ORIGINAL RESEARCH

# Fitwits™ Leads to Improved Parental Recognition of Childhood Obesity and Plans to Encourage Change

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***Introduction:*** **Brief tools are needed to help physicians and parents reach consensus on body mass index (BMI) categories for children and to discuss health-improving behaviors. This study tested the Fitwits™ intervention with interactive flashcards and before and- after surveys to improve parents' perceptions of children's BMI status.**

***Methods:*** **We enrolled 140 parents and their 9- to 12-year-old children presenting for well child care, regardless of BMI status, scheduled with 53 Fitwits-trained physicians. The Fitwits tool guided a conversation with all parent-child dyads regarding understanding BMI, nutrition, activity, and portion sizes. A survey addressed BMI category perceptions before and after the intervention, requested 2 goal selections, and included open-ended comment areas.**

***Results:*** **Fifty-three percent of children were overweight or obese. The primary outcome variable was the rate of correct parental identification of their child's weight status (underweight, healthy, overweight, or obese). The survey before the intervention resulted in 50.0% correct BMI category designations. This changed to 60.6% correct perceptions after the intervention, with movement between correct overweight (34.5% to 51.7%) and obese (4.4% to 24.4%) categories. Secondary outcome variables included specific behavior change goals and the qualitative responses of parents, children, and physicians to the intervention. Parent-child dyads predominantly commented favorably and chose (75.8%) goals corresponding to Fitwits card suggestions.**

***Conclusions:*** **An improvement was observed in parental ability to identify the correct BMI category after the intervention during a preadolescent well child visit. Parent underrecognition of overweight/obese children was also observed. Most parent comments were appreciative of the physician interaction, Fitwits flashcards, and health improvement exchange. (J Am Board Fam Med 2017;30:178–188.)**

***Keywords:*** **Body Mass Index, Body Weight, Childhood Obesity, Health Literacy, Portion Size, Surveys and Questionnaires**

The 2007 Expert Committee recommendations encouraged physicians to screen children between 2 and 18 years of age at well-child visits for body mass index (BMI) percentiles, to provide anticipatory guidance for children at a healthy weight, and to effectively counsel overweight and obese children.[1] However, physicians and parents often rely on visual and cultural impressions of weight status rather than objective BMI measurements when considering children.[2–4] Underrecognition of mildly obese and overweight children is common.[5–8] When excess weight is observed, physi-

This article was externally peer reviewed.
*Submitted* 30 August 2016; revised 8 December 2016; accepted 23 December 2016.

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cians and families frequently struggle to find accessible language and helpful management strategies within the confines of well-child visits.[4,9,10] Calculated BMI percentiles may be difficult for parents to understand.[9,11] In these instances, obese and overweight children are not properly assessed and treated.[5,7,12] Studies in the medical literature are replete with subpar productive and documented BMI discussions with families.[4–6,10,13,14]

To assist primary care physicians with these discussions, university-based design specialists, physicians, dietitians, and children from Pittsburgh, Pennsylvania codeveloped the Fitwits™ office tool as a brief well-child care intervention, irrespective of BMI status.[15,16] Fitwits products were invented as a health communications–related preventive approach to reducing obesity in 2007 to 2009.[17] Seventeen flashcards populated with "Fitwits" and "Nitwits" food and snack-based characters frame key expert-recommended elements: BMI discussion, use of the term *obesity*, exercise, nutrition, portion sizes, and behavioral management suggestions. Cards 3 and 4 depict accurate BMI percentile scales for girls and boys, respectively. They have ordinate labels and color-coded obese, overweight, and healthy weight BMI categories, illustrated with representative Fitwits and Nitwits characters. The flashcards prompt conversations about 60 minutes of daily activity, reducing fast food and sweetened beverages, and 7 hand-based portion sizes for any place a meal is being eaten. Our 2011 residency-based office study of this tool demonstrated increased physician comfort and competence in discussions, particularly those about BMI, obesity, and portion sizes.[18] Physicians are more disposed to screen for obesity with concurrent training in prevention and treatment.[19–21] We have continued Fitwits training for physicians entering our program and are focused on patient outcomes.

This Fitwits BMI study is a response to the growing "norm" of childhood obesity and the concurrent fading parental recognition of a child's excess weight. Physicians need to help parents understand that their child is overweight or obese, and then help them take action.[22] Our study assesses parents' awareness of their child's BMI status, perceptions of the physician-led discussion, and the child's longitudinal BMI percentile trajectory over 12 months. In this article we only report parent responses to questions about prior physician-led BMI discussion, health behaviors regarding eating and activities, parent's identification of the child's BMI category before and after the Fitwits intervention, selected goals, and visit comments; this well-child survey was administered on the day of enrollment.

## Methods

### *Design*

Our intention was to determine whether parents' perceptions of their child's weight status would change by using the Fitwits office tool during a well-child visit. The approximately 5-minute Fitwits-framed discussion replaced the usual well-child weight status, nutrition, and activity conversation. We used electronic medical record (EMR)–generated BMI percentiles, the physician-led Fitwits brief intervention, and self-reporting surveys administered before and after the intervention for parents/guardians and children ages 9 to 12 years. To attract enrollees, a home-use Fitwits game set was given to each child at the visit's conclusion; the games included (1) Fitwits or Nitwits food characters with simple fat and sugar scales and recipes using hand-based portion sizes; (2) a memory game connecting hand-based portion sizes and a variety of foods; and (3) a trivia game with engaging nutrition-related questions. This study was part of a larger longitudinal, nonrandomized intervention study that measured BMI category perceptions and child BMI trajectories at 4 time points (baseline and 2, 6, and 12 months). All procedures were approved by the University of Pittsburgh Institutional Review Board.

### *Setting and Participants*

Our study was conducted in an urban western Pennsylvania family medicine residency program in 3 family health centers serving patients with low to middle socioeconomic status. A Fitwits research team of residents trained and obtained consent from 100 family health center residents, fellows,

*Funding:* This research was supported through grants from the Allegheny County Medical Society Foundation, the Auxiliary Board of St. Margaret Foundation, the St. Margaret Foundation Family Health Center Fund, and the A.J. and Sigismunda Palumbo Charitable Trust.

*Conflict of interest:* none declared.

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and faculty physicians. We enrolled 140 parents and 9- to 12 year-old children between May 2012 and November 2013.

### Procedure

*Inclusion and Recruitment Methods*

The Fitwits team developed a training PowerPoint presentation for reception and nursing staff and separate printed pages for the staff and patients. These outlined the eligibility of all children ages 9 to 12 years, regardless of BMI status, provided that they were scheduled for a well-child visit and accompanied by a parent/legal guardian. Trained staff obtained informed consent from parents/legal guardians and assent from the children.

*Process*

Nursing staff weighed the child on well-maintained scales, which were different at each site, and measured their height using Seca 222 stadiometers (seca North America, Chino, CA). Measurements were entered in our EpicCare EMR (Epic Systems Corp., Verona, WI), producing a BMI and a BMI percentile to the 0.01 place. In the examination room, the parent and child completed the survey up to the indicated stopping point; then the physician narrated the flashcards and facilitated bidirectional conversations. The EMR-generated BMI percentile and the BMI category were discussed using the girls' or boys' BMI flashcard. After the Fitwits intervention, the parent and child completed the remaining survey. The physician completed his/her comment area.

### Outcomes

The primary outcome variable was the rate of correct identification by parents of their child's weight status (underweight, healthy, overweight, or obese) before and after the brief Fitwits intervention. Secondary outcome variables included specific behavior change goals, chosen collaboratively by the parent-child dyad, and the qualitative responses of parents, children, and physicians to the intervention.

### Survey and Study Development, and Physician Training

A validated children's behavioral health survey was not available. The pen and paper survey was constructed over several months by the Fitwits team of residents and faculty to reflect the contents of the Fitwits tool. Additional questions were developed based on published use of brief tools focused on BMI identification and communication, participant health habits, and goal-setting.[23,24] The survey was not validated, but the team edited questions to improve the level of understanding.

Surveys completed by parents and children included questions related to demographics; parent perceptions that a physician discussed and helped them understand BMI in the 2 years before the intervention; understanding of BMI category before and after the Fitwits intervention; and 9 health-related behaviors (3 possible responses per question).[1,23,25] The Fitwits office tool was implemented before the after-intervention survey, which requested the selection of 2 behavioral change goals from among 25 suggestions. The survey concluded with child and parent comment areas, prefaced by "Comments on visit with the doctor," followed by "Physician comments on visit."

Residency-based physicians have been trained by a Fitwits resident team to use the Fitwits intervention since 2008. Group intern orientation training was accomplished each June starting in 2012 with a PowerPoint presentation on the epidemiology of childhood obesity, child BMI percentile discussions, and a review of the card games, 17 flashcards, and surveys.

### Sample Size Estimation

We based our sample size estimation on the major study goal of improving the rate of parents correctly identifying their child's weight status. Under the null hypothesis, a parent would guess their child's correct status 50% of the time before the intervention. A sample size of approximately 110 parents would be sufficient to determine an improvement of 15% ($\alpha = 0.05$, 2-tailed; power = 0.90). Assuming a 20% loss to follow-up at 12 months resulted in us seeking to enroll 130 parents and children.

### Statistical Analysis

In this article, basic descriptive statistical measures (frequency and relative frequency distributions, cross-tabulations) are used to describe the parent, child, and physician responses to survey questions. The McNemar test for matched dichotomous differences was used to compare the parent's accuracy (either correct or incorrect) of identifying their



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child's BMI status before and after the intervention.

Two qualitative analysts (IJK and DJA) independently coded the written comments of parents, children, and physicians; developed major themes; and grouped the comments. The analysts conferred on differences in applied codes and came to a consensus.

## Results

We obtained consent from and enrolled 140 pairs of parents and 9- to 12-year-old children at well-child visits, regardless of BMI status, though 130 parent/child pairs were determined to be sufficient. A total of 53 Fitwits-trained physicians participated based on family enrollments.

As seen in the population description provided in Table 1, the 140 enrolled children were evenly distributed in age; 54% were male, and the children were predominantly English-speaking, African American, not Hispanic, insured by Medicaid, and accompanied by their mother. Fewer than half (46%) had a healthy BMI, 1% was underweight, and 53% were overweight or obese. Our concurrent outpatient population of 378 9- to 12-year-olds was 51% male; 61% African American, 33% white, and 7% other; 81% insured by Medicaid; and 42.1% overweight or obese (52.1% at center 1, 39.1% at center 2, and 32.7% at center 3). The demographics and high enrollment (53%) of overweight and obese children most closely resembled the preadolescent population at center 1 (86% African American). About half (71 of 140) of the parent/child cohort chose to enroll at center 1.

Table 2 addresses parents' views of a prior physician-led, BMI-related discussion and a child behavior survey. Most children (94%) had weight and height measurements. Just over half (60%) recalled a discussion of BMI with their physician, and 55% felt that a physician had helped them understand BMI. A total of 29% had experienced Fitwits previously, in a study or informally. Table 2 also shows parental assessments of factors that were influential in normal or excessive weight gain. Most reported (their opinion) "about right" portion sizes (72%) and ≤1 fast food meals in a week (69%). The majority of responses indicated <5 servings of fruits and vegetables each day and ≥2 sweetened drinks and junk food snacks each day. For activity behaviors, only 7% thought their child actively played <1 hour per day, whereas 68% reported ≥2 hours of daily screen time. All responders (n = 135) owned a television; 68% had a television located in the child's sleeping area. By contrast, 80% of participant households owned a computer, and 12 of these were located in the child's sleeping area.

**Table 1. Descriptive Characteristics of Child Participants (n = 140)***

| Variable | Participants, n (%)† |
|---|---|
| Age (years) | |
| 9 | 40 (29) |
| 10 | 35 (25) |
| 11 | 32 (23) |
| 12 | 33 (24) |
| Male sex | 75 (54) |
| Race | |
| Black/African American | 96 (70) |
| White | 21 (15) |
| >1 race | 18 (13) |
| Asian | 3 (2) |
| Ethnicity‡ | |
| Hispanic/Latino(a) | 5 (6) |
| Non-Hispanic/Latino(a) | 80 (93) |
| Insurance | |
| Medicaid | 108 (77) |
| Commercial | 27 (19) |
| Uninsured | 5 (4) |
| BMI category | |
| Underweight | 1 (1) |
| Healthy | 65 (46) |
| Overweight | 29 (21) |
| Obese | 45 (32) |
| BMI percentile | |
| 25th | (55.4) |
| 50th | (87.2) |
| 75th | (96.8) |
| Language | |
| English | 135 (99) |
| Other | 2 (2) |
| Parent accompanying child | |
| Mother | 110 (79) |
| Father | 11 (8) |
| Legal guardian | 14 (10) |
| Other responsible adult | 5 (4) |

*Well child enrollment occurred May 2012 through November 2013. Frequencies not adding to 140 are because of missing responses and/or unknown data.
†Percentages were rounded to the nearest percent.
‡Many respondents (n = 54) did not answer for ethnicity. Pittsburgh has a relatively low but growing Hispanic population/familiarity.
BMI, body mass index.



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**Table 2. Preintervention Parent Report of Physician Interactions and Child's Behaviors***

| Questions | Responses, n (%) |
|---|---|
| Within the past 2 years, my child's weight and height were measured in a doctor's office. | |
| Yes | 130 (94) |
| No | 6 (4) |
| N/A | 2 (2) |
| Within the past 2 years, my child's doctor discussed BMI with me. | |
| Yes | 82 (60) |
| No | 49 (36) |
| N/A | 6 (4) |
| Within the past 2 years, my child's doctor helped me to understand BMI. | |
| Yes | 74 (55) |
| No | 49 (36) |
| N/A | 11 (8) |
| My child's doctor has done Fitwits in the office with my child before today.† | |
| Yes | 38 (29) |
| No | 88 (67) |
| N/A | 6 (5) |
| My child eats a portion size of food at each meal that is: | |
| Too little | 7 (5) |
| About right | 101 (72) |
| Too much | 32 (23) |
| My child eats this number of fruits and vegetable servings each day: | |
| ≤2 | 68 (49) |
| 3–4 | 69 (49) |
| ≥5 | 3 (2) |
| My child drinks this number of sweetened drinks each day (soda/pop, juice, punch, sports drinks, powdered drinks, sweet tea, etc.): | |
| ≤1 | 49 (35) |
| 2 | 51 (36) |
| >2 | 40 (29) |
| My child eats this number of junk food snacks each day (candy, cookies, cake, pastries, chips, fries, etc.): | |
| ≤1 | 46 (33) |
| 2 | 56 (40) |
| >2 | 38 (27) |
| My child eats this number of fast food meals in a week: | |
| ≤1 | 96 (69) |
| 2 | 28 (20) |
| >2 | 15 (11) |
| My child actively plays this number of hours each day: | |
| 0–1 | 10 (7) |
| 1 | 19 (14) |
| >1 | 111 (79) |
| My child watches this number of hours of screen time (television + video + computer) each day (not including school): | |
| 0–2 | 43 (31) |
| 2–3 | 53 (38) |
| >3 | 42 (30) |
| A home television is located: | |
| Don't own a television | 0 (0.0) |
| Child's sleeping area | 92 (68) |
| Not in child's sleeping area | 43 (32) |
| A home computer is located: | |
| Don't own a computer | 28 (20) |
| Child's sleeping area | 12 (9) |
| Not in child's sleeping area | 100 (71) |

*Sample size varied from 132 to 140.
†Fitwits feasibility or physician studies or informally prior to this study.
BMI, body mass index; N/A, no response available for preadolescents without a well child visit within the past 2 years (preadolescents tend to have fewer well child visits than in early childhood).

Perceptions about BMI categories are found in Table 3. Approximately 53% of the 140 enrolled children were overweight (n = 29) or obese (n = 45). Most parents whose children had a healthy BMI percentile recognized them as such (86.2% correct responses), whereas 34.5% correctly identified their child as overweight and just 4.4% correctly identified their child as obese. Eight children were perceived as being underweight, though actually 1 child was underweight, 6 had healthy weights, and 1 was obese. The results after the intervention showed a shift in the direction of more parents (11 of 45) correctly acknowledging their child's obesity. Total parent perceptions of the correct BMI category changed from 50.0% to 60.6%, with positive movement in both the overweight (51.7%) and obese (24.4%) categories. Nine children were identified as underweight, which was true only for 1 of them.

A matched set of 135 parents responded to both the pre- and postintervention questions regarding their child's perceived BMI status. A total of 63



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**Table 3. Comparison of Parent Responses Before and After the Intervention***

| Child Status | Parent Perception | | Parent Correct Response | |
|---|---|---|---|---|
| | Before the Intervention | After the Intervention | Before the Intervention | After the Intervention |
| Underweight (n = 1) | 8 (6%) | 9 (7%) | 1 (100.0%) | 1 (100.0%) |
| Healthy (n = 65) | 82 (59%) | 74 (54%) | 56 (86.2%) | 56 (86.2%) |
| Overweight (n = 29) | 45 (33%) | 43 (31%) | 10 (34.5%) | 15 (51.7%) |
| Obese (n = 45) | 3 (2%) | 11 (8%) | 2 (4.4%) | 11 (24.4%) |
| Total correct responses | | | 69 (50.0%) | 83 (60.6%) |

*There were 138 responses from parents before the intervention and 137 responses after.

parents (47%) correctly identified their child's BMI status on the surveys both before and after the intervention, 48 (36%) were incorrect on both, and 24 (18%) changed their perception. Of the 24 who changed, 18 parents were incorrect on the survey before the intervention but answered correctly on the survey after the intervention, versus 6 who changed to incorrect after the intervention ($P = .014$).

Table 4 is a compilation of the 2 goals selected from among 25 choices by parents and children after the Fitwits discussion. Participants tended to select goals (191/252, 75.8%) corresponding to visual and conversational cues included in the Fitwits flashcards and/or physician training. Those selected ≥20 times included the visually cued increase in fruits and vegetables (n = 31), less junk food, more healthy snacks (n = 32), decrease sugary drinks (n = 21), drink more water (n = 25), proportionate hand-based portion sizes (n = 23), and active play at least 60 minutes each day (n = 20). The next tier, chosen 10 to 19 times, included built-in messages to eat less fast food (n = 12) and the activity inquiry (eg, dance, bicycle, walking), chosen 13 times. Fitwits cards do not include limiting screen time (chosen 14 times), but trainees were instructed to verbally add this message to the 60-minute activity card.

Qualitative comments are summarized in Table 5. Of the 53 participating physicians, 39 wrote at least 1 comment. Remarks favored adult and child engagement (52 comments) over absent engagement (13 comments). Approximately 25% of com-

**Table 4. Goals Selected by Parents and Children After the Intervention (Instructed to Select 2 of 25 Example Goals)***

| | | | | | |
|---|---|---|---|---|---|
| Food and drink | **Eat 5 fruits and vegetables each day†** | **Eat less junk food, more healthy snacks** | **Decrease sugary drinks to 1 or none each day** | **Drink more water** | Choose low-fat milk |
| | 31 | 32 | 21 | 25 | 1 |
| Eating habits | **Eat fast food no more than once a week** | Eat more home-cooked meals with your family | Eat snacks and meals at the table | Eat a healthy breakfast each day | Make a bag lunch for school |
| | 12 | 2 | 4 | 6 | 0 |
| | **Eat healthier portion sizes** | Talk to family and friends at dinner table | Chew your food slowly | Make eating changes as a family | Your idea _____ |
| | 23 | 6 | 6 | 9 | 5 |
| Activity | **Be active and play ≥1 hour each day** | **Be active: dance, bicycle, walk, run, or swim** | Be active and try a team sport | Be active and try an individual sport | Your idea _____ |
| | 20 | 13 | 8 | 2 | 2 |
| Child and parent | **Limit screen time to 2 hours each day** | Move television out of your child's sleeping area | Help your child get a good night's sleep | Reward your child without using food | Work with school on physical activity |
| | 14 | 0 | 5 | 5 | 0 |

*A total of 127 selected 1 goal (13 missing), and 125 selected 2 goals (15 missing).
†Boldfaced goals (191/252, 75.8%) represent goals that correspond to recommended behaviors found in the Fitwits flashcards and/or physician training.



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**Table 5. Qualitative Physician Comments and Parent Comments upon a Visit with the Doctor**

| Initial Comments | Responses (n) |
|---|---|
| Physician comments* | |
| Engaged adult at visit | 28 |
| Engaged child at visit | 24 |
| Information was received and understood | 10 |
| Adult not engaged at visit | 8 |
| Child not engaged at visit | 5 |
| High-calorie foods problematic | 5 |
| Adult confused/in denial about BMI | 5 |
| Adult supportive of information and motivated to change | 4 |
| Parent comments† | |
| Mentioned improved understanding about healthy eating/drinking; informative | 13 |
| Positive comment about doctor | 9 |
| Increased understanding/knowledge about weight/BMI | 9 |
| Positive comment about visit | 7 |

*Of 53 participating physicians, 39 wrote at least 1 comment; 83 surveys included physician comment(s) about the visit, with 89 remarks listed. Most frequently mentioned comments are rank ordered by frequency of response

†Of parents, 43 wrote a comment. The most frequently mentioned comments are ordered by frequency of response.

BMI, body mass index.

ments were positive regarding the information provided. Nonacceptance of BMI was perceived for 5 adults. The parents and children (n = 31; child data not shown) who commented wrote mostly positive remarks about the physician, receiving information, and improved healthy eating/drinking or understanding of BMI. Comments from child-parent dyads are portrayed in the word cloud (Wordle, http://www.wordle.net) shown in Figure 1. Some comments are included in the discussion to support or refute BMI discussion and regarding activation expressed by parents and children after the intervention. Examples of additional comments follow.

Parent/guardian comments (set verbatim) reflecting physician communication included appreciation for the doctor's skills and Fitwits messages about BMI and changing health habits: "She was so informative. I really liked the way she does her job"; "Great advise [sic] and help to understand the importance of my childs [sic] BMI"; "Really helped us understand the importance of BMI being healthy—works well with my family." A grandmother said, "This health care . . . is very informative about healthy eating, exercising, ways to help the parents out with this difficult task." Other comments from parents/guardians included, "It was very informative about my niece's BMI and the Dr showed us great ways to improve our eating habits"; "Up until today I thought her weight was nice but I learned that we have to change her eating habit"; "Glad to have been introduced to fitwits and the info is very helpful." Children commented: "I think that this was a good visit & I would like to thank my Dr for telling me how to be healthy. Thank you!"; "Learned how to stay healthy and active to keep a good weight!"; "He helped me very much about my weight"; "I liked the flash cards."

**Figure 1. Our physicians and 17 Fitwits flashcards guide each child and parent through an interactive conversation about body mass index status, "obesity," nutrition, activity, and hand-based portion sizes. The thumb portion size (shown) is a recommended serving of peanut butter, mayonnaise, hummus, or other spreads at 1 meal. Responsive parent and child survey comments are captured in this word cloud.**

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Some negative but perceptive comments by physicians indicated parents' reluctance to accept BMI designations: "Mother is a little skeptical about BMI category"; "Mother frowning, reluctant to acknowledge BMI status, I think." Additional physician comments pertained to examination room distractions: "Visit very busy & loud with multiple siblings but the 8 year old & 10 year old really tried to listen"; "Patient was interested but mother in & out of room with other children."

## Discussion

Physicians and families in pediatric care settings often experience a quadruple dilemma: (1) low rates of physician-led communication regarding BMI[6,10]; (2) parent misperceptions about their child's BMI status[8,26,27]; (3) low parental acceptance of their child's BMI status[3]; and (4) reaching agreement on a corrective plan.[28] These themes support this Fitwits intervention study and the following discussion.

Systematic identification of overweight/obese children is deemed important to find associated health problems and to match treatment advice and services.[6,7,14] Less than a quarter of parents of overweight children aged 2 to 15 years reported having been told by a health professional that their child was overweight, per the 1999 through 2008 National Health and Nutrition Examination Surveys.[20] Notification to parents about their child's BMI has recently improved in practices using built-in EMR prompts and decision support, though without necessarily specifying parental buy-in.[29–31] Our results support previous studies reporting low rates of physician-led communication about BMI and feedback regarding health implications.[4–7,10,12,32] In our setting, almost all parents (94%) noted that weight and height had been measured, but only 60% recalled physician-led discussion of BMI, and only 55% felt that a physician had helped them understand BMI. Some positive responses may have been skewed by prior exposure to Fitwits (29%). The Fitwits intervention assisted our physicians with BMI education by using the girl's or boy's BMI flashcard to discuss the BMI percentile and category for each child and their parent. The subsequent activity and nutrition flashcards were used to suggest maintaining a healthy BMI, if applicable, or to make behavior changes to move in a healthy direction if the child was underweight, overweight, or obese. This comment reflects parent satisfaction: "Very happy to learn more about BMI & ways to better my child's health."

Before the intervention, looking at all individual parent responses as a whole, the numbers of underweight, healthy weight, and overweight children were overestimated and the number of obese children (3 of 45) was greatly underestimated. Parents' misperceptions about their child's BMI status before the intervention were particularly evident when the child was obese. The data represent a perceptive shift toward choosing lower rather than actual weight categories, with low overall correct recognition of BMI category (50.0%). Our study is consistent with analyses of National Health and Nutrition Examination Survey data from 1988 to 1994 and 2005 to 2010, in which interviewed parents were asked whether their 6- to 11-year-old child was overweight, underweight, or just about the right weight. Overweight/obese children were less likely to be perceived as overweight in the later survey years. More than three quarters of parents perceived overweight children as "about the right weight." The study authors surmised a generational shift in mismatched parent perceptions with current heavier child weights and a related growing challenge to prevent childhood obesity.[33]

Correct recognition by parents of their child's BMI percentile after the intervention showed an overall improvement, most notably for obese and overweight children. However, some parents continued to incorrectly identify their child's BMI. Choosing an incorrect BMI category could represent ≥1 or more belief or cultural or social factors, including low acceptance by parents of their child's BMI status on a chart compared with the parent's strong notion of a child as underweight, healthy, or, at most, overweight.[3] This comment corresponds to this: "Mother very resistant to BMI as a useful measure in children." Many cultural attitudes correlate health and/or sports prowess with increased weight.[34,35] It is common for parents to feel that an overweight child is "fine," despite a physician's concern,[34] as in this comment from a physician regarding an obese boy: "Mom feels he is normal compared with family and wants him to play football. . . ." It is also common for a parent to worry that a healthy child is too thin.[8,27] Some parents have competing priorities, feel too over-



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whelmed to adopt a new concern, or express low confidence in controlling the food and behavior environment, including child-rearing by extended family members.[28,35] The new childhood "norm" of excess body weight makes it difficult for parents and youth to know what healthy children look like.[33,36] Although the Institute of Medicine (2005) and the American Academy of Pediatrics (2007) endorsed the term *obesity* in child BMI percentile determinations,[34,37,38] some of the pediatric literature finds it pejorative or insensitive for family discussions and shows preference for terms such as *unhealthy weight*.[22,39–41] Providers agree on health-supporting, culturally attuned, and motivating discussions.[42,43] Our physicians were trained and accustomed to using the flashcard term *obesity*, defined as "too much weight for height." Physician comments on the lack of parental engagement indicated fatigue and distraction from listening during real-world office conditions: "Mom was very sleepy and not very engaged but was appreciative." Some of these factors may have influenced parental misidentification of BMI.

In studies that included agreement on a corrective plan, families lauded weight-related discussions that partner the child, parent, and physician; set specific goals over successive visits; and provide simplified and correct nutrition information.[21,25,28,34,35,44] Most responses to 9 behavioral questions before the intervention (Table 2) suggested high consumption of sweetened beverages and junk food, prolonged screen time, and a television in the child's bedroom. These survey questions set the tone of behavioral messages for the coming Fitwits discussion. The most popular behavior change goals selected by parent-child dyads after the intervention (Table 4) correlated with visual images on the Fitwits cards and physician training cues. Parent comments supported physician-led Fitwits conversations as age-appropriate and motivating: "Very nice and explained everything so it could be understood by the children"; "This visit has been informative and goal inspiring." Fitwits games were given for use at home, with implied permission to engage further in lifestyle changes, as per this trio of comments: "Mother ready to share in dietary improvements" (from a physician); "We will do this together" (from a parent); "I understood everything the doctor told me" (from a child).

### *Limitations*

Our study was promoted by an interested team of residents and may not translate to a busy primary care practice. It is, however, a brief conversation that can replace usual discussions about BMI, nutrition, and activity. The demographics of our study population (mostly African American) may limit the generalizability of the findings.

## Conclusions

Given prevalent underrecognition of children's weight status, physicians need to develop clinical skills and be given brief tools to foster productive discussions of BMI and awareness of health by children and parents.[9,20,21,45–49] Our study measured communication between physicians, preadolescents, and parents, starting with an ordinary well-child office visit and mediated by a child-friendly tool, to test correct understanding of BMI—a known gap in parent-child readiness to pursue health-attaining behavioral goals. This well-child visit tested the Fitwits office tool for joint discussions among physicians, parents, and 9- to 12-year-olds about their understanding and identification of BMI category (underweight, healthy weight, overweight, or obese). Overall correct identification of BMI improved from 50% before to 60.6% after the intervention, with positive movement between the overweight (34.5% to 51.7%) and obese (4.4% to 24.4%) categories. Continuing underrecognition or acknowledgment of overweight/obese children and some healthy children was noted. This highlights the difficulties of educating parents to identify BMI status in the new "normal" environment of heavier children, even with a dedicated intervention.[33] The behavioral management suggestions for nutrition, portion size, and activity changes built in to the Fitwits flashcards were reflected in the 2 goals most often chosen by the parent-child dyads. The majority of comments by parents were appreciative of the physician interaction, Fitwits flashcards, and information. Further results pending analysis include longitudinal 12-month surveillance of correct BMI category choices and BMI trajectories, with an opportunity to improve with the use of Fitwits at 3 follow-up visits.

The authors thank all the participants and supporters of this study at the University of Pittsburgh Medical Center, St. Mar-



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garet Family Medicine Residency Program. They are grateful for the formative work of Fitwits team members Jeremy Alland, MD, LaShonna M. Austin, Scott Bragg, PharmD, Gregory Castelli, PharmD, Matthew Harbaugh, MD, and Danielle York, MD; article review by Susan K. Fidler, MD, and J. Dustin Williams, MLIS; the literature contributions from Amy Haugh, MLS; survey construction assistance from Abigail A. Jacobsen, MLIS, and J. Dustin Williams, MLIS; photography by Andrea Karsh, LCSW, BCD; and article preparation by Paula Preisach.

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