Title

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Journal

Pediatric Exercise Science, 33(4)

ISSN

0899-8493

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Publication Date

2021

DOI

10.1123/pes.2020-0214

Peer reviewed

Exploration of Barriers and Facilitators to Implementing Best Practice in Exercise Medicine in Primary Pediatric Care—Pediatrician Perspectives

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Purpose: Despite the known health benefits of physical activity (PA), few primary care pediatricians discuss, evaluate, or prescribe PA for children. The goal of this study was to examine pediatricians' thoughts and practices related to child PA and the perceived facilitators and barriers to implementing PA evaluation and prescription in pediatric primary care clinics.

Methods: The Consolidated Framework for Implementation Research was used to explore implementation barriers and facilitators. A mixed-method design combined questionnaires and focus groups with 27 pediatricians.

Results: Despite the pediatricians' beliefs that PA is important for patients, there was wide practice variability in their approaches to discussing PA. Several perceived barriers to implementing PA evaluation and prescription were identified, including lack of knowledge and training, managing time for PA with multiple demands, the need for a team approach and simple PA tools and resources, support for
patient tailoring of PA messaging, and a need for PA best practice champions.

Conclusion: The identified barriers to implementing evidence in PA suggest several directions for improvement, including a care-team approach; quick, inexpensive, and simple PA tools; community PA partnerships; PA training in medical education; evidence-based strategies; and PA directories for families. These efforts could facilitate the implementation of PA best practices in pediatrics.

Physical inactivity threatens the health of children and adults alike, contributing to a range of preventable diseases and raising the cost of healthcare across the lifespan (24). Primary care pediatricians (PCPs) are well positioned to be champions and advocates for physical activity (PA) in children, yet PA is rarely addressed in the pediatric clinical encounter (17-21). This is a missed opportunity for health improvement, as PCPs are natural agents of change with respect to best practices. The need for pediatricians to increase their involvement in patient PA is highlighted by data demonstrating that, despite greater awareness of the health consequences of obesity, this epidemic seems to be intractable (10). In contrast, there is encouraging data to

suggest that efforts to increase PA in children and adolescents can track into adulthood and mitigate cardiovascular disease risk (13,36). Exercise interventions that begin in childhood and adolescence (critical periods of growth and development) likely modify genomic, epigenetic, and behavioral mechanisms leading to sustainable health benefits (36). The PCPs can play a role in supporting optimal health by providing patients and their families with care that attends to PA and with thoughtful encouragement to pursue healthy lifestyles.

Following the release of the updated Physical Activity Guidelines for Americans, Thompson and Eljsvogels (33) issued a "Call to Activity" for clinicians and other health care professionals regarding PA. However, few primary care providers have adopted these guidelines to assess, monitor, or prescribe PA in their practices (17,21,27); this is evidence of the classic evidence-to-practice gap—the discrepancy between the research evidence for clinical interventions and assessment methods, on the one hand, and their routine use in clinical practice, on the other (9). For example, the National Health Lung and Blood Institute and the American Academy of Pediatrics (AAP) guidelines recommending universal blood lipid screening (instituted in 2008) to identify both lifestyle- and/or genetic-increased cardiovascular disease risk during childhood (12) have also been met with limited adoption (37). Studies that have identified the underlying causes for the poor adoption of evidence-based guidelines highlight the need for understanding contextual, organizational, and individual factors related to the implementing organization (15). As such, we hypothesized that PCPs' poor use of PA guidelines in practice might be due to a lack of guideline awareness, ineffective implementation of PA best practices, a paucity of standardized and simple tools and resources for assessing and managing child PA in the context of a busy primary care encounter, and suboptimal training in PA assessment and individualized guidelines (the exercise prescription) in medical school and pediatric residency programs (1).

How PCPs can effectively implement and deliver best practices in PA remains understudied. The science of implementation—the scientific study of methods to promote the systematic uptake of research evidence into routine practice to improve the quality and effectiveness of health services (7)—can illuminate the way forward. We began with this study to identify barriers and facilitators to practice change that, combined with evidence-based implementation processes and strategies, can improve implementation effectiveness (citations) and subsequent outcomes. We explored the perspectives, practices, and challenges faced by PCPs in communicating, assessing, and prescribing PA recommendations for their pediatric patients with the intention of informing future efforts to develop PA resources and support their implementation in pediatric primary care environments. We explored PCP perspectives and barriers to incorporating PA guidelines using focus groups and a questionnaire informed by the literature in implementation science (2). We assessed PCP perceptions on factors known to be associated with unsuccessful practice change as captured by a determinant implementation framework called the Consolidated Framework for Implementation Research (CFIR) (4). Previous research with CFIR has identified several robust factors across a range of study settings, contexts, and interventions (2,15) that have informed effective implementation processes and strategies that lead to sustained practice change and concomitant improved outcomes.

Methods

Participants

The participants were 27 pediatricians practicing in southern California. The participants were recruited with flyers distributed through the AAP Orange County chapter, which includes over 500 local pediatricians. This study was approved by the Research Ethics Boards at the University of California at Irvine, USA, and the Hospital for Sick Children in Toronto, Canada. All participants indicated in writing their consent to participate in the present research.

Data Collection

Both quantitative and qualitative data were collected. To explore the barriers and facilitators to practice change, we first invited PCPs to complete a CFIR-informed questionnaire to explore a wide range of contextual factors implicated in the implementation of PA best practices (15). The questionnaire was administered online via a web link (see Supplementary Material 1 [available online]), and the items were rated on a 5-point Likert scale from 1 (very unimportant) to 5 (very important). The CFIR comprises 31 factors shown to be associated with implementation effectiveness, nested within 5 domains: characteristics of the intervention, the inner setting, outer setting, implementation process, and characteristics of intervention providers. Our intention was to identify the salient factors that would inform the subsequent focus group protocol, in line with a sequential mixed methods design. However, our survey response rate prior to the focus groups was 20%, and thus we invited PCPs
who had not completed the survey to do so following the focus group meetings using laptops we provided for this purpose. This rendered our design a convergent parallel one.

The qualitative data were then collected via three 45-minute focus groups (n = 11, n = 7, and n = 9) that took place at the Pediatric Exercise and Genomics Research Center over the course of 2 days (January 2017). All focus groups were conducted in person by the same 2 facilitators (M.B. and R.D.) and audiotaped. The participants were invited to discuss preferences regarding their practices with respect to discussing, assessing, and prescribing best practice PA with patients, the barriers and facilitators to adopting new evidence-based practices, and how/why they would be motivated to implement best practices to assess and treat PA in children. The focus group protocol was informed by the CFIR (4) (see
Supplementary Material 2 [available online]).

Data Analyses

The quantitative survey data are reported descriptively as mean ratings and standard deviations for the group of 27 participants.

The qualitative focus group data were transcribed verbatim and coded inductively using a thematic analysis framework (11). Consistency between the data extracted and identified themes was explored during coding. Two researchers (E.S., qualitative expert, unfamiliar with CFIR, and R.D.) read the transcripts, coded independently, and subsequently met to discuss and finalize the codes. One researcher coded the data fully (E.S.), and the second coded a third of the data (R.D.) using NVivo software (version 10, QSR International, Melbourne, Australia). Any disagreements between the coders were addressed through consensus. The quantitative and

qualitative data were integrated during interpretation, examining overarching patterns, alignment, and discrepancies in the results.

Results

Participant Characteristics

The highest educational degree completed for all of the participants (n = 27, 100%) was doctor of medicine (n = 25, 92.5%) or doctor of osteopathic medicine (n = 2, 7.5%). The participants held their current position for an average of 17 years (mean = 17.4, SD =13.0; see Table 1). The practices of 5 (18.5%) participants were located in areas of California with lower socioeconomic status, including 3 PCPs working at federally qualified health centers.

Survey: Barriers and Facilitators

The CFIR-based questionnaire data are summarized in Table 2. The average ratings for all CFIR factors centered around and above the middle point of the scale (ie, 3). In total, 12 factors had values of 4.5 or higher, indicating perceived relative importance in their influence on practice change. These factors are consistent with and complement the comments shared in focus group discussions.

Focus Group Themes

Four main themes emerged from the focus group data; see Figure 1 for a graphic overview and Supplementary Table 1 (available online) for a summary of the main themes, subthemes, and illustrative quotations.

Figure 1 — Overview of barriers and facilitators to PA best practice in primary care. PA indicates physical activity.

Physician Barriers

Variability of PA Discussions With Children and Parents.

We found significant variability among the pediatricians regarding how they discussed PA with families, as well as the PA-related strategies and information they typically provided to parents. Time pressure was a key constraint that forced PCPs to select among competing priorities during the patient visit. Overall, the pediatricians seemed more comfortable with addressing nutrition than PA, resulting in nutrition being prioritized during visits. Focus group discussions highlighted PCPs' PA knowledge and their views about initiating PA discussions with patients. Specifically, some PCPs felt it was within their scope to support patients in PA-related behavior change, while others felt schoolteachers were better positioned to address PA given their central role in children's lives. The PCPs felt it was important to tailor their approach to PA to maximize effectiveness and relevance for each family. Overall, few PCPs reported applying or sharing PA guidelines or evidence in their clinical encounters with patients.

Lack of PA Knowledge and Formal Training. The PCPs reported knowing little about PA physiology or guidelines.

Managing Multiple Demands in Limited Time. The PCPs commonly expressed a lack of time and competing demands, and as a result, prioritized more urgent needs. They also reported feeling overburdened and burnt out, which impeded their ability to address PA during well and sick visits.

Self-Efficacy. The PCPs expressed a sense of futility at being able to motivate and bring about PA-related behavior change in their patients. Many PCPs felt disheartened and pessimistic when their efforts did not result in change, noting that family habits dominated their recommendations. A minority of PCPs believed they could influence their patients' knowledge, awareness, and motivation to change, but were cognizant that their role was limited by environmental factors and that, despite their efforts, they could not be "miracle workers."

Contextual and Systemic Issues. The PCPs noted difficulties with patient follow-up, lack of communication between physicians and schools, and the diminished status of PA in school curricula resulting from their defunding. The absence of PA-related communication between schools and PCPs was thought to contribute to minimal or nonexistent feedback for PCPs and difficulties monitoring patient progress, resulting in kids "falling through the cracks."

Parent and Family Barriers

Family Low Socio-Economic Status. The PCPs noted a range of parent and family barriers to PA, including limited financial resources and time to engage in PA activities, lack of access to parks and community activities, and safety concerns.

Table 1 Characteristics of the Participants (N = 27), Their Practice, and Patients

Characteristics	n	%
Participants' age		
30–39 y	7	25.9
40–49 y	5	18.5
50–59 y	8	29.6
60 y or older	7	25.9
Participants' gender		
Male	13	48.2
Female	15	51.8
Employment		
Full time (40 h/wk or more)	21	77.8
Part time (1–39 h/wk)	6	22.2
Practice type		
Private	24	88.9
Public	3	11.1
Participants' race/ethnicity		
White	15	55.6
Asian	8	29.6
Persian	1	3.7
Latino/Hispanic	3	11.1
Participants' say in decision making regarding tools and processes		
A great deal of say	8	29.6
A lot of say	6	22.2
A moderate amount of say	7	25.9
A little say	6	22.2
No say at all	0	0
Importance of exercise to participants		
Extremely important	9	33.3
Very important	12	44.4
Somewhat important	6	22.2
Not so important	0	0
Not important at all	0	0
Participants' exercise frequency		
I don't exercise regularly	2	7.4
1 d/wk	1	3.7
2–4 d/wk	13	48.2
5–7 d/wk	11	40.7
Patients' race/ethnicty		
American Indian/Alaskan Native	2	7.4
Asian/Pacific Islander	23	85.2
Black/African American	16	59.3
Hispanic/Latino	24	88.9
White/European American	23	85.2
All ethnicities	2	7.4
Participants' perception of physical fitness being an issue among patients		
Extremely	8	29.6
Very much	14	51.9
Somewhat	5	18.5
Not so much	1	3.7
Not at all	0	0
Participants' contact with school personnel regarding patients		
A great deal	1	3.7
A lot	1	3.7
Moderate	1	3.7
A little	9	33.3
None at all	15	55.6

Table 2 Means and SDs for CFIR Domains and Factors (N = 27)

CFIR domains and factors	Mean (SD)
Intervention characteristics	
Intervention source	2.8 (1.3)
Evidence strength and quality	4.8 (0.4)[a]
Relative advantage	4.5 (0.6)[a]
Adaptability	4.7 (0.5)
Trialability	3.8 (0.9)
Complexity	**4.8 (0.5)[a]**
Design quality and packaging	4.0 (0.8)
Cost	**4.8 (0.4)[a]**
Outer setting	
Patient needs and resources	4.6 (0.6)[a]
Cosmopolitanism	3.5 (0.8)
Peer pressure	3.1 (1.2)
External policy and incentives	3.9 (0.7)
Inner setting	
Structural characteristics	3.7 (1.2)
Networks and communications	3.6 (0.9)
Culture	4.0 (0.8)
Implementation climate	4.3 (0.7)
Tension for change	4.2 (0.8)
Compatibility	**4.7 (0.5)[a]**
Relative priority	4.3 (0.6)
Organizational incentives and rewards	3.8 (0.8)
Goals and feedback	4.4 (0.6)
Learning climate	4.3 (0.5)
Readiness for implementation	3.9 (0.6)
Leadership engagement	4.5 (0.6)[a]
Available resources	**4.6 (0.6)[a]**
Access to knowledge and information	4.6 (0.5)[a]
Characteristics of individuals	
Knowledge and beliefs about the intervention	**4.1 (0.5)**
Self-efficacy	**4.3 (0.6)**
Individual stage of change	**4.4 (0.6)**
Individual identification with organization	4.3 (0.7)
Other personal attributes	4.0 (0.7)
Process	
Planning	**4.4 (0.6)**
Engaging	4.5 (0.5)[a]
Opinion leaders	4.5 (0.5)[a]
Formally appointed internal implementation leaders	4.3 (0.7)
Champions	4.5 (0.5)[a]
External change agents	3.5 (0.7)
Executing	3.8 (0.8)
Reflecting and evaluating	4.3 (0.6)

Note: Items were rated on a 5-point Likert scale ranging from 1 (very important) to 5 (very important). Bolded values indicate alignment with focus group themes.
[a]Average score higher than 4.5.

Patient and Family Beliefs and Knowledge About Exercise. The PCPs perceived more subtle obstacles to parent and child participation in PA, including parents' knowledge and beliefs about exercise; parent and child motivation to engage in PA-related behavior change, even when agreeing to do so; and perceptions of the physical health of their children as at-risk, concerning, or urgently needing change. Some PCPs maintained that parents attribute poor PA to genetics, claiming it overpowers their efforts to engage in PA, or that parents believe that changing one's diet exerts a stronger influence on health than does exercise.

Supporting PA Practice Change Among PCPs

Motivation and Tension for Change. The PCPs described themselves as inherently motivated to help patients improve their PA, and many perceived that it was within the scope of their role to do so. However, they noted variability regarding the motivation to incorporate PA best practices among their peers, perceiving the motivation of other PCPs as primarily extrinsic and financial. They suggested a low tension for change in PA practice and suggested their less motivated peers might benefit from more targeted change strategies, such as in-office visits by PA health promoters.

Practice Change With a Team Approach. The PCPs stressed the importance of a team approach for addressing PA in practice, which could include creating a clinic-based team to ensure PA is addressed and followed up; delegating PA-related tasks (ie, assessment) to nonphysicians in the practice (eg, medical assistant) to defer costs and improve efficiency; and/or sharing PA-related responsibilities with other specialists, particularly for patients presenting with obesity and diabetes.

Closing the Feedback Loop. The PCPs reported being strongly motivated to engage clients in PA when they received feedback about whether patients took up their recommendations or referrals, or made any PA-related changes. Cost (time) reimbursement was noted as insufficient for driving change in the absence of hard outcome indicators (eg, changes in body mass index levels or blood pressure).

Cost Reimbursement. Most PCPs perceived the costs related to implementing PA best practices as a deterrent to practice change. They were doubtful that insurance companies would reimburse for extra time or billing extenders, given the already limited funding for pediatrics. Yet, a few PCPs identified "pay for performance" as a strong driver for practice change. Overall, remuneration linked to PA did not seem to be an effective facilitator of PA-related practice change.

Mitigating Burnout. Although PCPs recognized the importance of implementing PA best practices in the clinic, they were wary of introducing additional task burdens. They emphasized that new PA best practices should not add to their potential for burnout. Receiving feedback on patient progress, using a team approach, and delegating tasks to less costly team members were identified as key strategies for mitigating practice change burnout.

Formal PA Training. The PCPs reported having limited knowledge about the role of PA in pediatric health and were eager to learn (eg, what works; the role of genes and environment) and

to incorporate motivational interviewing as a tool to facilitate PA discussions. They reported wide variability in their preferences for professional development formats. In particular, face-to-face meetings with colleagues were described as invigorating because they could learn how others are facilitating PA with their patients. Some PCPs, particularly those working part time, voiced a preference for web-based professional development that could be done on their own time. Overall, they agreed that effective professional development would benefit from a multimodal approach that could maximize engagement, highlight how practice change "would make a difference in patient care," and provide incentives such as continuing medical education credits.

Best Practice Reminders. The PCPs noted that best practice reminders about the importance of exercise and the importance of addressing PA consistently with patients would improve their practice because it would make PA "top of mind." Reminders could take various forms, including highlighting PA in meetings or promoting PA-related presentations.

Needs and Features of PA Tools

New PA Assessment Measures. The PCPs were generally enthusiastic about assessing physical fitness but viewed doing this as fraught with time limitations and other demands. More fundamental concerns included selecting appropriate, evidence-based PA assessment and management tools having acceptable efficacy, sensitivity, and validity; having sufficient knowledge (target, goal, and follow-up plan) to interpret measurement data in a meaningful way; and ensuring that tools were used with fidelity. While some PCPs viewed the development of new best practice PA tools as unnecessary, others felt that developing a specific, evidence-based, and valid measure of physical fitness would help them to broach PA with patients.

List of Community-Based PA Resources. The PCPs wanted more knowledge about where children could engage in PA within their community and the associated time and costs. They proposed a community PA directory as a valuable resource for supporting PA recommendations and facilitating patient attitude and behavior change.

Quick and Easy Tools. The limited time available for discussing PA with patients was a common theme across all PCPs that could be addressed through quick and simple tools that could promote buy-in and support effective implementation of PA best practices. Ultimately, the PCPs noted that new PA tools had to meet 3 aims: address patient need, be low cost, and be quick and easy.

Multifaceted Dissemination. The PCPs felt that multiple dissemination strategies would be useful for creating awareness and reinforcing PA messages outside the primary care clinic setting, serving to complement and validate their direct PA messaging to patients (eg, posters promoting exercise). They also discussed various channels for disseminating best practice PA information to patients (eg, digital vs paper and face-to-face).

Alignment of CFIR Constructs From Focus Group and Survey Data

We looked at the complementarity of survey and focus group data and identified 9 highly salient (survey mean over 4.5) CFIR constructs that aligned across methods (see Table 2).

The PCPs commented on the importance of mitigating burnout potential by promoting quick and simple PA tools (intervention characteristics). This addresses the importance of complexity in implementation or the perceived difficulty of the intervention as reflected by its duration, scope, radicalness, disruptiveness, centrality, intricacy, and the number of steps required to implement and deliver, as an important facilitator of implementation effectiveness. Also noted was the importance of low-cost PA best practices that could be implemented and the need for suitable reimbursement tied to PA-related activities.

In the larger health system setting (outer setting), we see survey data on the perceived importance of networking with other external organizations (cosmopolitanism), aligning with the PCPs' comments about the need to establish communication with schools to support PA prescription, adherence, and follow-up.

In the clinic setting (inner setting), PA best practices were seen as needing to be compatible with existing workflows and systems in order to reduce burden. As well, resources were required that could facilitate practice change, such as new assessment tools, access to knowledge and training, and a community PA directory.

The alignment was also evident with respect to several provider characteristics. In particular, the survey highlights the importance of PCPs' knowledge and beliefs about PA, their feelings of self-efficacy in delivering PA best practices, and their individual stage of change aligned with focus group comments about PCP motivation to change their PA practice.

Lastly, the need for a team approach to PA care discussed in focus groups aligned with a high endorsement of process planning and execution in support of the implementation process.

Discussion

This study examined pediatricians' thoughts and practices related to PA best practices and the perceived facilitators and barriers to discussing, evaluating, and prescribing PA in pediatric clinics. Our findings identified strategies for improving PA best practices in pediatric primary care and key needs and features of PA tools. Given the important role that pediatricians play in promoting evidence-based practices, their knowledge, behaviors, and perspectives can inform the design, dissemination, and implementation of PA best practice resources for clinical practice. Previous studies examining knowledge, attitudes, and beliefs about the role of PCPs regarding PA counseling have primarily utilized questionnaires (1,6,16), potentially missing insights that can emerge from structured interviews and an implementation science lens (4). Indeed, our mixed-method approach identified 9 factors that were common to both surveys and focus group discussions, highlighting a way forward to effectively implement and deliver exercise as medicine best practices in primary pediatric practice.

While some studies have examined PCPs' views on PA and nutrition associated with obesity counseling, our study focused on PA within the primary care setting. This is important because, although physical inactivity is often linked with obesity, there are a substantial number of overweight and obese children who are physically fit (19). Even inactive adolescents with a normal body mass index percentile demonstrate higher levels of inflammatory mediators compared with physically active counterparts (29). Most PCPs in our focus groups saw physical

fitness as a significant issue among their patients and believed addressing it was within their scope of practice. Additionally, focusing healthy behavior changes on PA rather than obesity or nutrition may support practice change by avoiding some of the stigma and shame related to addressing weight issues in the pediatrician's office (8,25).

Our results on implementation barriers and facilitators are consistent with previous implementation research conducted in health and global health settings. These studies have identified several factors strongly associated with implementation effectiveness and distinguished between high and low implementers, including relative advantage, tension for change, and patient needs and resources; relative priority; available resources; and planning (2,15,31,35). The gap in PA best practice evidence and use in primary care has not previously been explored with an implementation science lens. Our results are a unique contribution to PA research as the first study to explore implementation barriers and facilitators for PA practice in pediatric primary care. Our findings identify key factors that can inform the development and implementation of new or existing PA practices, tools and resources, and an evidence-based approach to their implementation.

We found variability in how PCPs discuss and educate patients and families about PA and how they provide PA-related best practices to their patients. Generally, PCPs reported they were not delivering PA best practice, in part, due to a lack of standard and formal training and knowledge regarding PA and health in pediatrics. This interpretation is consistent with other studies that have shown that exercise medicine is rarely included in the curriculum of medical schools and residency programs (31). Solmundson et al reported that a large majority of family medicine residents view exercise prescription as important and integral to their patients' health, but do not feel sufficiently prepared to prescribe exercise (31). Similar reports on the obesity crisis in both Canada and the United States have published a call to action recommending the incorporation of PA training into all phases of medical education—medical schools, residency programs, credentialing processes, and continuing education requirements (30,32).

The PCPs also identified preferred needs and features of PA tools and resources. Potentially useful and simple PA assessment tools have been instituted at 2 large health care systems, Kaiser Permanente and Intermountain Healthcare, where PA is included as a "fifth vital sign" (33), but the clinical effectiveness of these tools has yet to be determined. Ultimately, the PCPs in our study noted that the successful implementation of new PA tools would have to meet 3 aims: address patient's needs, be cost effective, and be time efficient. It is encouraging to note that primary care–initiated public health initiatives that have demonstrably changed outpatient practice do exist, but we know little of how they have been implemented. For example, the "Back to Sleep" campaign from the AAP 1994, in partnership with the National Institute of Child Health and Human Development; https://safetosleep.nichd.nih.gov/activities/campaign resulted in a 44% decline in sudden infant death syndrome (22,23), illustrating how a simple but effective message can facilitate behavior change and positive health outcomes.

The PCPs in our study identified a need for a team-based approach to promoting PA in the clinical setting and to engage with community partners. One example of such an approach is the "Fit2Play" program, a partnership between pediatricians and the Department of Parks and Recreation in Miami Dade County, Florida, which was shown to be effective for both obesity prevention and treatment (26). The Fit2Playmodel highlighted the need to align health and wellness strategies between pediatricians and community-based programs to support the overall health of the community. Other promising approaches that could be integrated into primary care include the use of motivational interviewing techniques to improve nutrition and PA behaviors in

youth. Many of these programs highlight the importance of engagement between PCPs and community organizations, including schools, for effectively addressing the PA crisis in children and adolescents. Our findings suggest that, while our participating pediatricians appreciated the role of schools in managing PA, their experience has been that there is little communication between them.

This study has several potential limitations. Our sample of pediatricians was small, and all practiced in Southern California, with the majority of them working in private practice. As such, the results may not be generalizable to populations in other regions or to different practice settings. We note that participating pediatricians cared for an ethnically and economically diverse patient population from a range of communities across southern California. Our participants were likely highly motivated, as well as highly active, potentially biasing our findings to physicians who were inclined to change their PA practice, factors known to influence patient health practices (3). Additionally, the majority of our participants were mid- to later-career, and may not reflect the current state of medical education and training; the need for PA-related training was more recently recommended by the AAP (21). Lastly, we acknowledge that primary pediatric care is provided not just by pediatricians, but family practitioners, nurse practitioners, and physician assistants, and these perspectives were not elicited.

Our findings suggest key considerations for improving PA best practices in pediatric primary care, with an emphasis on the need to look beyond clinical effectiveness to how effective practices might be effectively developed and implemented in pediatric primary care. Other countries have integrated such changes. For example, in the United Kingdom, PA promotion has been integrated into undergraduate, postgraduate education and continuing professional development, and PA training is included in the majority of the medical curriculum in Australia (5,20). Exercise referral from general practitioners is common practice in several countries, including New Zealand and Canada; however, referral rates vary. In one UK study, general practitioners reported an overreliance on them to promote
PA and advocated for a community of exercise medicine advocates, including other healthcare professionals (28,34).

In summary, our study identifies several actions that may illuminate the way forward to closing the evidence to practice gap in pediatric PA best practice:

1. Using a care team–approach to delivering PA-focused services to facilitate implementation, avoid physician burnout, and create financial and resource efficiencies.
2. The development and use of effective, quick, and simple tools for PA assessment, management, and follow-up with little or no additional costs, minimal burden, and conform to the structure and workflow of a pediatric practice.
3. Building PA partnerships with schools and community to improve communication and support the execution and evaluation of PA recommendations with feedback.
4. Improving PA awareness and knowledge among PCPs by integrating PA training in medical and residency training and through professional development.
5. Using evidence of implementation barriers, processes, and strategies to improve the effective implementation of PA guidelines and best practices in pediatric practice settings.
6. The development of jurisdictional or community PA directories of up-to-date and available community and school-based resources that support PA prescription and are feasible and low cost for families.

The PA best practices are only as effective as their implementation. Improving PA in pediatric primary care will require effective tools, resources, and interventions, but if we fail to attend to how these will be effectively implemented and used, we will be no further ahead.

The science of implementation has illuminated a path forward. The enormous health risks imposed by physical inactivity in youth can be successfully addressed through creative, collaborative, and evidence-based multifaceted dissemination and implementation approaches codeveloped by primary care pediatricians, families, community members, and allied professionals. More work is needed in formative medical education, primary care practice, intersectoral partnerships (health, education, and community), and resource development and evaluation.

Acknowledgments

This work was supported by the Pediatric Exercise and Genomics Research Center, Department of Pediatrics, UC Irvine School of Medicine and Dr. Reuben Chen Exercise as Medicine initiative. K.D.L.'s work was funded by UCI CTSI grant KL2-TR001414. All authors have indicated that they have no financial relationships relevant to this article to disclose. R.D. and M.B. were compensated for their work as implementation research consultants to conceptualize the methods, collect and analyze data, provide a project report that formed the basis of this manuscript, and contribute to the manuscript. All other authors have indicated that they have no potential conflicts of interest to disclose. Clinical Trial Registration: not applicable. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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