundwork for the recently developed LM core competency online program.<sup>10</sup> This level of familiarity may be due simply to the newness of the competencies but may also demonstrate the presence of barriers in communication of new information to trainees. If this is the case for trainees interested in the field of LM, such information is even less likely to be known by the larger population of medical students. The recent remodeling of the ACLM website and the work of the Professionals in Training group may help to overcome these possible communication challenges.<sup>30,36,37</sup>

Lastly, most trainees participated in some level of physical activity with over 70% of trainees meeting ACSM guidelines for aerobic exercise and over 50% meeting the guidelines for strength training. This exceeds the 21% of Americans that meet the Physical Activity Guidelines in 2011.<sup>38</sup> Medical students have been shown to engage more in physical activity than the general population.<sup>39,40</sup> The contrary was seen in a study of female first-year nursing students where they were found to be more sedentary when compared to female students in other disciplines.<sup>41</sup> Studies show that the personal health practices of US medical students were highly predictive of patient counseling as has been similarly seen among physicians.<sup>42-44</sup> This was demonstrated by the trainees of this study attending a LM conference.

Some limitations of the study include a small sample size, participant bias, self-reported data, lack of demographic data, lack of statistical analysis, lack of stress management and sleep content areas in the assessment, and broad nature of the survey. It is unknown whether the survey respondents were all exposed to medical school education or whether other disciplines responded. The number of trainees registered for the conference was 37. The response rate for the completed survey was 49% (59% if one includes the partially completed trainee surveys). Trainees represented a biased sample as they were surveyed at the Annual Lifestyle Medicine Conference and represented a group that at baseline had a high interest in LM. In being motivated to seek additional training, these participants were likely more aware of the adequacies and deficiencies at their respective institutions. With the majority of the trainees meeting current national exercise guidelines and the research supporting the influence of health behaviors on counseling, it may be advantageous to assess the factors that increase the likelihood of medical students engaging in healthy behaviors and promoting those factors in medical school education. With self-reported data, there is always concern about the accuracy of responses.

Trainees completed the surveys on site and were current students, residents, or enrolled in other healthcare training programs, increasing their ability to assess the current educational experiences. Demographic data were not collected which does not provide a perspective of each discipline. Curriculum can vary widely among disciplines so this would be an important consideration for future studies. No statistical methods were employed in the study. However, the purposes of the study were more observational and informative than finding statistical significance among responses.



The effective practice of Lifestyle Medicine also includes sleep and stress management, which was lacking in the assessment used in the study. Nutrition and exercise are content areas of LM that have traditionally received the most attention but including other areas of LM can offer a more rounded assessment of the current trainee perspective. Lastly, to increase the robustness of the study, in the future, survey questions may be directed to assess the specific components of curriculum such as specific topics in nutrition, number of teaching hours, structure of content delivery (block or thread), as well as assessment of trainee adherence to dietary guidelines.

This study included students in other disciplines. This interdisciplinary approach is representative of the current model of team-based medicine. As mentioned by McMahon in a recent article on continuing medical education, "Health care is delivered by teams, and those teams need to learn together."<sup>45</sup> Even if team-learning may not currently be established in trainee education, improvement in LM education for all training programs would still be expected to enhance the impact of LM on patient behavior and clinical outcomes by optimizing the clinical environment. Despite limitations, some key elements continue to be highlighted in this pilot study. The inclusion of LM in medical education continues to be a challenge. From a trainee perspective, LM is a strongly desired component of health professional training. Though there has been progress, the level of LM education remains inadequate for the purposes of training health professionals in various disciplines to effectively treat chronic diseases. LM counseling skills including behavior change theory and motivational strategies continue to be viewed as important and necessary skills to develop during training.

### CONCLUSION:

In a small pilot study of multidisciplinary trainees, there is recognition regarding the value and importance LM has on preventing and treating chronic disease. Although the results suggest that there is some exposure to LM related topics in a variety of health care related curricula, trainees appear to be desirous of incorporating more practical LM training in their respective curricula. Many trainees are practicing LM behaviors personally, however, even among interested trainees, there appears to be lack of familiarity with the published core competencies of LM. More research and larger studies are needed to evaluate the current trainee educational experiences and to discern the feasibility of incorporating more basic LM training in healthcare related education as well as clinical care.

### REFERENCES:

1. Anderson K, Gudnason V. Chronic non-communicable diseases: a global epidemic of the 21st century. *Laeknabladid*. 2012 Nov;98(11):591-5. [PMID: 23232660]
2. Egger GJ, Binns AF, Rossner SR. The emergence of lifestyle medicine as a structured approach for management of chronic disease. *Med J Aust*. 2009;190(3):143-5. [PMID: 19203313]
3. Center for Disease Control and Prevention. *Chronic Disease Overview*. <http://www.cdc.gov/chronicdisease/overview/>. Update August 25, 2016. Accessed July 4, 2017.
4. World Health Organization. *Diet, Nutrition and Prevention of Chronic Disease*. *World Health Organ Tech Rep Ser*. 916.i-viii (2003). <http://www.who.int/dietphysicalactivity/publications/trs916/en/>
5. Barnes PM, Schoenborn CA. Trends in adults receiving a recommendation for exercise or other physical activity from a physician or other health professional. *NCHS data brief*, no 86. Hyattsville, MD: National Center for Health Statistics. 2012.
6. Kolasa KM, Rickett K. Barriers to providing counseling cited by physicians: a survey of primary care practitioners. *Nutr Clin Pract*. 2010 Oct;25(5):502-9. doi: 10.1177/0884533610380057. [PMID: 20962310]
7. Barss P, Grivna M, Al-Maskari F, Kershaw G. Strengthening public health medicine training for medical students: development and evaluation of a lifestyle curriculum. *Med Teach*. 2008;30(9-10):e196-218. doi: 10.1080/01421590802334267. [PMID: 19117217]
8. Lobelo F, Duperly J, Frank E. Physical activity habits of doctors and medical students influence their counseling practices. *Br J Sports Med*. 2009;43(2):89-92. [PMID: 19019898]
9. Balls JE, Price JH, Dake JA, Jordan TR, Khuder S. African American primary care physicians' perceptions and practices regarding smoking cessation therapy. *J Natl Med Assoc*. 2010;102(7):579-89. [PMID: 20690321]
10. Lianov L, Johnson M. Physician competencies for prescribing lifestyle medicine. *JAMA*. 2010;304(2):202-3. [PMID: 20628134]
11. Graber DR, Bellack JP, Musham C, O'Neil EH. Academic deans' views on curriculum content in medical schools. *Acad Med*. 1997 Oct;72(10):901-7. [PMID: 9347713]
12. Adams KM, Lindell KC, Kohlmeier MP, Zeisel SH. Status of nutrition in US medical schools. *Am J Clin Nutr*. 2006 Apr; 83(4):941S-4S. [PMID: 16600952]

13. Darer JD, Hwang W, Pham HH, Bass EB, Anderson G. More training needed in chronic care: a survey of US physicians. *Acad Med*. 2004;79(6):541-8. [PMID: 15165973]
14. Howe M, Leidel A, Krishnan SM, Weber A, Rubenfire M, Jackson EA. Patient-related diet and exercise counseling: do providers' own lifestyle habits matter? *Prev Cardiol*. 2010;13(4):180-5.
15. Bipartisan Policy Center. *Teaching Nutrition and Physical Activity in Medical School: Training Doctors for Prevention-oriented Care*. 2014. Available from:[http://bipartisanpolicy.org/sites/default/files/Med\\_Ed\\_Report.PDF](http://bipartisanpolicy.org/sites/default/files/Med_Ed_Report.PDF). Accessed July 4, 2017.
16. Phillips E, Pojednic R, Polak R, Bush J, Trilk J. Including lifestyle medicine in undergraduate medical curricula. *Med Educ Online*. 2015;20:26150. doi:<http://dx.doi.org/10.3402/meo.v20.26150>. [PMID: 25652118]
17. Inzucchi SE, Bergenstal RM, Buse JB, Diamant M, Ferrannini E, et al. Management of hyperglycemia in type 2 diabetes: a patient-centered approach: position statement of the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD). *Diabetes Care*. 2012;35(6):1364-79. [PMID: 22517736]
18. Malone M, Alger-Mayer SA, Anderson DA. The lifestyle challenge program: a multidisciplinary approach to weight management. *Ann Pharmacother*. 2005 Dec;39(12):2015-20. [PMID: 16288070]
19. Garber CE, Blissmer B, Deschenes MR, et al. Quantity and quality of exercise for developing and maintaining cardiorespiratory musculoskeletal and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. *Med. Sci. Sports Exerc*. 2011; 43(7):1334-1359.
20. American Association of College of Nursing (AACN). *Standards, Procedures and Resources*. <http://www.aacn.nche.edu/cnec-accreditation/standards-procedures-resources/overview>. Accessed on February 15, 2017.
21. Accreditation Review Commission for the Physician Assistant (ARC-PA). *Accreditation Standards for Physician Assistant Education*, 4e. March 2010. <http://www.arc-pa.org/wp-content/uploads/2016/10/Standards-4th-Ed-March-2016.pdf>. Accessed on February 15, 2017.
22. Commission on Accreditation in Physical Therapy Education (CAPTE). *Standards and Required Elements of Accreditation of Physical Therapist Education Programs*. Revised 11/11/15. [http://www.capteonline.org/uploadedFiles/CAPTEorg/About\\_CAPTE/Resources/Accreditation\\_Handbook/CAPTE\\_PTStandardsEvidence.pdf](http://www.capteonline.org/uploadedFiles/CAPTEorg/About_CAPTE/Resources/Accreditation_Handbook/CAPTE_PTStandardsEvidence.pdf). Accessed on February 15, 2017.
23. Cardinal BJ, Park EA, Kim M, Cardinal MK. If exercise is medicine, where is exercise in medicine? review of US medical education curricula for physical activity-related content. *J Phys Act Health*. 2015;12(9):1336-43. doi:10.1123/jpah.2014-0316. [PMID: 25459966]
24. Connaughton AV, Weiler RM, Connaughton DP. Graduating medical students' exercise prescription competence as perceived by deans and directors of medical education in United States: implications for Healthy People 2010. *Public Health Rep*. 2001;116(3):226-34. [PMID: 12034912]
25. Vallance JK, Wylie M, MacDonald R. Medical students' self perceived competence and prescription of patient-centered physical activity. *Prev Med*. 2009;48(2):164-6. [PMID: 19135081]
26. Van Horn L. The nutrition academic award: brief history, overview, and legacy. *Am J Clin Nutr*. 2006;83(4):936S-40S. [PMID: 16600951]
27. Adams KM, Kohlmeier MP, Zeisel SH. Nutrition education in US medical education: latest update of a national survey. *Acad Med*. 2010 Sep;85(9):1537-42. [PMID: 20736683]
28. Cardinal BJ, Park EA, Kim M, Cardinal MK. If exercise is medicine, where is exercise in medicine? review of US medical education curricula for physical activity-related content. *J Phys Act Health*. 2015;12(9):1336-43. [PMID: 25459966]
29. Putre L. Medical schools recognize the importance of lifestyle choices. *AAMC Reporter*. January 2014.
30. Clarke C, Edshteyn I, Zhu C. An emerging medical education competency: Lifestyle Medicine. *SGIM Forum*. 2015;38(2).
31. Pojednic R, Frates E. A parallel curriculum in lifestyle medicine. *Clin Teach*. 2017;14(1):27-31. doi:10.1111/tct.12475. [PMID: 26639320]
32. Phillips EM. A call to arms (and legs): exercise prescription for medical students. *PM R*. 2012;4(11):914-8. [PMID: 23174559]
33. Seres D. *The Need for Nutrition Education in Med Schools*. August 11, 2014. <http://thehill.com/blogs/pundits-blog/healthcare/214797-the-need-for-nutrition-education-in-med-schools>. Accessed January 18, 2016.
34. Morris N. The neglect of nutrition in medical education: a first hand look. *JAMA*. 2014;174(6):841-2. [PMID: 24733421]
35. Eisenberg DM. Nutrition education in an era of global obesity. *Acad Med*. 2015 Jul;90(7):854-60. [PMID: 25785680]
36. American College of Lifestyle Medicine. <http://www.lifestylemedicine.org/>. Accessed January 18, 2016.

37. *American College of Lifestyle Medicine Professionals in Training Executive Board*. American College of Lifestyle Medicine. <http://www.lifestylemedicine.org/executive-board>. Accessed January 18, 2016.
38. *Facts about Physical Activity*. Center of Disease Control and Prevention website. <http://www.cdc.gov/physicalactivity/data/facts.htm>. Updated May 23, 2014. Accessed January 18, 2016.
39. Stanford FC, Durkin MW, Stallworth JR, Blair SN. Comparison of physical activity levels in physicians and medical students with the general adult population of the United States. *Phys Sportsmed*. 2013;41(4):86-92. [PMID: 24231600]
40. Frank E, Tong E, Lobelo F, Carrera J, Duperly J. Physical activity levels and counseling practices of US medical students. *Med Sci Sports Exerc*. 2008 Mar;40(3):413-21. [PMID: 18379201]
41. Irazusta A, Gil S, Ruiz F, Gondra J, Jauregi A, et al. Exercise, physical fitness and dietary habits of first-year female nursing students. *Biol Res Nurs*. 2006;7(3):175-86. [PMID: 16552945]
42. Frank E, Carrera JS, Elon L, Hertzberg VS. Predictors of US medical students' prevention counseling practices. *Prev Med*. 2007;44(1):76-81. [PMID: 16978687]
43. Abramson S, Stein J, Schaufele, Frates E, Rogan S. Personal exercise habits and counseling practices of primary care physicians: a national survey. *Clin J Sports Med*. 2000;10(1):40-8. [PMID: 10695849]
44. Oberg EB, Frank E. Physicians' health practices strongly influence patient health practices. *J R Coll Physicians Edinb*. 2009;39(4):290-1. [PMID: 21152462]
45. McMahon GT. Advancing Continuing Medical Education. *JAMA*. 2015;314(6):561-2. doi:10.1001/jama.2015.7094. [PMID: 26192406]