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# Exercise medicine and physical activity promotion: core curricula for US medical schools, residencies and sports medicine fellowships: developed by the American Medical Society for Sports Medicine and endorsed by the Canadian Academy of Sport and Exercise Medicine

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# Exercise medicine and physical activity promotion: core curricula for US medical schools, residencies and sports medicine fellowships: developed by the American Medical Society for Sports Medicine and endorsed by the Canadian Academy of Sport and Exercise Medicine

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## ABSTRACT

Regular physical activity provides a variety of health benefits and is proven to treat and prevent several non-communicable diseases. Specifically, physical activity enhances muscular and osseous strength, improves cardiorespiratory fitness, and reduces the risk of hypertension, coronary heart disease, stroke, type 2 diabetes, mental health disorders, cognitive decline and several cancers. Despite these well-known benefits, physical activity promotion in clinical practice is underused due to insufficient training during medical education. Medical trainees in the USA receive relatively few hours of instruction in sports and exercise medicine (SEM). One reason for this shortage of instruction is a lack of curricular resources at each level of medical education. To address this need, the American Medical Society for Sports Medicine (AMSSM) assembled a group of SEM experts to develop curricular guidance for exercise medicine and physical activity promotion at the medical school, residency and sports medicine fellowship levels of training. After an evidence review of existing curricular examples, we performed a modified Delphi process to create curricula for medical students, residents and sports medicine fellows. Three training level-specific curricula emerged, each containing Domains, General Learning Areas, and Specific Learning Areas; options for additional training and suggestions for assessment and evaluation were also provided. Review and comment on the initial curricula were conducted by three groups: a second set of experts in exercise medicine and physical activity promotion, sports medicine fellowship directors representing a variety of fellowship settings and the AMSSM Board of Directors. The final curricula for each training level were prepared based on input from the review groups. We believe enhanced medical education will enable clinicians to better integrate exercise medicine and physical activity promotion in their clinical practice and result in healthier, more physically active patients.

## INTRODUCTION

Up to 80% of diseases in the USA. are due to lifestyle behaviours.[1] One of the most effective interventions for the treatment and prevention of non-communicable diseases is physical activity and exercise. Despite the proven benefits of regular physical activity on cardiometabolic parameters, mental health and cognition, many medical professionals feel ill equipped to counsel patients on appropriate lifestyle behaviours centred on physical activity.[2] This is partly due to training deficiencies during medical education.[3–6] For instance, the average that American medical schools require is only 8 hours of curriculum on physical activity over the 4 years of training.[7] Similarly, the average offered by primary care residency programmes was only 3 hours per year of didactic training on physical activity, nutrition and obesity, while a survey of American sports medicine fellowship directors found that 63% of fellows were not taught how to write an exercise prescription.[2 8] Without fundamental knowledge in exercise medicine and proper training on how to promote physical activity in clinical practice, use of this low-cost, evidence-based intervention for the prevention and treatment of chronic diseases will remain limited. Additionally, because physical inactivity and several associated non-communicable diseases disproportionately affect marginalised communities including under-represented minorities and persons of colour, there is an urgent need for broader education and implementation of physical activity promotion to foster equitable healthcare delivery.[9–11]

To address this training deficiency in medical education, the American Medical Society for Sports Medicine (AMSSM) assembled a group of experts in sports and exercise medicine (SEM) education to design a series of curricula in exercise medicine and physical activity promotion (EM-PAP) to be implemented at the medical school, residency and sports medicine fellowship levels. The curricula have a particular focus on the promotion of physical activity in clinical practice and include components related to medical knowledge and experiential training. By developing this resource, we hope to enable medical schools and specialty training programmes to deliver high-quality education in the field of EM-PAP.

## IMPLEMENTATION

We believe EM-PAP curricula should be a core component of basic medical education, residency and sports medicine fellowship training. However, we also recognise the ability to initially satisfy all elements within each curriculum is aspirational, especially as programmes develop new educational resources. In particular, the comprehensive nature of the outlined curriculum for sports (and exercise) medicine fellowship training may be difficult to complete within a 1-year time frame, and we anticipate that further experience will be gained through clinical practice and continued medical education. EM-PAP education is recognised as a critical gap for learners and the adoption of any curricular elements will likely yield an improvement in the knowledge and ability of trainees to apply EM-PAP within their clinical practice. While the ability to differentiate between basic and advanced curricular elements would be ideal, programmes should consider implementation based on resource availability within their institution. Additionally, the numbers of procedures and experiences that are presented in this document are based on consensus opinion since objective data to create established benchmarks do not yet exist. These curricula are presented in their entirety to encourage and assist medical schools, residencies, and sports medicine fellowships to place a greater focus on EM-PAP education.

## METHODS

The EM-PAP group included nine experts in SEM who have clinical and educational (eg, presentation, publication or implementation experience) experience in physical activity promotion. For each of the three curricula (medical school, residency and sports medicine fellowship), a modified Delphi process was followed. After a review of curricula examples in EM-PAP, two members of the group (IA and JD) created a draft curriculum for each training level, with resulting questions created for each of the three curricula.[12 13] These questions were presented to the larger group via an anonymous survey using Survey Monkey. The questionnaires were distributed via a link embedded within an email. Members of the group were given approximately 2 weeks to complete the questionnaires; a reminder email was sent 1 week prior to the due date. Questionnaires were closed after reaching a 100% response rate from all nine members.

Each questionnaire posed a series of questions around topic areas with members agreeing or disagreeing on a topic's inclusion in the curricula. Members were given the option of commenting on the topics and making suggestions for improvement. Each response to a question involved a 5-point Likert scale as to whether the topic should be included in the curricula: 1=strongly disagree to 5=strongly agree. An element was included if 80% of participants agreed or strongly agreed it should be part of the curricula. Results of the survey, commentary and additional suggestions were collated and circulated to the group with the option of further open comment. It was not possible for the collator to identify who had provided particular comments. Where appropriate, follow-up or revised questions on the topic areas were posed in the next iteration of the questionnaire through the Delphi process.

To ensure a sequence of foundational elements, the curriculum for medical education was developed first, followed by the residency programme and then the sports medicine fellowship curriculum. The curricula are hierarchical; the top level contains the 'Domains', the second level contains 'General Learning Areas' (GLA) and each GLA is divided into 'Specific Learning Areas'. Before finalising the curricula, open review and comment by a second group of 10 experts in EM-PAP, a group of five sports medicine fellowship directors with proficiency in medical education and representing a variety of fellowship settings, two experts in the field of diversity, equity and inclusion, and the AMSSM Board of Directors, was conducted. The suggested changes were used to strengthen the language within the document, while not fundamentally altering the Delphi process for the curriculum.

## RESULTS

Tables 1–3 depict curricula for medical students, residents and sports medicine fellows, respectively. Considerations for optional training as well as suggestions for assessment and evaluation are also provided.

### Optional content for student training enhancement in EM-PAP

For students who desire more education in EM-PAP

- Participate in a scholarly project.
- Create quality improvement (QI) Initiative.
- Participate in (or organise) journal clubs related to exercise medicine and physical activity.
- Present and discuss the benefits of exercise with a community group facing barriers to physical activity.
- Serve as a longitudinal health coach, with a focus on exercise and physical activity, for a core panel of patients with chronic disease and track their disease outcomes.
- Serve longitudinally as an exercise/physical activity mentor for patients with (or at-risk for) adult and/or paediatric obesity.
- Create patient education handouts or infographics.
- Create exam/test questions.

### Assessment and evaluation of medical school student performance in EM-PAP

Examples of student assessment

- Using a standardised checklist, (eg, Observed Structured Clinical Examination (OSCE)) observe a student counselling a patient on exercise/physical activity.
- Using a standardised checklist, (eg, OSCE) review a written exercise prescription from a patient encounter.
- Administer a short answer or essay exam to assess student learning of EM-PAP curriculum content.
- Review a written description of what the student would do in response to a presented case to assess student learning of EM-PAP curriculum content.
- Allow the trainee to evaluate the EM-PAP programme with an opportunity to incorporate the trainee's suggestions for programme improvement.

### Optional content for resident training enhancement in EM-PAP

For residents who desire more education in EM-PAP

- Participate in a scholarly project related to EM-PAP or lifestyle medicine.
- Create a QI Initiative related to EM-PAP or lifestyle medicine.
- Participate in or organise journal clubs related to EM-PAP.
- Present and discuss the benefits of exercise and physical activity with a community group.
- Serve as a longitudinal health coach, with a focus on exercise and physical activity, for a core panel of patients with chronic disease while tracking their physical activity and disease outcomes.

**Table 1** Medical school education curriculum

| Domain | General learning areas | Specific learning areas |
|---|---|---|
| 1. Foundations of Exercise Medicine and Physical Activity Promotion | 1.1 Understand the basics of exercise in health and medicine. | 1.1.1 Describe the role of exercise medicine and physical activity in disease prevention/treatment.<br>1.1.2 Review standard recommendations for exercise, physical activity, step counts, and sedentary behaviour in the general population, including children, teenagers, and adults.[17 18]<br>1.1.3 Outline the FITT (frequency, intensity, time, and type) or FITT-volume, progression framework. |
| | 1.2 Understand the basics of exercise prescription. | 1.2.1 Review general principles of writing an exercise prescription.<br>1.2.2 Write a general exercise prescription.<br>1.2.3 Outline safety considerations/contraindications. |
| | 1.3 Understand the basics of behavioural change. | 1.3.1 Define models of behaviour change.<br>1.3.2 Review the practical aspects of motivational interviewing and brief intervention that can be used in the clinical setting. |
| 2. Exercise Prescriptions in Medical Conditions and Special Populations | 2.1 Learn modifications and recommendations for exercise in various common conditions (may be incorporated into case-based discussions). | 2.1.1 Cardiovascular: coronary artery disease, heart failure, and obesity.<br>2.1.2: Pulmonary: COPD, asthma, and cystic fibrosis.<br>2.1.3 Gastrointestinal: post-abdominal surgery.<br>2.1.4 Renal: hypertension.<br>2.1.5 Neurosciences: depression.<br>2.1.6 Musculoskeletal: knee osteoarthritis, low back pain, physical disability.<br>2.1.7 Endocrine: type II diabetes.<br>2.1.8 Reproductive: pregnancy.<br>2.1.9 Haematology-oncology: cancer, sickle cell trait/disease. |
| 3. Exercise Medicine and Physical Activity Promotion in Clinical Practice | 3.1 Experience writing exercise prescriptions during patient encounters. | 3.1.1 Assess physical activity levels during ambulatory patient encounters.<br>3.1.2 Write exercise prescriptions as part of ambulatory clinical rotations. |
| | 3.2 Promote individual and community engagement. | 3.2.1 Learn general barriers (including social and economic) to physical activity that are specific to an individual.<br>3.2.2 Learn general barriers (including the built environment, traffic, pollution, and climate) to physical activity that are specific to a community.<br>3.2.3 Identify community resources available for patients to engage in physical activity.<br>3.2.4 Learn that bias (implicit or explicit) can affect one's ability to counsel patients. |
| Practical elements<br>► Assess physical activity levels and write exercise prescriptions for five patients as part of an ambulatory clinical rotation (eg, Family Medicine Clerkship/rotation*).<br>► Assess physical activity levels and write exercise prescriptions for 10 patients as part of an ambulatory acting internship/subinternship.†<br>► Locate at least three different types of accessible resources (eg, community partners, online videos) that can be used to assist physical activity promotion for patients or a community.<br>► Identify at least one funding source to assist patients in need of financial assistance to conduct a physical activity programme.<br>► Participate in a local fitness event (charity run/walk, group fitness class, etc). | | |

*The introductory rotation in family medicine and preventative care.
†An ambulatory acting internship/subinternship is an advanced level of clinical training beyond the basic clerkship which provides an opportunity for greater autonomy and care for patients in a way that approximates early postgraduate (internship) training.

- ► Serve longitudinally as an exercise/physical activity mentor for patients with or at risk for paediatric obesity.
- ► Create patient education handouts or other enduring materials as resources.
- ► Create exam/test questions related to EM-PAP.

## Assessment and evaluation of resident performance in EM-PAP

### Examples of resident assessment

- ► Using a standardised checklist (eg, OSCE), evaluate a resident counselling a patient on exercise medicine and physical activity.
- ► Using a standardised checklist (eg, OSCE), evaluate a written exercise prescription from a patient encounter.
- ► Administer a short-answer or essay exam to assess resident learning of EM-PAP curriculum content.
- ► Evaluate a written description of what the resident would do in response to a patient case to assess learning of EM-PAP curriculum content.
- ► Allow the trainee to evaluate the EM-PAP programme with an opportunity to incorporate the trainee's suggestions for programme improvement.

## Optional content for fellow training enhancement in EM-PAP

### For fellows who desire more education in EM-PAP

- ► Participate in a scholarly project related to EM-PAP.
- ► Create a QI Initiative related to EM-PAP.
- ► Participate in journal clubs related to EM-PAP.
- ► Present and discuss the benefits of exercise and physical activity with a community group.
- ► Serve as a longitudinal health coach, with a focus on exercise and physical activity, for a core panel of patients with chronic disease while tracking their physical activity and disease outcomes.
- ► Serve longitudinally as an exercise/physical activity mentor for patients with or at risk for paediatric obesity.
- ► Create patient education handouts or other enduring materials in EM-PAP as resources.
- ► Create exam/test questions related to EM-PAP.

## Assessment and evaluation of fellow performance in EM-PAP

### Examples of fellow assessment

- ► Using a standardised checklist (eg, OSCE), evaluate a fellow counselling a patient on exercise medicine and physical activity.

**Table 2** Residency education curriculum

| Domain | General learning areas | Specific learning areas |
|---|---|---|
| 1. Healthy Bbehaviours | 1.1 Identify the role of physical activity, nutrition, mental health, sleep, and reduction of substance use in health promotion and disease prevention. | 1.1.1 Examine how physical activity—as part of a broader curriculum focused on healthy behaviours—can be used to prevent/treat common diseases encountered within a residency, across disciplines/specialties.<br>1.1.2 Demonstrate motivational interviewing techniques that could be used to promote healthy behaviours.<br>1.1.3 Demonstrate ways to work with patients who disagree or cannot complete recommendations. |
| Practical elements<br>Use motivational interviewing techniques to promote healthy behaviours with 10 patients | | |
| 2.Exercise Medicine and Physical Activity Promotion in Clinical Practice | 2.1 Practice physical activity promotion and exercise counselling during patient encounters. | 2.1.1 If needed, review the Medical School Curriculum in Exercise Medicine and Physical Activity Promotion, including disease-specific exercise recommendations and motivational interviewing best practices in the clinical setting.<br>2.1.2 Implement routine assessment of physical activity levels of patients during ambulatory clinical patient encounters.<br>2.1.3 Implement routinely writing exercise prescriptions during ambulatory clinical patient encounters.<br>2.1.4 Classify the billing and coding mechanisms for physical activity promotion and exercise counselling. |
| | 2.2 Promote individual and community engagement. | 2.2.1 Interpret general barriers (including social and economic) to physical activity that are specific to an individual.<br>2.2.2 Describe general barriers (including the built environment, traffic, pollution, and climate) to physical activity that are specific to a community.<br>2.2.3 Organise community resources available for patients to engage in physical activity.<br>2.2.4 Examine the bias (implicit or explicit) that can affect one's ability to counsel patients. |
| Practical elements<br>► As part of a longitudinal experience in residency, write 30 exercise prescriptions (adults and/or children), including both aerobic exercise, resistance training, balance and flexibility, with disease-specific recommendations when indicated.<br>► Over the course of residency education, record and then view five clinical encounters of physical activity promotion in 1-to-1 and/or group sessions and examine opportunities for improving content delivery and patient comprehension.<br>► Examine physical activity log for 30 patients (approximately 10 per year).<br>► Perform 10 chart audits with a medical coding specialist of patients receiving exercise counselling.<br>► As part of a quality improvement initiative, examine the effect of physical activity on one prioritised quality measure (eg, blood pressure, blood sugar, body mass index, depression) within the home institution.<br>► Locate at least five different types of accessible resources (eg, community partners, online videos) that can be used to assist physical activity promotion for patients or a community.<br>► Identify at least one funding source to assist patients in need of financial assistance to undertake a physical activity programme.<br>► Serve as a medical volunteer for a community event focused on physical activity (eg, 5 k run). | | |
| 3.Self-care with physical activity | 3.1 Understand that self-care can enhance well-being, minimise burnout, and improve effectiveness of patient counselling | 3.1.1 Demonstrate how to develop a personal wellness plan |
| Practical elements<br>► Create a personal wellness plan with Specific, Measurable, Attainable, Relevant and Time-Based goals that are adopted for at least 1 month, with reviews and modifications every 7 days as needed<br>► Participate in local fitness event (eg, charity run/walk, group fitness class). | | |

- ► Using a standardised checklist (eg, OSCE), evaluate a written exercise prescription from a patient encounter.
- ► Administer a short-answer or essay exam to assess fellow learning of EM-PAP curriculum content.
- ► Evaluate a written description of what the fellows would do in response to a patient case to assess learning of EM-PAP curriculum content.
- ► Allow the trainee to evaluate the EM-PAP programme with an opportunity to incorporate the trainee's suggestions for programme improvement.

## DISCUSSION

Regular exercise and physical activity are proven to enhance health, well-being and address a number of chronic diseases faced by patients today. However, there is a gap between these known benefits and the implementation of exercise and physical activity promotion in clinical practice, due in part to deficiencies in training and education. The International Syllabus in Sport and Exercise Medicine Group developed an international syllabus for SEM specialty training.[12 13] Our group, appointed by the AMSSM, sought to take this work further by proposing curricula across the US medical education spectrum (medical student, resident and fellow), while also providing practical elements to help solidify medical knowledge into clinical practice. Additionally, since the length of training programmes vary across the world, it was important to develop curricula that could be used within similar medical education systems. These proposed curricula provide a standard set of objectives to improve trainee education, but also offer flexibility in how they may be incorporated within a given institution or training programme.

To promote use in clinical practice, the proposed curricula include a combination of theory and practical experiences to solidify understanding. The medical school curriculum offers content to be incorporated longitudinally using exercise prescriptions for commonly encountered medical conditions, and to facilitate discussion of how disease can be modified by exercise and physical activity. Importantly, if the proposed curricula are incorporated, every physician completing medical school will have

**Table 3** Fellowship education curriculum

| Domain | General learning areas | Specific learning areas |
|---|---|---|
| 1.Exercise Physiology | 1.1 Understand the body's normal and abnormal responses to exercise and recovery | 1.1.1 Examine the effects of exercise on the body, with special emphasis on the musculoskeletal, cardiovascular, respiratory, neuromuscular, and endocrine systems, as well as brain/mental health |
| 2.Exercise Nutrition | 2.1 Describe how energy is derived and used to fuel various types of exercise and physical activity | 2.1.1 Explain the biological pathways involved in exercise metabolism<br>2.1.2 Explain energy absorption and release from macronutrient sources (carbohydrates, fats, proteins)<br>2.1.3 Explain the effects of low energy availability on the ability to exercise |
| | 2.2. Understand sources of nutrition | 2.2.1 Outline recommendations for the dietary intake of carbohydrates, fats, proteins, micronutrients and vitamins in the general and athletic populations<br>2.2.2 Define resting metabolic rate to estimate caloric use at rest, and active metabolic rate to estimate energy needs during exercise at different intensities<br>2.2.3 Differentiate the rationale for and the risks associated with nutritional supplements and ergogenic aids<br>2.2.4 Cite common equations and tools used to determine energy needs in adults and children[18]<br>2.2.5 Compare the elements and methods of a body composition analysis and how those values assist in developing a nutrition plan<br>2.2.6 Examine how social, economic, and cultural factors can impact nutrition and dietary choices of athletes and physically active patients |
| Practical elements<br>► Counsel 10 patients on hydration and fuelling plans for physical activity or exercise<br>► Design or participate in the design of nutrition plans (including daily metabolic/caloric needs, as well as social, economic or other cultural influences on dietary choices) for 10 individuals with chronic disease participating in physical activity.<br>► Design or participate in the design of nutrition plans (including daily metabolic/caloric needs) for 10 competitive athletes.<br>► Design or participate in the design of nutrition plans for 5 teams of differing energy demands.<br>► Examine a food recall diary for 10 physically active individuals (or patients).<br>► Perform resting metabolic rate assessments for 10 patients and determine the ratio of macronutrient energy utilisation at rest.<br>► Complete a body composition analysis on 10 physically active individuals (or patients).<br>► Counsel at least five athletes demonstrating low energy availability or poor nutritional intake. | | |
| 3.Exercise Training | 3.1 Describe training principles and types of exercise. | 3.1.1 Distinguish the following types of exercise, their physiological effects, methods of fitness assessment and ways to optimise their health benefits<br>► Aerobic<br>► Anaerobic<br>► Strength and Power<br>► Flexibility<br>► Balance/Proprioception<br>► Mind-body |
| | 3.2 Define how exercise capacity can be used to monitor physical fitness. | 3.2.1 Demonstrate how to monitor exercise capacity via internal (eg, heart rate, blood lactate, oxygen consumption, and ratings of perceived exertion (RPE)) and external (power output, speed, acceleration, time–motion analysis, global positioning system (GPS) parameters, and accelerometer)training load measurements<br>3.2.2 Describe the signs and symptoms of overtraining and outline prevention and treatment strategies |
| Practical elements<br>► Participate in the design of 25 exercise training programmes for competitive athletes or physically active individuals (or patients). | | |
| 4.Exercise and Behaviour Change | 4.1 Define barriers to exercise and physical activity. | 4.1.1 Describe the foundations of behaviour change (eg, Transtheoretical model of change)<br>4.1.2 Analyse how social, economic, and other factors can create barriers to exercise and physical activity<br>4.2.3 Outline general barriers (including social and economic) to physical activity that are specific to an individual<br>4.2.4 Identify general barriers (including the built environment, traffic, pollution, and climate) to physical activity that are specific to a community |
| | 4.2 Describe how to motivate or work with patients to begin or maintain an exercise programme. | 4.2.1. Develop cognitive and behavioural strategies for increasing physical activity behaviour (eg, enhancing self-efficacy, goal setting)<br>4.2.2 Outline collaborative strategies and approaches to increase exercise adoption and adherence (eg, motivational interviewing)<br>4.2.3 Produce ways to work with patients who disagree or cannot complete recommendations |
| Practical elements<br>► Utilise behavioural change and/or motivational interviewing techniques to increase physical activity behaviour during 25 patient encounters. | | |
| 5.Exercise Prescription | 5.1 Define when and how to screen prior to the initiation of a physical activity or exercise programme. | 5.1.1 Identify the populations for which a screening health assessment is recommended prior to beginning a new exercise programme<br>5.1.2 Demonstrate the major components of a screening evaluation with special emphasis on the general medical, cardiovascular, musculoskeletal, and neurologic elements<br>5.1.3 Define ancillary testing and prevention in patients at higher risk for adverse events with exercise (eg, cardiovascular disease, diabetes)<br>5.1.4 Understand contraindications to beginning an exercise programme |

Continued

**Table 3** Continued

| Domain | General learning areas | Specific learning areas |
|---|---|---|
| | 5.2 Define how to write exercise prescriptions for healthy individuals and those with chronic disease. | 5.2.1 Describe the Frequency, Intensity, Time, Type, Volume, and Progression model for writing an exercise prescription<br>5.2.2 Write an exercise prescription for healthy/low-risk patients<br>5.2.3 Appreciate modifications of an exercise prescription for commonly encountered medical (eg, coronary artery disease, obesity, asthma, diabetes, pregnancy) and musculoskeletal (eg, osteoarthritis) conditions<br>5.2.4 Write exercise prescription modifications for special circumstances (eg, advanced age, children, physical disability, learning disability, beginners, post-surgery)[18]<br>5.2.5 Explain the effect of commonly used medications in children (eg, stimulants) and adults that might influence exercise capacity (eg, beta blockers, diuretics) or create risk with exercise (eg, insulin, fluoroquinolones, QT prolonging medications, impaired thermoregulation with anti-cholinergic medication)[18] |
| Practical elements<br>► Examine a physical activity log for 25 patients<br>► Write a physical activity prescription for 25 patients, including individuals with chronic disease or mobility impairment | | |
| 6.Exercise Testing | 6.1 Use exercise testing for screening, diagnosis or development of exercise programming | 6.1.1 Demonstrate the appropriate use and indications for the following tests for screening, diagnosis, or development of an exercise programme<br>► In-office assessment of physical fitness<br>► Exercise treadmill testing<br>► -Cardiopulmonary exercise testing<br>► Pulmonary function testing |
| **Practical elements**<br>► Perform and interpret 50 exercise treadmill tests[19 20]<br>► Perform and interpret 50 cardiopulmonary exercise tests<br>► Perform and interpret 10 active metabolic assessments and use the information to design exercise programmes and target intensity training zones<br>► Perform and interpret 10 pulmonary function tests | | |
| 7.Exercise in Clinical Practice | 7.1 Define sustainable clinical practice models to promote exercise and physical activity in the sports medicine physician's office | 7.1.1 Enact models for physical activity assessment, counselling, and referral to community programmes<br>7.1.2 Investigate options for billing and coding in a sports and exercise medicine physician's practice that will help sustain clinical practice models that support EM-PAP<br>7.1.3 Determine the multi-disciplinary partners who can facilitate exercise promotion inside and outside of the clinical practice setting<br>7.1.4 Define EM-PAP resources for children/youth, particularly in under-resourced settings<br>7.1.5 Describe how physical activity for youth requires counselling for the entire family<br>7.1.6 Examine the bias (implicit or explicit) that can affect one's ability to counsel patients |
| **Practical elements**<br>► Find at least one community partnership that may assist patients who wish to begin an exercise programme<br>► Conduct 10 billing/coding audits for notes you completed where a patient was counselled on exercise or nutrition<br>► Assess physical activity levels of 25 patients in the office | | |
| 8.Exercise and Population Health | 8.1 Learn how exercise and physical activity can help prevent or treat chronic disease | 8.1.1 Assess how physical activity can modify both individual and population health<br>8.1.2 Explain the health benefits of meeting physical activity guidelines and the health risks of not achieving minimum physical activity levels<br>8.1.3 Describe how social determinants and community infrastructure can affect physical activity in different populations<br>8.1.4 Determine effective physical activity interventions that can improve population health |
| | 8.2 Understand strategies for community engagement | 8.2.1 Organise local community resources that are available to promote exercise and physical activity<br>8.2.2 Examine social and economic barriers to exercise for individuals and communities |
| **Practical elements**<br>► For a defined population of patients within a clinic/hospital-based setting, determine whether physical activity improved a chronic disease marker (eg, hypertension, hyperlipidaemia, diabetes, obesity) over a 3-month period<br>► Design an exercise programme for individuals (>10 people) from an underserved community, disadvantaged background, or disabled group<br>► Locate at least five different types of accessible resources (eg, community partners, online videos) that can be used to assist physical activity promotion for patients or a community<br>► Identify at least one funding source to assist patients in need of financial assistance to conduct a physical activity programme<br>► Identify barriers, including social and economic, to exercise for individuals within your community or society as a whole and consider how advocacy can be part of the solution | | |

the skills necessary to prescribe physical activity for commonly encountered medical conditions. Within residency, the promotion of physical activity and exercise may be incorporated into an existing curriculum, or as a part of a broader lifestyle medicine curriculum that includes training in how to promote physical activity, healthy nutrition, and proper sleep hygiene. Finally, the curriculum for EM-PAP within sports medicine fellowship training includes a more focused, in-depth experience. Experiences and clinical encounter benchmarks may vary based on institutional and programmatic resources and infrastructure; however, the curriculum offers a framework for incorporating experiences to better prepare the trainee for clinical practice. Ultimately, physicians who have the ability to properly promote exercise and physical activity as a form of medicine in their clinical practices can have a dramatic impact on health outcomes for their patients at a reduced cost to the healthcare system.[14–16]

While the curricula offer guidance on physical activity promotion at various levels of medical education, there are some limitations worth noting. For instance, institutions and programmes may differ in the timing, approach, and evaluation of how trainees are educated. These differences may alter how the principles of the proposed curricula are implemented. Nevertheless, the curricula capitalise on foundational elements and core disease processes that are taught at each level of training. Thus,

our hope is that these components can be taught with minimal additional resource utilisation. With regard to residency education, benchmarks for the number of clinical encounters will likely vary because there are significant differences between specialties. Implementation and necessary modifications may occur at the discretion of the programme to best fit their training paradigm. Finally, these curricula have a particular focus on clinical experience and training. They are meant to complement, rather than replace, existing content on the overall benefits of exercise and physical activity.

Future directions include the development of specific educational content within the proposed curricula and standardised assessments that could drive curriculum change at all levels. This may include online modules that could be adopted by training programmes worldwide. Similar educational material has been created through international collaboration (eg, Sports Cardiology ECG Interpretation Training Modules) and has formed the basis for elevating the knowledgebase in general medical and SEM trainees. When developing the suggested resources for use in medical curricula, the end users of the resources (eg, medical students/trainees and patients) should be included, especially those from under-represented groups who are at highest risk of lifestyle diseases, and less likely to meet PA guidelines. This will ensure the resources are relevant to the end users, and thus improve the likelihood of uptake and impact of the resources.

## CONCLUSION

The adoption of lifelong exercise and physical activity habits can dramatically improve the health of patients and populations. Physicians must be appropriately trained to be effective at counselling patients and promoting physical activity. The proposed curricula are the first published guidelines to offer programmatic elements for longitudinal training in EM-PAP for medical students, residents and sports medicine fellows at US medical institutions. We believe access and implementation of these curricula will facilitate training of physicians competent in promoting exercise and physical activity within their clinical practices for the betterment of the health and well-being of their patients.

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