



The Primary Care Obesity Network: Translating Expert Committee Guidelines on Childhood Obesity Into Practice

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Abstract

Childhood obesity remains a serious public health threat. There is an urgent need for innovative, effective, and sustainable interventions for childhood obesity that are multisector, integrated, and pragmatic. Using the 2007 Expert Committee on the Assessment, Prevention, and Treatment of Child and Adolescent Overweight and Obesity as a guide, a tertiary care obesity program at a children's hospital established the Primary Care Obesity Network (PCON). This article describes the structure, implementation, resources, and outcome measures of the PCON, a network of primary care practices and a tertiary care obesity center established to prevent and treat childhood obesity in Central Ohio. This program offers an opportunity to assess how and whether the expert committee guidelines can be translated into practice. As Accountable Care Organizations strive to provide services through the lens of improving population health, the PCON can serve as an example for addressing childhood obesity.

Keywords

primary care, children, obesity, integration, treatment

Childhood obesity can be optimally managed by concurrently tackling risk factors at several socioecological levels that affect the child. In 2007, the Expert Committee on the Assessment, Prevention, and Treatment of Child and Adolescent Overweight and Obesity recommended a 4-stage approach for tackling childhood obesity in the clinical setting based on age, weight status, presence of comorbidities, and response to treatment.¹ The first 2 stages (Stage 1 is “prevention plus” and Stage 2 is structured weight management) are delivered in the primary care office by a health care provider. The support of an allied health care provider, such as a dietitian, is included in Stage 2 treatment. Stage 3 treatment is a weight management program (WMP) delivered by a multidisciplinary team in a clinic and/or community setting. These WMPs can be effective in reducing body mass index (BMI) when they deliver moderate to high-intensity interventions (ie, offer ≥ 26 hours of contact with the child and/or family over 6-12 months).^{2,3} Stage 4 treatment, aimed at youth with severe obesity, includes the use of medications, very low calorie diets, and/or weight loss surgery. Stage 3 and Stage 4 programs often take place in tertiary care obesity centers located at Children's hospitals.¹

Treatment within the primary care office offers an opportunity to reach and engage a larger proportion of children with obesity,^{4,5} when compared with the more specialized tertiary care obesity clinics. Although the primary care setting has been understudied, and implementation can be challenging, treatment programs in the primary care office can be effective.⁴ The Brief Motivational Interviewing to Reduce Body Mass Index study² provides compelling evidence of the feasibility and effectiveness of primary care-based WMPs.⁴ In a cluster-randomized, 3-group intervention trial within 46 primary care practices, participants in the treatment group who were counseled by a physician and dietitian trained in motivational interviewing had a mean decrease of

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4.9% in BMI percentile after 2 years. This change in BMI percentile was significantly greater than participants exposed to usual care.

The Expert Committee–staged approach, although largely limited to a clinical setting, provides a framework on which interventions in other sectors can be integrated.⁶ The child's medical home can serve as the anchor for a treatment plan that links into other resources in the community, school, and the home. In this role, the primary care provider or their clinic staff can serve in the role of an integrator. Using the Primary Care Obesity Network (PCON), a network of primary care practices linked to a tertiary care obesity center at a children's hospital to prevent and treat childhood obesity, this article will describe the translation of the Expert Committee treatment stages into practice and integration of interventions across primary care, tertiary care, and community settings.

Rationale for the Primary Care Obesity Network

Two key events served as the impetus to establish PCON. First, the Ohio legislature passed the Healthy Choices for Healthy Children legislation, which was signed into law in 2010. The Healthy Choices for Healthy Children has 3 components: (1) increase opportunities for physical activity during the school day; (2) expose children to healthier, more nutritious food options; and (3) conduct BMI screening annually in kindergarten, third, fifth, seventh, and ninth grades. An outcome of this legislation was to increase obesity screening and identification rates; however, the bill did not provide support or guidance on treatment, a crucial element for any screening program. The second event was a needs assessment survey of 60 physicians and nurse practitioners in the community conducted by the Children's Hospital. The results indicated providers had low to moderate comfort level with managing children with obesity and a desire to improve their knowledge and skills. In response to these events, the tertiary care obesity center at the Children's hospital called the Center for Healthy Weight and Nutrition (CHWN) established PCON.

Description of the Primary Care Obesity Network

The primary objective of PCON is to implement high-quality, evidence-based obesity care by providing training, allied health, and administrative support for primary care practices. Primary care practices in the network offer patients and families the first 2 stages of

care recommended by the 2007 Expert Committee guidelines.¹ The network of primary care practices is then linked to CHWN, a comprehensive tertiary care obesity center that provides Stage 3 and Stage 4 treatment options.¹ The second objective of the network is to create clinic-community linkages by establishing a patient-centered medical neighborhood (PCMN) that recognizes and supports the care of the patient within and outside the health care system. CHWN serves as the integrator for all the activities of the network. Figure 1 provides a schematic representation of PCON structure and linkages.

Program Description and Delivery

PCON practices offer either Stage 1 or Stage 2 care as outlined in the 2007 Expert Committee guidelines.¹ Only the physician provides the intervention in Stage 1 clinics, whereas in Stage 2 clinics, the physician and an allied provider, a dietitian, partner together to deliver the intervention. For both Stage 1 and Stage 2 clinics, patients are usually seen monthly. Depending on practice preference and personnel capacity, the PCON program is delivered to families in 2 ways. Nine practices offer a 4-hour clinic each week, dedicated specifically to providing care for children who are overweight or have obesity. During these clinic visits, the child and family are seen either by the physician alone or the physician and the dietitian. The other 10 practices use an alternate method where the patient visits are scheduled with the physician as part of the regular clinic day, while the dietitian visits occur at a separate time, not in tandem with the physician's clinic visits. To minimize concern around stigma and confer a sense of ownership for the child and family, the clinic visits are referred to as MyHealth visits. In doing so, the terms "overweight" and "obesity" are not used by the clinic staff when communicating with the family. The MyHealth visits by the provider last between 15 and 30 minutes, while the dietitian visits when scheduled separately last 30 minutes.

Children need to have a BMI at or above the 85th percentile to be seen for the monthly MyHealth clinic visits. During the MyHealth visit, the provider reviews any medical complaints: progress on existing goals, current diet, and physical activity behaviors, and problem solves barriers using an intake form (Figure 2). Using motivational interviewing, the provider will guide the family to select the nutrition, physical activity, or behavior change topics that are important to their treatment plan and create goals using the evidenced-based messages (Table 1). The specific, measurable, achievable, results-focused, and time-bound (SMART) framework is used to create goals for the treatment plan. Baseline

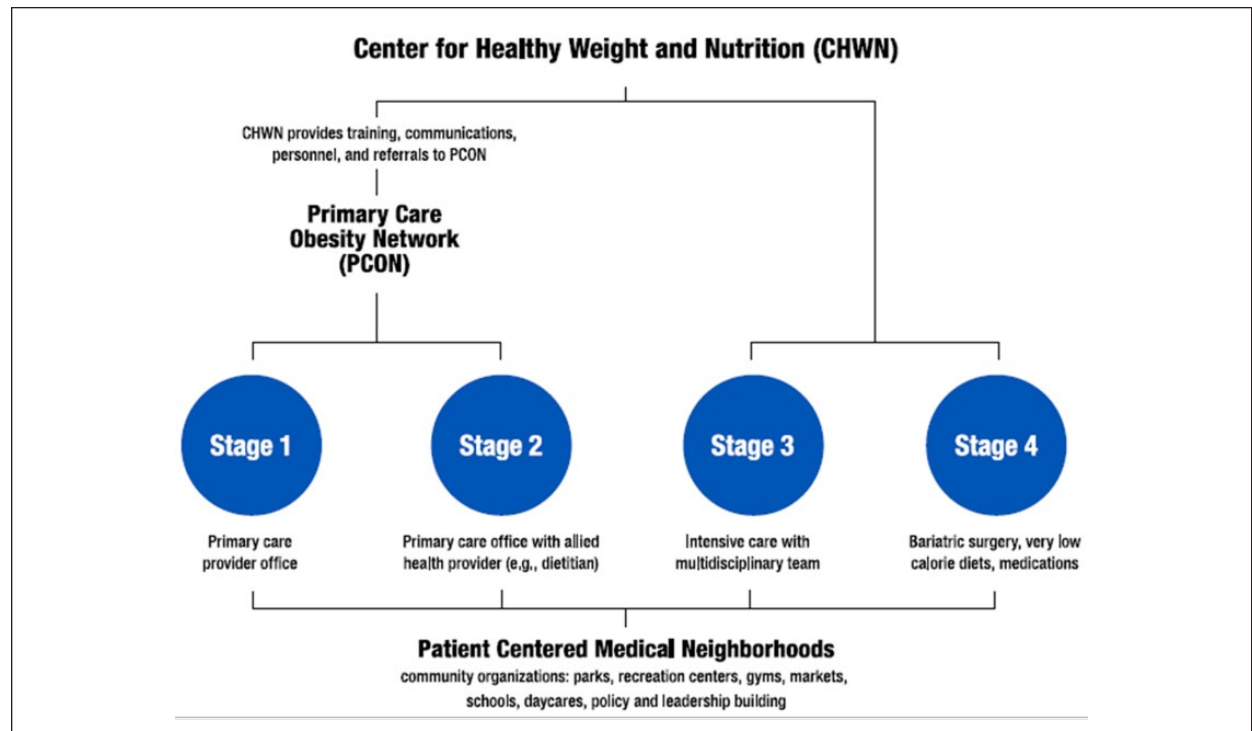


Figure 1. Schematic representation of Primary Care Obesity Network (PCON) structure and linkages.

studies include a fasting blood glucose, alanine transaminase, hemoglobin A1c, and a lipid profile.¹ The child and family are provided with and encouraged to use community resources that have been identified as part of the patient-centered medical neighborhood near their practice location. The visit is coded using any existing comorbidity or obesity as an initial diagnosis. At Stage 2 MyHealth visits, the dietitian screens the child's and family's motivation level and desire for change. Food recalls and food frequency nutrition questions are obtained and documented at each visit. Each family receives an educational program binder. Depending on the child's progress or presence of serious comorbidities, the dietitian and physician in consultation with the family may decide to refer the child for more intensive Stage 3 or Stage 4 interventions at the tertiary care obesity center or at community-based programs such as the YMCA programs. The same intake (Figure 2) and follow-up forms are used in both the primary care practices and tertiary care obesity center, allowing for tracking of behaviors across the continuum of care.

PCON Training and Program Content

Providers participating in PCON are required to attend an initial 3-hour training session presented by faculty and staff from the tertiary care obesity center as part of

their annual training. Subsequent annual trainings for existing practices are shorter, lasting 1 to 2 hours, conducted as face-to-face trainings or virtually depending on practice preference. Training content consists of a review of program inclusion/exclusion criteria; translation of Expert Committee guidelines into practice; guidelines on screening and interpretation of laboratory studies; comorbidities, nutrition, and physical activity counseling techniques; review of motivational interviewing; and billing and coding guides. Case studies are presented by the physician, dietitian, physical therapist, and psychologist to highlight managing common challenges and barriers. Each provider receives a binder with comprehensive information on provider education, screening forms, community resources, and educational handouts for the families. An electronic version of the binder is also made available to each practice. Table 2 outlines the contents for the binder.

Other opportunities for continuing education in obesity management includes the following: spending time at the tertiary care obesity center with a multidisciplinary team consisting of an obesity medicine clinician, dietitian, physical therapist, and psychologist; quarterly webinars; and a variety of printed and electronic resources. Providers are encouraged to use the American Academy of Pediatrics Institute of Healthy Weight and Nutrition motivational interviewing app called "Change

MyHealth Clinic – First Visit Information

Patient Name: _____

Date of Birth: ____/____/____

Who filled out this form? ☐ Parent ☐ Patient ☐ Other _____

Background Information

☐ Asian/Pacific Islander

☐ Male

☐ Black

☐ Female

☐ Caucasian

☐ Hispanic

☐ Native American

Who lives with the patient?

Name	Relationship	Place of Employment
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Does anyone in the family (parents, grandparents, aunts, uncles, brothers, sisters) have:

Diabetes (type 2 adult onset) ☐ Yes ☐ No Who: _____
 Heart problems ☐ Yes ☐ No Who: _____
 High blood pressure ☐ Yes ☐ No Who: _____
 Overweight/Obese ☐ Yes ☐ No Who: _____
 High cholesterol ☐ Yes ☐ No Who: _____
 Gall bladder disease/removal ☐ Yes ☐ No Who: _____
 Thyroid disease ☐ Yes ☐ No Who: _____
 Mental health problems ☐ Yes ☐ No Who: _____
 Substance abuse ☐ Yes ☐ No Who: _____
 Weight loss surgery ☐ Yes ☐ No Who: _____
 Died of heart problems, heart attack, or sudden death before age 55:
☐ Yes ☐ No Who: _____

What grade is the patient in? ☐ Preschool ☐ Grade school (____ grade) ☐ College ☐ Home-schooled

Screen Time

In the room where the patient sleeps, is there a:

- computer or iPad or tablet ☐ Yes ☐ No
- TV or video game ☐ Yes ☐ No

How many hours a day does the patient:

- watch TV ☐ None ☐ Less than 1 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more
- use a computer/iPad/tablet ☐ None ☐ Less than 1 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more
- play video games ☐ None ☐ Less than 1 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more
- use a cell phone/iPod ☐ None ☐ Less than 1 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more

Sleep

What time does the patient go to bed? _____ Wake up? _____

Go to Next Page.

Figure 2. (continued)

MyHealth Clinic – First Visit Information

Physical Activity

How often is the patient playing, exercising, or in sports that make them breathe hard and their heart beat fast? (Do not count gym class.)

- minutes a day: ☐ 0 ☐ 15 ☐ 30 ☐ 45 ☐ 60 ☐ More than 60
 - days a week: _____

How often is the patient in gym class (physical education)? _____ days/week

Is the patient in any school or community sports/activities? ☐ Yes ☐ No

What activities does the patient do? _____

Is it safe to be outside alone in your neighborhood during the day? ☐ Yes ☐ No

What might keep the patient from being physically active or exercising? (Check all that apply.)

- | | |
|---|---|
| <input type="checkbox"/> 1 Nothing | <input type="checkbox"/> 8 Not enough time |
| <input type="checkbox"/> 2 Does not like how it looks when exercising | <input type="checkbox"/> 9 Teasing or chosen last for teams |
| <input type="checkbox"/> 3 Does not know how to do activities | <input type="checkbox"/> 10 Too tired |
| <input type="checkbox"/> 4 No interest or does not like it | <input type="checkbox"/> 11 No one to be active with |
| <input type="checkbox"/> 5 No place or gear to do activities | <input type="checkbox"/> 12 Bad weather |
| <input type="checkbox"/> 6 Can't stick with it | <input type="checkbox"/> 13 No way to get there |
| <input type="checkbox"/> 7 Too heavy | <input type="checkbox"/> 14 Other: _____ |

Eating and Drinking

How often does the patient eat or drink:

Food Group	Every Day (A)	Several times a week (B)	Once a week (C)	Once a month (D)	Less than once a month (E)	Never (F)
1 Vegetables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 Fruits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 Fried foods (like fried chicken, French Fries)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 Foods like cookies, cake, doughnuts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 Snacks (like chips, candy)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 Fast food or at restaurants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 100% juice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 Juice/sweet drinks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 Sports or energy drinks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 Regular soda	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11 Milk (What kind? _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12 Water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How many days a week does the patient eat: - breakfast _____
 - dinner at the table with family _____

Go to Next Page.

Figure 2. (continued)

MyHealth Clinic – First Visit Information

Eating Habits (Check all that apply.)

<input type="checkbox"/> 1 Skips meals	<input type="checkbox"/> 11 Food used as a reward
<input type="checkbox"/> 2 Eats too big of portions	<input type="checkbox"/> 12 Sneaks food
<input type="checkbox"/> 3 Eats 2 or more helpings of food	<input type="checkbox"/> 13 Does not like to eat in front of others
<input type="checkbox"/> 4 Not sure when full	<input type="checkbox"/> 14 Eats at night (after 8 PM)
<input type="checkbox"/> 5 Eats too fast	<input type="checkbox"/> 15 Eats when happy
<input type="checkbox"/> 6 Snacks too much	<input type="checkbox"/> 16 Eats when emotional (like when bored, upset, sad)
<input type="checkbox"/> 7 Eats the wrong kinds of foods	<input type="checkbox"/> 17 High-calorie drinks (like whole milk, soda, juice, sweet tea, sports drinks)
<input type="checkbox"/> 8 Loves sweets/can't stay away from sweets	<input type="checkbox"/> 18 Other: _____
<input type="checkbox"/> 9 Fried foods	
<input type="checkbox"/> 10 Eats in front of TV	

Now that you have filled out this form, is there one thing you would like to work on changing?

<input type="checkbox"/> 1 Eat more fruits & vegetables	<input type="checkbox"/> 10 Drink less soda, juice, punch, sports drinks
<input type="checkbox"/> 2 Eat healthier snacks	<input type="checkbox"/> 11 Replace sweet drinks with water
<input type="checkbox"/> 3 Eat at table with TV off	<input type="checkbox"/> 12 Not eating when bored
<input type="checkbox"/> 4 Change to skim or low-fat milk	<input type="checkbox"/> 13 Take TV, iPad, computer out of bedroom
<input type="checkbox"/> 5 Eat less fast food/take-out	<input type="checkbox"/> 14 Spend less time watching TV/movies or playing video/computer games
<input type="checkbox"/> 6 Cut down portion sizes	<input type="checkbox"/> 15 Increase physical activity
<input type="checkbox"/> 7 Work on a set bedtime	<input type="checkbox"/> 16 Other: _____
<input type="checkbox"/> 8 Not sneaking food	
<input type="checkbox"/> 9 Not eating after 8 PM	

Food Information

In the past 12 months, how often have you worried that your food would run out before you had the money to buy more?

☐ Often ☐ Sometimes ☐ Never ☐ Do not know/do not want to answer

In the past 12 months, how often have you noticed the food you bought didn't last and you didn't have the money to buy more?

☐ Often ☐ Sometimes ☐ Never ☐ Do not know/do not want to answer

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Figure 2. Primary Care Obesity Network (PCON) new patient intake form.

Talk” to enhance their motivational interviewing counseling skills in keeping with the 2007 Expert Committee recommendations.¹ Change Talk is built as a virtual practice environment in which health care providers assume the role of a physician providing care for a child with obesity and his mother in a stimulated conversation at a primary care clinic visit.⁷ Motivational interviewing helps the provider assist a family in creating actionable opportunities for behavioral change and manage resistance and barriers to change.⁷ Providers can earn continuing medical education credits for the trainings and

webinars. In addition, in 2014, the materials were enhanced to allow providers to use them to complete an American Board of Pediatrics Obesity Maintenance of Certification Part IV quality improvement project as part of their pediatric board certification.

Structure and Implementation of the Program

CHWN provides oversight for provider training, administrative support, building clinic-community linkages, providing educational materials, program evaluation,

Table 1. Specific Healthy Eating and Activity Behaviors.

1. Consume ≥ 5 servings of fruits and vegetables every day
2. Minimize sugar-sweetened beverages, such as soda, sports drinks, and punches
3. Decrease television viewing (and other forms of screen time) to ≤ 2 hours per day
4. Be physically active ≥ 1 hour each day
5. Prepare more meals at home rather than purchasing restaurant food
6. Eat at the table as a family at least 5 or 6 times per week
7. Consume a healthy breakfast every day
8. Involve the whole family in lifestyle changes
9. Allow the child to self-regulate his or her meals and avoid overly restrictive feeding behaviors

and dissemination. CHWN is a tertiary care obesity center established in 2005. Since CHWN offers Stage 3 and Stage 4 programs for the evaluation and treatment of overweight and obese children by a multidisciplinary team, it serves as a referral resource for the network.⁸

The PCON leadership team is composed of the Director of CHWN, the program dietitians, the prevention coordinator, and 2 physician leads—one physician lead for the network of primary care practices affiliated with the Children's hospital and another for the private community practices as the needs and modes of program delivery for practices in these groups vary. An administrative person (eg, the office manager) and a pediatrician who is designated as the clinic champion serve as the point of contact for each PCON practice. Each physician lead works closely with the clinic champions, dietitians, and prevention coordinator in providing oversight on how the program is implemented for their assigned practices.

The role of the Director of CHWN is to guide the strategic vision for the network, oversee training activities, program evaluation, and outcomes. The prevention coordinator is responsible for the administrative oversight of the day-to-day activities of the network and serves as the integrator for activities in the health care, public health, school, and community sectors. An advisory committee made up of PCON clinic champions, health coaches, and ad hoc clinic administrative staff serve as a sounding board and help guide decisions. The advisory team meets approximately 2 to 4 times a year.

The costs for the program include the costs for a part-time prevention coordinator, part-time dietitian, materials, patient incentives, and printing. The physician leads and primary care practice champions are not reimbursed for their time as part of PCON. Initially funded by grants for the first 3 years, the Children's hospital adopted PCON in recognition of its impact and alignment with the hospital's community health needs assessment and strategic plan on

population health. Thus, the hospital currently provides financial support for the prevention coordinator and dietitians. Patient handouts are provided electronically for each clinic to allow for replication as needed. Each clinic can customize the pamphlets, posters, and handouts with their logo and clinic address. Clinics also receive incentives as made available by community partners. The program is exploring other sustainable business models that can support the costs of the dietitian.

Description and Implementation of the Patient-Centered Medical Neighborhood (PCMN)

PCON established a PCMN as a way to build multisector linkages for obesity treatment and to address prevention for children who are not yet overweight. The PCMN is a set of relationships around the medical home that links the individual to pertinent resources within their own community. A defining feature is that care is coordinated with the medical home. In integrating the services and resources, the individual receives personalized, redundant, and consistent messaging and care. PCON emphasizes the use of all PCMN materials for all children in the practice, not only for those who are overweight or have obesity. Thus, activities related to the PCMN serve 2 purposes: prevention and treatment of childhood obesity. The need for strong clinic-community linkages is aptly outlined in the recent National Academy of Medicine Obesity Roundtable enhanced chronic care model.⁹ Dietz et al⁹ highlight the importance of integrating the community and the health care system, while recognizing the role for appropriate metrics, training, and infrastructure support in managing chronic diseases such as obesity. Available resources in the community that support a healthy lifestyle have a positive effect on a wide range of health outcomes when linked with treatment efforts within the health care system.¹⁰

The prevention coordinator works with clinics and community organizations to map out community resources in their neighborhoods and establishes relationships with organizations and public health initiatives focused on creating a healthy lifestyle for children and families. Information on how to implement the PCMN is customized for each practice and shared with the clinic team. Specific healthy lifestyle topics and events are organized into quarterly themes over the year. For instance, the April to June theme often involves sharing materials on gardening, farmers markets, and summer programs from collaborating partners. For example, one year, seedling pods provided through a partnership with a national gardening company with educational materials on gardening were offered during well-child visits in place of stickers.

Table 2. Table of Contents for PCON Binder.

Section	Contents
PCON Protocol	Eligibility criteria
Comorbidity Screening	Childhood obesity algorithm—Assessment, Prevention, and Treatment
	Guide for ordering laboratory studies
Surveys	Guidelines for referral to tertiary care obesity program
	New patient intake survey (English and Spanish)
Management Guides	Follow-up visit survey (English and Spanish)
	Medical screening by BMI category
	Lipid protocol and management
	Evaluation and treatment of hypertension for children with BMI \geq 85th percentile
	Blood pressure levels for the 90th and 95th percentiles
	Evaluation of abnormal liver enzymes in children (BMI > 95th percentile)
Creating Goals	Ten evidence-based messages
	Creating SMART goals
	Practice tool: Motivational interviewing
Educational Materials & Handouts	Nutrition handouts
	Physical activity handouts
	Behavior handouts
	Community resources
Outcomes	Outcomes measured: Administrative, anthropometric
	Process measures
Maintenance of Certification (MOC)	American Board of Pediatrics (ABP) Obesity MOC instructions and related forms
Resources	Coding guidelines—ICD-10
	Expert Committee recommendations articles
	Children's Hospital Association Consensus articles on comorbidities and prediabetes
	Bariatric surgery health care provider and consumer fact sheets

Abbreviations: PCON, Primary Care Obesity Network; BMI, body mass index; SMART, specific, measurable, achievable, results-focused, and time-bound; ICD-10, International Classification of Diseases, Tenth Revision.

Another example of PCMN implementation is the opportunity for families in PCON practices to attend a grocery tour conducted in collaboration with Local Matters, a local nonprofit community organization.¹¹ The goal of Local Matters to transform the food system through education and increased access to healthful, affordable, and sustainable food aligns with the overall aims of PCON. PCON has also partnered with the Columbus Health Department to share their public health campaigns, such as “Water First for Thirst” in our practices.¹² Handouts related to each PCMN quarterly theme are provided to all families in the PCON practices, regardless of BMI in keeping with the intent of the PCMN to address both prevention and treatment.

Process and Outcome Evaluation

Outcome measures are tracked at the provider, program, and patient levels (Table 3). Annual goals are set by the leadership team and a key driver diagram is used to track progress of activities related to the goals. Continuous

quality improvement projects are part of the PCON process to improve care. For instance, an initial quality improvement project employed the use of an electronic health record alert to prompt identification of obesity on the problem list by the clinician for any chart with an elevated BMI. Over an 18-month period, rates of identification on the problem list increased from 57% to 82%.¹³

Discussion

PCON provides an example of how primary care practices can translate the 2007 Expert Committee guidelines into practice in a sustainable and collaborative fashion within the child's home and community. Currently, PCON practices are located in 11 primary care clinics attached to the Children's hospital and 7 private primary care practices in the community, all in Central Ohio. Two additional PCON practices are outside Central Ohio. There are 165 pediatricians and nurse practitioners involved in the PCON practices. Seven practices are located in zip codes with a high vulnerable

Table 3. PCON Evaluation Measures.

Outcomes	Variables	Description
Program	Clinic utilization rate	75% of available clinic appointments are filled for each session
	Uptake of community resources	Percentage of participants who use community resources
Provider	Participation in training	Practice champion will attend annual training
	Participation in webinar	Attend 2 webinars a year
Patient	Anthropometrics: BMI, BMI z-score; diet and physical activity behaviors	75% will have 3 or more visits in 6 months
		55% of patients with 3 or more visits in 6 months decrease BMI Improvement in diet and physical activity behaviors after 3 PCON visits

Abbreviations: PCON, Primary Care Obesity Network; BMI, body mass index.

footprint defined as $\geq 15\%$ with less than a high school diploma and $\geq 20\%$ of the population living below poverty. In 2016, the network began expansion into 13 school-based clinics in a single school district run by nurse practitioners. Eleven of the school-based clinics are within zip codes that meet the vulnerable footprint criteria. Twelve practices have used their participation in PCON to fulfill their meaningful use and/or patient-centered medical home requirements.

Potential benefits of even a modest reduction in risk within a clinical setting can translate to significant benefits when evaluated at the population level.⁷ The support of a health care system is indispensable for a program like PCON to exist and be sustainable. In providing a pragmatic framework for treatment, structured training, and educational opportunities, PCON attempts to address often-cited barriers such as time constraints during the clinic visit, poor reimbursement, and inadequate physician knowledge and counseling skills.^{8,14-17} Providers can be reticent to identify or address the problem of weight gain. This reticence follows from skepticism that they can be effective and lack of time because of busy clinic schedules.¹⁸⁻²⁰ Yet parents identify the physician's office as the preferred setting to address weight-related concerns for their child,²¹ and overweight adolescents are more likely to attempt weight loss strategies when counseled by their physician in primary care.²² Providing adequate training and support for primary care providers can help mitigate this concern.

Lack of patient and family engagement is another significant barrier to treatment.²³ Higher rates of attrition have been reported among adolescents, minority populations, and families on Medicaid.²⁴ Reasons for high attrition rates include mismatched expectations between the patient/family and the program goals, poor motivation, program cost, poor insurance coverage, scheduling difficulties, transportation problems, and the child's wish to discontinue treatment.^{17,23-25} Addressing these barriers to enhance engagement has been a priority in the PCON educational programs.¹³

Explaining to the families that managing obesity is a slow and time-consuming process that requires their participation to be successful is essential. To improve utilization rates, using a dedicated front office staff member to schedule the physician and dietitian visits is helpful and using personalized text and phone reminders for appointments can improve attendance and engagement. A benefit of the PCON program is that patients are cared for in their primary care office, so patient compliance and access to care is better, while inappropriate referrals to Stage 3 and Stage 4 tertiary care obesity programs that often have limited capacity to care for large numbers of children are minimized. Engaging practices and community partners to maintain the network is not without challenges. It requires a commitment from the children's hospital to underwrite the administrative support for the network rather than depending on funding sources from grants that are often not reliable. The PCON activities often address the needs of the community around health and wellness. If obesity is an identified health problem in the Affordable Care Act–mandated community health needs assessments, most hospitals can justify the costs of supporting such a program. An alternative mechanism for funding can be a nominal charge to each primary care practices to be part of the network.

Conclusion

PCON is an innovative and pragmatic translation of the Expert Committee recommendations. It has served as an opportunity for collaboration between community organization, schools, and public health departments, thus broadening the scope and depth of prevention and treatment options in our community. Outcome research using this model will be worthwhile in evaluating the 2007 Expert Committee recommendations as a pragmatic and sustainable intervention for childhood obesity. The PCON framework may also lend itself well to assess the shift from fee-for-service reimbursement to value-based

purchasing model, especially as accountable care organizations strive to provide services through the lens of improving population health.

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Author Contributions

IUE: Conception and design, implementation of process, acquisition of funding, and program analysis. Primarily responsible for drafting the article and the intellectual content. CH, PP and MER: Conception and design, implementation of program process, oversight and analysis, and revision of manuscript for intellectual content. KP: Oversight, analysis, and revision of manuscript for intellectual content. ELL and ELD: Implementation of process and revision of manuscript for intellectual content.

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