

## **ABSTRACT**

COOKE, NATALIE KATHLEEN. Assessing Future Healthcare Providers' Views of Childhood Obesity to Inform Premedical and Medical Curricular Changes. (Under the direction of L. Suzanne Goodell).

Childhood obesity is a disease that affects 17% of children aged 2-19. This disease, best described by a social ecological perspective, is multifactorial in nature and includes individual, familial, community, and societal contributors. As the causes are multifactorial, so too should be prevention and treatment. Healthcare providers, specifically physicians, can play an important role in the diagnosis, prevention, and treatment of childhood obesity, especially if they appropriately utilize nutrition behavior change counseling to facilitate lifestyle changes. Behavior change falls within the realm of the social and behavioral sciences, disciplines that will receive greater emphasis on the newly designed MCAT 2015®; therefore, premedical and medical programs may need to alter their approaches to disseminating this discipline-specific knowledge. Nutrition education is currently limited in medical education; and thus, just as premedical programs seek to increase the social and behavioral sciences, so too should they increase nutrition education. In light of these recommended curricular changes, researchers sought to investigate the current state of premedical and medical students' views of childhood obesity. This dissertation describes three studies conducted for that purpose. In study 1, researchers investigated 30 pre-healthcare undergraduate seniors' views of childhood obesity and their sources of knowledge through in-depth qualitative interviews. Investigators found that students with specialized coursework and significant volunteer and/or internship experience had a deeper understanding of childhood obesity; however, as a whole, students failed to see the role of healthcare providers in prevention and treatment. These findings provide justification for

premedical programs to guide students to see their role in prevention and treatment through educating them on the social ecological model and providing them with relevant service-learning opportunities and guided reflection. In study 2, researchers conducted a similar nationwide qualitative investigation in 78 third and fourth year medical students. These students described student-, patient- and healthcare system-centered barriers, including their lack of knowledge, patients' lack of access, and their lack of time in practice. Students also requested more applicable information and counseling training in order to equip them to prevent and treat childhood obesity. Much like the pre-healthcare seniors, these medical students failed to discuss their role in prevention and treatment. Therefore, medical schools need to help their students overcome barriers by providing them knowledge and skills and helping them understand their role in prevention and treatment. In study 3, researchers built on the knowledge gained from study 1 and study 2 and developed a valid and reliable computerized tool, the Childhood Obesity Prevention Self-efficacy (COP-SE) survey. Factor analysis of 444 completed surveys from students at 53 medical schools revealed a two factor structure with a correlation of 0.637 between factors. Factor 1 assesses self-efficacy in nutrition counseling while Factor 2 measures self-efficacy to assess readiness to change and initiate nutrition lifestyle changes. There was high reliability within factors (Factor 1 = 0.946; Factor 2 = 0.927), and the correlation (0.648) between the COP-SE survey and a general self-efficacy survey confirmed that the COP-SE measures domain-specific self-efficacy. This valid and reliable survey can be used by medical schools as a formative or summative assessment of students' self-efficacy in childhood obesity prevention and treatment. Further research should include confirming the factor structure and exploring the significance of response trends seen in this sample. The findings of all three studies can be used by

premedical and medical programs to maximize the effectiveness of their preparatory programs to provide students with the necessary skills for prevention and treatment of childhood obesity. With the appropriate preparation, future healthcare providers can build their self-efficacy in disease prevention and treatment, hopefully resulting in improved patient outcomes.

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Assessing Future Healthcare Providers' Views of Childhood Obesity  
to Inform Premedical and Medical Curricular Changes

by  
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## **DEDICATION**

To God, who put me on this path and as promised, never gave me more than I could handle. Through this journey, He has taught me strength, perseverance, balance, and trust. To my parents, Jimmy and Charlene Cooke: You deserve honorary PhDs for the countless hours of guidance and support you provided me. Daddy, 13 years ago you taught me how to love running and instilled in me the perseverance it takes to not only run half marathons but also to endure the long distance of a PhD. By example, you have also taught me how to be a leader with integrity, and I am so grateful. Mommy, from you I received a heart for others and my passion for cooking and nutrition. You constantly remind me to fight for justice and to be passionate in all things I do. To my grandparents, James and Ellen Marie Cooke and Daniel and Marguerite Kennedy, thank you for cheering me on from Heaven. In my heart, I hold a special piece of each of you.

## **BIOGRAPHY**

Natalie Kathleen Cooke was born on December 15, 1987 in Raleigh, N.C. as the only child of Jimmy and Charlene Cooke. She graduated as Valedictorian of Sanderson High School in 2006. A life-long Wolfpack fan, her dream was realized when she was awarded the Park Scholarship, a full four-year merit scholarship, to attend her father's alma mater, North Carolina State University. While at N.C. State, she developed a love for community nutrition and nutrition education, and in May 2010, she graduated summa cum laude with degrees in Biochemistry and Nutrition Sciences and a minor in Genetics.

Continuing her passion for nutrition, Ms. Cooke began her doctoral studies, also at N.C. State, directly after completing her undergraduate degrees. In addition to her dissertation research, Ms. Cooke collaborated with her major advisor, Dr. L. Suzanne Goodell in developing, implementing, and evaluating an upper-level service-learning course, Community Nutrition. Together, Dr. Goodell and Ms. Cooke developed A PACKed Kitchen, a satellite program of the Inter-Faith Food Shuttle of Raleigh, N.C. and Share Our Strength of Washington, D.C., to provide undergraduate students hands-on experience teaching Cooking Matters cooking and nutrition classes. As Coordinator of A PACKed Kitchen, Ms. Cooke maintained sustainable partnerships with over ten different nonprofit community agencies and coordinated 30 Cooking Matters 6-week courses, reaching over 250 low-income individuals in the Triangle area. She trained and monitored over 100 student volunteers and managed three teams of undergraduate community liaisons to ensure the highest standard of quality nutrition education.

Ms. Cooke was also heavily involved in Graduate School's Preparing Future Leaders (PFL) program, receiving her Certificate of Accomplishment in Teaching in December 2011 and serving on the inaugural team of PFL Ambassadors. In her role as Ambassador, she promoted PFL at various departmental and university events and developed workshops for the program. Ms. Cooke was also awarded the University Graduate Student Association Outstanding Graduate Teaching Assistant Award in April 2013.

An avid cook and long-distance runner, Ms. Cooke firmly believes that with the right resources and encouragement, everyone can make steps towards leading a healthier life. She is passionate about effective education for all and plans to pursue a career where she can combine her passions of community nutrition and education.

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I would like to acknowledge my co-authors on the three manuscripts included in this dissertation: Dr. Sarah Ash (Chapters 2 and 3), Dr. Suzie Goodell (Chapters 2, 3, and 4); Dr. Matthew Haemer (Chapter 3), Dr. John Nietfeld (Chapter 4), and Kelsey Wilson (Chapter 2). I appreciate the role each played in research design, data collection, data analysis, and/or manuscript development/editing.

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For a constant reminder of why I decided to pursue my PhD, I thank my students. They continue to amaze me with their passion for nutrition education, and each of them has taught me countless lessons.

Throughout my journey, my parents, Jimmy and Charlene Cooke, have been a steady foundation. Words cannot express my appreciation for their loving support. I am also thankful for friends and family who believed in me and helped me “recharge.”

I want to acknowledge the Park Scholarships program for providing me with the encouragement, support, and resources to discover and pursue my passions. I am who I am today because of the fine staff, faculty mentors, and peers who invested in my growth. And finally, I would like to acknowledge North Carolina State University, the world class institution I have been blessed to call my academic home for eight years. As a proud alumna, “[my] heart will ever hold you, N.C. State, in the folds of [my] love and pride.”

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## CHAPTER 1: LITERATURE REVIEW

### Childhood obesity: Disease prevalence, contributors, and implications

Childhood obesity is a national concern, affecting seventeen percent of children and adolescents (ages 2-19) in the US.<sup>1</sup> Obesity, recently recognized as a disease by the American Medical Association,<sup>2</sup> is defined in children by having a body mass index (BMI) at or above the 95<sup>th</sup> percentile for sex and age. It is an important distinction that childhood obesity differs from adult obesity, which is defined as a BMI of 30 or greater.<sup>3-5</sup>

Child weight status is determined by a variety of factors, including personal factors, familial practices, and community characteristics<sup>5</sup> and can be described by the social ecological model, which includes various levels of contributing factors.<sup>6-8</sup> Davison & Birch (2001) constructed a three-level model: (1) child characteristics and risk factors (i.e. diet, physical activity, and genetics); (2) parental and familial characteristics (i.e. parental diet and physical activity behaviors, availability of food in the home, and sibling interactions); and (3) community, demographic, and social characteristics (i.e. socioeconomic status, the school environment, safe places to play, and availability of food in the environment). Harrison et al. (2011) expanded on the three-level model with their “Six- Cs” cell-to-society model: (1) cell, (2) child, (3) clan, (4) community, (5) country, and (6) culture. Recognizing that contributors do not act in isolation, the Six-Cs model includes five zones of influence that cross the six levels: (1) nutrition-related opportunities and resources, (2) activity-related opportunities and resources, (3) nutrition-related practices, (4) activity-related practices, and (5) personal and relational attributes.<sup>8</sup> Time is also a mitigating factor, which the authors

include at the bottom of the Six-Cs model to represent that not all contributors play a role at all stages of development and that approaches need to adapt throughout a child's life stage.<sup>8</sup>

Childhood obesity affects the child both physically and emotionally, and it also affects the healthcare system. The child may experience physical complications including insulin resistance, diabetes, metabolic syndrome, and coronary artery disease, among other health consequences.<sup>9</sup> Health consequences commonly screened for by clinicians include: sleeping, respiratory, gastrointestinal, and cardiovascular problems; endocrine, nervous system, and orthopedic disorders; and skin conditions.<sup>10</sup> Additionally, psychological and psychiatric implications of childhood obesity include low self-esteem and bullying.<sup>9,10</sup> Childhood obesity also often leads to adult obesity.<sup>3</sup> Childhood obesity affects not just the child, but also the economy because obesity has a huge economic impact on the healthcare system<sup>11</sup> at an estimated \$147 billion/year.<sup>12</sup>

### **Childhood obesity: Prevention and treatment approaches**

Prevention and treatment of childhood obesity require a variety of techniques because of the multifactorial nature of its contributors. Prevention and treatment may be approached through individual, familial, community, or societal interventions. Researchers have found both community and environmental interventions targeting individual and familial factors<sup>13</sup> and broader societal level interventions to be beneficial.<sup>14</sup> While these interventions measure impacts on a broader scale, more targeted interventions are also needed to help individuals and families make behavior changes based on overcoming barriers and limitations.

Pediatric obesity prevention and treatment targeting the inner levels of the social ecological model should ideally involve both parent and child programming, including

behavioral counseling and nutrition education.<sup>13</sup> Healthcare providers have the parent and child as a captive audience in office/clinic visits, so this is an ideal time to engage patients in conversation including behavior change counseling and nutrition education. Physicians, specifically, are seen by patients as having authority to provide recommendations,<sup>15</sup> and they play an important role in prevention and treatment because they see children at regular intervals.<sup>14</sup> Therefore, it is important to have a set of best practices to ensure quality standardized care.

The American Academy of Pediatrics' Expert Committee provides recommendations for how assessment, prevention, and treatment can be facilitated through office/clinic visits.<sup>10</sup> They recommend that physicians engage in the following practices: graphical plotting of BMI and skin fold measurements yearly; follow-up assessments and laboratory tests in overweight and obese children; and taking a diet and physical activity history, focusing on key topics like sugar sweetened beverage intake.<sup>10</sup> These recommendations mirror that of the Academy of Nutrition and Dietetics, the professional society for registered dietitians.<sup>13</sup> This overlap is important because physicians and registered dietitians need to work together as healthcare providers to help prevent and treat childhood obesity. Having recommendations for assessing childhood obesity ensures that overweight and obese children are not overlooked by healthcare providers. Also, assessment is an important first step in prevention and treatment because it helps to determine where children fall on the spectrum of weight status and opens up opportunities for conversation about healthy nutrition and physical activity practices.<sup>15</sup>

In children of all levels of weight status, the Expert Committee recommends that physicians advise parents on encouraging healthy behaviors in their children including: limiting consumption of sugar-sweetened beverages and energy dense foods; consuming a high fiber, calcium-rich diet with the recommended servings of fruits and vegetables and balanced macronutrients; eating breakfast; eating meals together as a family while limiting meals eaten outside of the home; limiting portion size; limiting television and screen time; and participating in 60 minutes of moderate to vigorous physical activity daily.<sup>10</sup> These conversations are especially important in overweight children who are at risk of obesity as well as those who are already classified as obese and are trying to “grow into” their weight. Dieting is not recommended in children and adolescents as it could potentially lead to an increase in weight gain over time or cause harm through the development of unhealthy attitudes about eating and eating disorders.<sup>13,17</sup>

### **Healthcare providers: Key players in disease prevention and treatment?**

In order to be able to prevent and treat childhood obesity, physicians should be able to identify obesity through physical examination and graphically plotting BMI as well as determine through conversation the child’s nutritional intake, physical activity level, and any complications due to weight.<sup>5,10</sup> This includes following the Expert Committee recommendations for counseling.<sup>10</sup>

Ideally, all physicians should follow the same approach to assessment, prevention, and treatment; however, there is no standardized, valid and reliable instrument for assessing diet and physical activity history for children. Therefore, physician approaches vary.<sup>10</sup>

Pediatricians, who should be key players in childhood obesity assessment, rarely graphically

record the child's BMI during patient visits, and many think it is the nurse's job to perform this assessment.<sup>18</sup> This can be problematic if pediatricians are relying on another member of their staff to perform this important measurement. In terms of behavior change counseling, fewer than 41% of pediatricians, pediatric nurse practitioners, and registered dietitians make recommendations to patients as suggested in the Expert Committee Recommendations.<sup>19,20</sup> In addition to not providing counseling in in-office visits, few of these healthcare providers refer patients to a specialist, for example, a registered dietitian, or weight-loss programs.<sup>20,21</sup> This is surprising as physicians see their role as providing patients with referrals to other healthcare providers, for example, a registered dietitian, who can facilitate their patients' weight loss.<sup>22</sup> This is problematic in the case where a parent does not view their child's weight as a problem. Physicians who do not broach the issue of weight status are missing key opportunities for conversations about beneficial lifestyle changes.

In addition to not providing recommendations about nutrition and healthy living, healthcare providers often display negative attitudes towards obese patients, describing them as lazy and unmotivated.<sup>23-25</sup> This bias could be due to lack of experience with obese patients, as empathy and lower bias are seen in healthcare providers who have worked closely with obese patients.<sup>26,27</sup> Furthermore, experience with obese patients is important for physicians because their knowledge of the condition alone cannot help them overcome bias.<sup>26</sup> Many healthcare providers do not feel comfortable talking about obesity with patients because it is a sensitive issue.<sup>28</sup> In fact, less than half of primary care physicians even believe that they can help obese patients lose weight.<sup>29</sup> This lack of confidence may prevent physicians from playing a key role in disease prevention and treatment.

Healthcare providers also struggle with communicating with obese children and their families. Healthcare providers tend to use non-medical terminology to avoid the term “obese,” which is seen as offensive, and they rarely bring up weight issues when not initially addressed by the family as a concern.<sup>30</sup> This may be challenging as parents expect healthcare providers to address their child’s weight management, even if it is not the focus of the visit.<sup>30</sup> The tone that healthcare providers use when discussing weight management can also impact patients’ willingness to heed recommendations for behavior change, and patients report that healthcare providers are often rude, judgmental, and ignore their child during visits.<sup>30</sup> Best practices in counseling involve both the child and the family;<sup>13</sup> therefore, parents should feel like physicians are engaging their child in the conversation as well. Pediatricians often prefer to make general comments about lifestyle changes rather than discussing obesity risk factors.<sup>18</sup> These general statements about living healthfully are helpful, but not if patients fail to see why they might benefit from lifestyle modifications.

These limited conversations are due in part to physician-reported barriers, including lack of clinician time, lack of patient motivation, lack of parent involvement, lack of clinician training, and lack of supportive services.<sup>31–34</sup> Many healthcare providers first experience these barriers in medical school through the “hidden curriculum.”<sup>35</sup> The “hidden curriculum” refers to medical students’ learnings outside of the intended medical school didactic and clinical curriculum, including physician bias and barriers.<sup>35</sup> These learnings may influence their perceptions of clinical practice, teaching them that they will not have time for counseling. Healthcare providers also lack comfort in using motivational interviewing (a counseling language used for guiding patients to make behavior changes) for

the prevention and treatment of childhood obesity.<sup>36</sup> Only half of pediatricians use behavior change counseling when giving nutrition advice to patients,<sup>37</sup> which could be due to their self-reported lack of nutrition knowledge.<sup>31</sup> Some physicians say that in-depth behavior change counseling is not feasible due to time constraints and that medical students should therefore be taught to discuss basic behavior change with the patient and refer to behavior change specialists for more in-depth counseling.<sup>38</sup> However, this may be difficult, because as previously stated, few physicians actually refer patients to specialists.<sup>20,21</sup> Physicians who have been in practice long enough to see the impacts of their limited knowledge and training request additional training,<sup>31</sup> so their limitations can be used as motivators for learning and serve as teachable moments.<sup>39</sup> However, it seems more logical to provide premedical and medical students with this training in undergraduate and professional school, rather than through continuing education. Therefore, it is important to understand where additional training could ideally fit within current models.

### **Preparation for practice: Premedical education**

Undergraduate institutions prepare students to enter medical school. While premedical students may choose any major, it is required that they complete coursework in biology, chemistry, and physics in order to attend medical school.<sup>40</sup> As a result, the heavy science coursework in premedical education is sometimes seen as a “weed out,”<sup>41</sup> with students reporting low science grades (namely organic chemistry) as a factor discouraging them from pursuing careers in medicine.<sup>42</sup> Given the current state of premedical and medical education, a committee formed by the Association of American Medical Colleges (AAMC) and the Howard Hughes Medical Institute evaluated these undergraduate curricula and

suggested that requiring specific courses in premedical education inhibits integrated education and that core competencies are the future of premedical and medical curricula.<sup>41</sup> These recommended competencies include (1) an understanding of scientific method, (2) more comprehensive biochemical knowledge instead of the less-relevant aspects of organic chemistry knowledge tested on the MCAT and not used in medical school; (3) statistical knowledge to evaluate scientific literature, and (4) specific biology concepts rather than a comprehensive one-year course.<sup>41</sup>

By design, coursework prepares premedical students to take the Medical College Admissions Test (MCAT®), a test measuring proficiency in undergraduate coursework needed to be successful in medical education.<sup>43</sup> The current version of the MCAT® requires an understanding of the physical and biological sciences as well as verbal reasoning.<sup>44</sup> However, the new MCAT 2015® will eliminate the written section and be re-organized to four sections: (1) Biological and Biochemical Foundations of Living Systems, (2) Chemical and Physical Foundations of Biological Systems, (3) Psychological, Social, and Biological Foundations of Behavior, and (4) Critical Analysis and Reasoning Skills.<sup>43</sup>

The changes to the MCAT 2015® are timely because over half of the causes of mortality in the U.S. are connected to social and behavioral factors; therefore, the social and behavioral sciences play a key role in preventing and treating diseases, like childhood obesity.<sup>35</sup> It is especially important to provide future physicians with this education as early as possible (i.e. during premedical education) because physicians display low self-efficacy in incorporating psychosocial factors into preventive medicine.<sup>45</sup>

In light of the changing MCAT®, undergraduate institutions will need to adapt their undergraduate curricula. This may require students to take an introductory biochemistry course as well as a psychology course.<sup>43</sup> Currently, undergraduate introductory psychology courses vary in content, lacking standardization, and therefore may not all prepare medical students for the MCAT 2015®.<sup>46</sup> Curricular changes in introductory psychology and sociology classes are needed, which some say may benefit all students, allowing them to learn more about health behavior and behavior change.<sup>46</sup> Changes might also be facilitated through the design of a new psychology/sociology course targeted towards premedical students. Additionally, undergraduate programs may choose to create integrated science courses that allow students to understand not only the basics of individual disciplines but also how these disciplines connect.<sup>47</sup> These undergraduate curricular changes allow for a better understanding of diseases, like childhood obesity, that are complex issues involving socio-cultural and behavioral determinants and are treated in part by behavior change. Another proposed change for premedical education involves a more inter-disciplinary education that more efficiently presents the biological and physical sciences to make more room for the social sciences and liberal arts, including social and behavioral sciences.<sup>48</sup> Whether through premedical programs designed to integrate this newly required knowledge through core competencies or through more traditional courses in universities lacking specialized premedical programs, these changes are important because students receive a foundational knowledge for medical school in their undergraduate premedical education.

In addition to coursework, premedical students are encouraged to gain experience working with patients through certification programs like Emergency Medical Technician

(EMT) or Certified Nursing Assistant (CNA) program, or through volunteer or shadowing experiences.<sup>40</sup> These experiences are recommended because they offer premedical students the opportunity to ensure that a career in medicine is suited for them.<sup>49</sup>

Before applying for medical school, students must decide what kind of medical school appeals to them. There are two types of medical schools: allopathic and osteopathic. The AAMC governs the 141 allopathic medical schools in the U.S., and the American Association of Colleges of Osteopathic Medicine (AACOM) governs the 30 osteopathic medical schools.<sup>50,51</sup> Both types of programs offer similar medical training, but osteopathic medical schools provide additional training in osteopathic manipulative methods (ways to manipulate the muscles to aid in wellness) and a focus on holistic medical care.<sup>52</sup>

The application process is similar for both allopathic and osteopathic medical school where students submit transcripts, MCAT® scores, letters of recommendation, work experience/activities/honors, and personal essays.<sup>53,54</sup> Medical schools invite eligible students to interview because they want to ensure that future doctors have not only academic potential but also “integrity, altruism, self-management, interpersonal and teamwork skills.”<sup>55</sup> The interview process might also serve to highlight students’ true intentions to be sure that premedical students are not pursuing a medical career for money, power, and prestige, motivators often reported by premedical students who do not finish premedical programs.<sup>42</sup> While medical schools consider the student’s entire application packet when deciding whom to invite for an interview, undergraduate grade point average (GPA) and MCAT® scores play a key role in the decision.<sup>55</sup> Furthermore, GPA and MCAT® scores are

important in the interview invitation, but the interview process appears to have more of an impact on the applicant's final acceptance.<sup>55</sup>

In 2012, the AAMC reported an average of 14 applications per premedical student with 636,309 total applications and 19,517 matriculants in 2012.<sup>56</sup> In the same year, the AACOM reported 118,329 applications and 5,986 matriculants.<sup>57</sup> Not all matriculated medical students are accepted directly after obtaining an undergraduate degree; many students take a “gap year” to complete post-baccalaureate premedical programs to improve their academic records,<sup>58</sup> to study more for the MCAT®, and/or to gain more volunteer experience. Taking a “gap year” is quite common. For example, in 2009, 12.7% of matriculating medical students had completed a post-baccalaureate program.<sup>58</sup>

### **Preparation for practice: Medical education**

Medical schools originated from the common practice of medical apprenticeships in the 17<sup>th</sup> and 18<sup>th</sup> centuries due to a need for more formalized medical education.<sup>59</sup> These medical institutions, dating back to as early as 1750, were historically designed to provide coursework in the first two years of medical school before allowing students to enter the clinical world during the third and fourth years.<sup>59</sup> Today's medical schools follow a more integrated approach to medical education, which Torteson (1991) attributes to the increasing understanding of the molecular intricacies of medicine and the need for multidisciplinary coordination.<sup>60</sup> Torteson (1991) also explains that with increasing amounts of information and no change in the length of medical school or students' ability to store large quantities of information, organizational reform was needed in medical school.<sup>60</sup> Dienstag (2011) echoes Torteson's theories, explaining that the traditional “2 + 2” curriculum often prevented

students from realizing the connection between knowledge learned in the first two years of medical school and their practice during the last two.<sup>61</sup>

For the past 25-30 years, medical schools as a collective have been adjusting curricula to involve pedagogies in medical education that align with an integrated approach. The current model involves the use of problem-based learning (PBL) and small groups to facilitate learning during the first two years of medical school.<sup>61</sup> PBL involves placing students in teams to complete case studies (i.e. problems), helping them apply information learned in lecture and medical literature while building the communication and teamwork skills needed to be successful in a team-based healthcare environment.<sup>62</sup> Also during the first two years of medical school, students gain clinical experience on a smaller scale through interaction with standardized patients.<sup>61</sup> Standardized patients are trained to act like real patients, allowing students to interact in a simulated environment without the risk of a life or death diagnosis.<sup>63</sup> Some programs match students with preceptors during the first two years to help them gain basic medical and communication skills. After the first two years, medical students have theoretically developed core didactic knowledge and are eligible to sit for the first of their board examinations: United States Medical Licensing Examination (USMLE) – Step 1 for allopathic students<sup>64</sup> or Comprehensive Osteopathic Medical Licensing Examination (COMLEX) – Level 1 for osteopathic students.<sup>65</sup>

The third year of medical school is typically a year of basic clinical experience where students gain knowledge and skills in a broad range of medical specialties, like Pediatrics.<sup>61</sup> After the third year, students typically sit for the USLME-Step 2 or COMLEX-Level 2 board examination<sup>64,65</sup> before beginning their fourth year. While many schools tend to follow this

model, there are differences in programs. For example, some students choose to complete another graduate degree (i.e. Masters of Public Health, PhD, Masters of Business Administration) while completing their medical degree, and the timing of didactic and clinical education and board examinations is therefore different. Of note, while pursuing additional degrees while in medical school may take additional time, specialized MD-MPH programs have been shown to expand students' knowledge of public health concerns and knowledge of the behavioral and social sciences.<sup>66</sup> Regardless of whether students complete an additional degree or not, students typically choose their intended specialty before beginning their final year of medical school and begin applying to residency programs. The fourth year typically consists of elective clinical rotations<sup>61</sup> that prepare future physicians for residency training.

### **Nutrition education in medical education**

With an understanding of the integrated structure of medical school, one might question the extent to which any one topic is discussed in medical school. Looking specifically at childhood obesity prevention, it is important to understand the degree of nutrition education taught in medical school. Nutrition in medical schools is currently lacking<sup>67</sup>; however, various advancements have been made in the past 15 years to increase the amount of nutrition education in medical school. The National Institutes of Health created the Nutrition Academic Award (NAA) Program in 1998 to fund 21 medical schools seeking to incorporate nutrition into their curriculum over the course of two cycles of funding.<sup>68,69</sup> The first cycle of funding (1998-2003) included: Albert Einstein, Brown University, Northwestern University, Tufts University, University of Alabama, University of

Iowa, University of Pennsylvania, University of Rochester, University of Texas Southwestern Medical Center, and the University of Washington.<sup>70</sup> The cycle of funding (2000-2005) included: Columbia University, Harvard University, Mercer University, Stanford University, University of Arkansas, University of Colorado, University of Maryland, University of Nevada, University of Texas/Houston, University of Vermont, and the University of Wisconsin.<sup>70</sup>

With the NAA award, these schools created novel approaches to incorporating nutrition education in medical curricula. One important outcome was that the NAA Curriculum Committee created a set of goals and objectives for a broad-scale nutrition education curriculum for medical schools.<sup>71</sup> This curriculum includes training in skills physicians, residents, and specialists need to prevent and treat obesity and childhood obesity<sup>71</sup> within the recommended 25-hour curriculum.<sup>72</sup>

The NAA program did not lead to a standardized nutrition education program in medical schools, despite the proposed curriculum. However, there has been a recent resurgence within the medical education community to continue the NAA goals. In July 2013, a group of medical educators interested in nutrition education convened at the National Academies of Science conference “Capacity Building in Nutrition Science: Revisiting the Curricula for Medical Professionals,” and they presented the current state of nutrition education in health professions schools and proposed changes to the medical curriculum.<sup>72</sup>

The speakers attributed a lack nutrition education in medical school in part to the lack of requirements by the Liaison Committee on Medical Education (LCME) and the AAMC and also to the lack of nutrition expertise among faculty in medical schools.<sup>72</sup> They believe

that one of the keys to incorporating nutrition education into medical schools is gaining support from the LCME and the AAMC.<sup>72</sup> The Nutrition in Medicine educational team, led by Martin Kohlmeier has completed extensive work in evaluating the state of nutrition education in medical schools and creating a curriculum to solve this inadequacy.<sup>72-77</sup> Kohlmeier presented preliminary data from the most recent survey evaluation of nutrition education in medical schools that less than a third of allopathic and osteopathic medical schools provide the 25 contact hours of nutrition education that the NAA program recommends.<sup>72</sup> Their 2010 report also stated that nutrition is not a required prerequisite course for medical school and few schools have a course devoted to nutrition, providing on average only 19.6 hours of nutrition education during all four years of medical school.<sup>67</sup> These statistics cover nutrition education as a whole; therefore, it is likely that education on childhood obesity, specifically, is even more limited. In addition to limited nutrition education in medical school curricula, it was not until 2002 that nutrition became recognized as a sub-score on the USMLE,<sup>78</sup> potentially leading some students to believe that nutrition is not as important as other topics.

Nutrition education in residency training programs is currently more extensive than medical school training, with 18.1% of programs having a formal childhood obesity training program and 52.6% of residency directors feeling that childhood obesity training is very important.<sup>79</sup> In fact, 47% of residency programs provide more than 15 hours of childhood obesity training including specialty clinics on obesity, primary care preceptors who specialize in obesity, working with a nutritionist, texts, and online and computer-based education.<sup>79</sup> However, given the state of nutrition education in medical schools as a whole and the

importance of nutrition in prevention and treatment of disease,<sup>67</sup> changes need to be made to medical curricula for more widespread incorporation of nutrition into curricula.

While there appears to be no “right” way to incorporate nutrition education into medical school, many schools have tried different approaches. Among the NAA awarded schools, many different nutrition programs were developed, but not all relate to the prevention and treatment of obesity and/or childhood obesity. However, over time, some medical schools have developed successful interventions that provide medical students with the knowledge and skills needed to prevent and treat obesity/childhood obesity. The University of Texas Southwestern Medical Center created a training for students to learn about diagnosing obesity with BMI and the intricacies of the metabolic syndrome.<sup>80</sup> The University of Louisville provides their students with nutrition and physical activity counseling training that is accompanied by feedback from standardized patients, leading to an increase in students’ knowledge of and self-efficacy in providing nutrition and physical activity counseling.<sup>81</sup> Another promising intervention at New York University School of Medicine involved a one-hour lecture by a registered dietitian and a one-hour interactive nutrition counseling workshop which led to an increase in students’ confidence in nutrition counseling.<sup>82</sup>

In addition to learning from these successful nutrition education models in medical curricula, medical school administrators can also look to the successes of other healthcare professional training models. One online childhood obesity prevention course, based on the social ecological model, increased nutrition professionals’ self-efficacy in using knowledge of the model to help improve prevention and treatment of childhood obesity.<sup>83</sup> A nutrition

elective taught pharmacy students about nutrition using educational techniques common to medical curricula including review of scientific literature, PBL, and case studies.<sup>84</sup> This program also led to an increase in nutrition self-efficacy. Continuing education interventions for medical professionals have also been successful, like one consisting of two 60-minute lectures on the etiology of obesity, assessment using BMI, and counseling models.<sup>85</sup> As a result, workshop attendees increased the frequency with which they assessed patients' BMI and provided nutrition counseling for 6 months post-intervention.<sup>85</sup> These programs were not taught to medical students; however, they could serve as good models for nutrition and/or childhood obesity training for medical students.

### **Behavior change counseling in medical school**

The Institutes of Medicine's Committee on Accelerating Progress in Obesity Prevention recently recommended that medical schools provide students with nutrition education and training in motivational interviewing and counseling.<sup>86</sup> Medical schools will likely be adapting these recommendations to provide their students with skills-based training in behavior change counseling. Currently there is no standardized behavior change counseling curriculum in medical schools, but counseling frameworks and theories commonly taught in medical schools include the Transtheoretical Model (Stages of Change), motivational interviewing, and the 5A's Model of Behavioral Counseling.<sup>34,87,88</sup> The Transtheoretical Model proposes steps in which physicians determine a patient's readiness to change and facilitate behavior change through stages of pre-contemplation to action.<sup>34,89</sup> Similarly, the 5A's Model of Behavioral Counseling involves assessing the behavior, advising about the behavior, agreeing on goals, assisting in change, and arranging a follow-

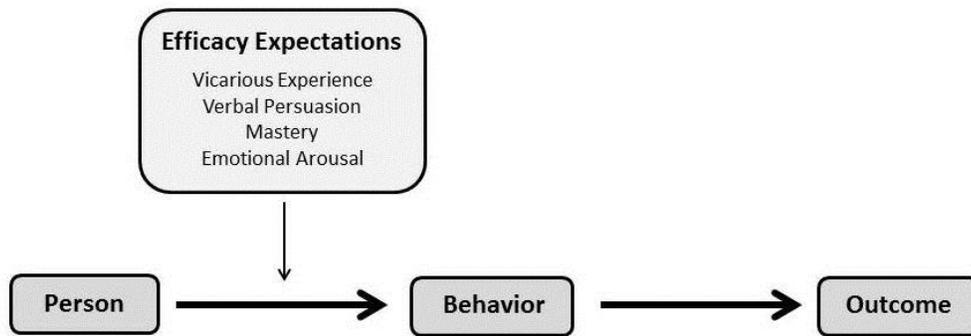
up to offer additional support.<sup>34,90</sup> Motivational interviewing, a counseling language, rather than framework, is used to help patients make changes based on their own motivation and is “collaborative, evocative, and honoring of patient autonomy” by nature.<sup>91</sup>

Physicians do not, however, feel confident in using behavior change counseling. Only 6% of family physician patient encounters involve nutrition counseling, and nutrition “counseling” averages only 55 seconds in length.<sup>92</sup> Additionally, physicians report having low confidence in their counseling skills, with some wondering if counseling is even effective.<sup>88</sup> It is promising, however, that many physicians do want to learn how to improve their counseling skills.<sup>88</sup> Knowing that practicing physicians feel this way, medical schools need to provide more counseling training for their students, especially because these skills can help promote healthier eating practices in obese children and their family members<sup>13</sup> and patients report higher care satisfaction when physicians take time to offer advice during visits.<sup>34</sup>

### **Self-efficacy: A domain specific construct**

Providing more training in behavioral and social sciences, nutrition, and behavior change counseling can be useful in building medical students’ self-efficacy. High self-efficacy is important for medical students because students with higher self-efficacy are more likely to overcome barriers and discuss weight status with a child.<sup>29</sup> Self-efficacy (commonly called ‘confidence’) is defined as one’s confidence in being able to complete a certain skill or task.<sup>93</sup> Bandura, the “Father of Self-efficacy,” defined four contributors to self-efficacy including vicarious learning, verbal persuasion, mastery, and state of arousal (Figure 1.1).<sup>93</sup>

Vicarious learning, typically one of the first steps in increasing self-efficacy, involves observing an expert who has already mastered the skill or task.<sup>93</sup> Through this, the student is able to observe successes and failures and determine what is necessary to mimic.<sup>93</sup> With physician buy-in for nutrition and behavior change counseling, students can experience prevention and treatment through role modeling<sup>80</sup> in order to emulate physicians' actions. However, medical schools should consider the connection between the hidden curriculum and some role models,<sup>94,95</sup> picking only role models who will help students build their self-efficacy and not discourage them from attempting to prevent and treat childhood obesity.



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**Figure 1.1.** Sources of efficacy expectations – adapted from Bandura (1977)

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Verbal persuasion involves feedback from the expert/role model to encourage appropriate execution of skills to further increase self-efficacy.<sup>93</sup> Verbal persuasion in behavior change counseling training programs may involve receiving feedback about their

performance from both faculty and standardized patients, gaining both viewpoints of the experts and the “patient.”

Mastery is arguably the most important aspect of self-efficacy as students reach a level where they have achieved proficiency.<sup>93</sup> However, mastery is not achieved in medical school training because physicians report that their training was inadequate.<sup>96</sup> As a result, they do not use nutrition counseling in practice,<sup>96</sup> but they do believe that counseling tools might help increase their self-efficacy.<sup>97</sup> Therefore, programs need to be designed to provide students with enough time, experience, and tools to help them master the skills of nutrition and behavior change counseling.

Finally, state of arousal refers to the student’s state of mind while attempting to complete a task or gain a skill.<sup>93</sup> “Pimping,” a common practice in which attending physicians and residents ask medical students difficult questions in front of patients and peers, is used to gauge students’ knowledge of difficult concepts under pressure.<sup>98,99</sup> Some say that this state of emotional arousal causes medical students to be more likely to remember the information they were asked about during “pimping.”<sup>99</sup> Negative emotional experiences may be more likely to be remembered; however, medical students’ motivation to achieve mastery may be reduced under these circumstances.<sup>99</sup> Therefore, it appears that positive emotional state may play a key role in building medical students’ self-efficacy in nutrition and behavior change counseling.

With the appropriate combination of (1) role models for vicariously learning, (2) verbal persuasion from role models and standardized patients, (3) adequate time to achieve mastery of skills, and (4) a positive emotional circumstances to build motivation, medical

schools may be able to increase their students' self-efficacy in nutrition and behavior change counseling. By building medical students' self-efficacy, which is historically low with regard to nutrition counseling,<sup>32,33,97</sup> students may be more likely to use behavior change and nutrition counseling in practice in the future.

### **Psychometrics in medical education**

As medical schools are encouraged to include more training in nutrition and counseling skills and undergraduates are required to learn the behavioral and psychosocial determinants of health before entering medical school, medical schools will need a way to evaluate the effectiveness of medical school training. There are currently no validated scales to assess medical students' self-efficacy in preventing and treating childhood obesity through counseling, but there is a need for assessing and evaluating these competencies.<sup>100</sup> Many nutrition and counseling-related surveys have been administered to medical students, residents, and practicing physicians, but most of the scales have not been validated.

Several surveys have been developed to assess physicians' counseling skills. Park et al. (2005) developed a survey based on the Accreditation Council on Graduate Medical Education's (ACGME) required curriculum for residency. This 15-minute survey measured residents' preparation in counseling about different areas (smoking, diet and exercise, depression, substance abuse, domestic violence) using a 4-pt Likert scale. While not validated, this preventive counseling scale was developed based on results from focus groups and a review of literature as well as expert opinions as a pilot testing, so the methodology is sound. Diet and exercise is a small portion of the preventive counseling topics covered in the

scale, so more relevant scales might better measure childhood obesity-specific preventive counseling.

Jay et al. (2008) used the “see one, do one, teach one” language to anchor their 15-item scale, categorizing their items into the 5A’s of Behavioral Counseling.<sup>32</sup> Jay et al. (2008) report that they validated the 5A’s framework through their study, but the details of their scale validation are limited.<sup>32</sup> Spivack et al. (2010) developed a survey to explore the differences in counseling different ages of pediatric patients,<sup>101</sup> and Perrin et al. (2008) developed a reliable but not valid scale to assess the confidence, ease, and frequency of counseling in pediatricians, using the survey as a pre-posttest measure for a nutrition counseling training.<sup>102</sup> All of these surveys come close to being surveys medical schools could use to measure childhood obesity-specific preventive counseling; however, it would take a combination of all of these surveys to be an appropriate measurement.

Hoppe et al. (1990) took a slightly different approach in their methodology, using their 127-item scale in conjunction with resident training and simulated patient performance assessment of counseling.<sup>103</sup> This scale was broad and covered many counseling behaviors, not just related to nutrition, and was also not validated.<sup>103</sup> This is a good approach to evaluation; however, this lengthy assessment would be cumbersome on a nationwide scale, which likely is why the scale is not validated in the resident population. While not a self-efficacy scale, Strayer et al. (2011) developed a valid and reliable coding instrument for assessing skills in counseling combining the Transtheoretical Model of Change, the 5A’s, and Motivational Interviewing.<sup>104</sup> This, too, would be a cumbersome tool as all medical

students would need to be videoed, and coders would need to be used to analyze the medical students' performance.

In addition to counseling surveys, nutrition-specific surveys have been developed. McGaghie et al. (2001) developed and validated the 45-item Nutrition in Patient care Survey (NIPS) that assesses five facets: (1) nutrition in routine care, (2) clinical behavior, (3) physician-patient relationship, (4) patient behavior and motivation, and (5) physician efficacy.<sup>105</sup> This survey, a result of the NAA award, was validated by test-re-test in first and second year medical students and residents at one university and is useful for measuring nutrition counseling as a whole in patients but not specific to childhood obesity nutrition counseling. A valuable outcome of the NAA award, it has been used by others to measure the effectiveness of nutrition counseling programs.<sup>106</sup> Mihalynuk et al. (2003) also developed a 31-item nutrition survey that measures nutrition proficiency with 5 subscales;<sup>96</sup> however, this survey also measures nutrition proficiency and not childhood obesity-specific nutrition counseling.

Even more specific than nutrition self-efficacy surveys, several obesity or childhood-obesity specific surveys have been developed, though none validated. Rhodes et al. (2007) used the Expert Committee Recommendations on Obesity to frame their questions about managing childhood obesity including multiple choice, yes/no, and Likert items;<sup>21</sup> however, these items do not measure self-efficacy of medical students. Similarly, Epling et al. (2011) developed a valid tool to assess physician attitudes and barriers to treatment of obesity, but not childhood obesity.<sup>107</sup>

Stark et al. (2011) created a scale to assess their workshop participants' self-efficacy in using social ecological perspectives in preventing and treating childhood obesity.<sup>83</sup> This scale works well for those who have been taught a social ecological perspective to child weight status; however, because this content is not disseminated to all medical schools, it might prove too specific to measure students' self-efficacy on a nationwide scale.

Silberberg et al. (2012) developed a non-validated measure to be used with primary care providers and their staff to assess their comfort in preventing and treating childhood obesity and their perceived effectiveness.<sup>36</sup> Items included skills-specific questions (raising the issue of overweight, recommending nutritional resources and advising parents on healthy foods, and using motivational interviewing) and medical practice-based questions (billing for obesity and current capacity to address childhood obesity). This survey is intended for primary care providers, not medical students, so it may not provide medical schools with the knowledge they need to evaluate the effectiveness of their programs.

As a whole, these studies demonstrate the medical population's interest in assessing healthcare provider knowledge and confidence in counseling, but none of these scales is designed to assess medical students' counseling skills relative to childhood obesity prevention and treatment. Therefore, a valid and reliable scale needs to be developed to assess medical students' self-efficacy in preventing childhood obesity.

### **Summary and Conclusions**

In light of proposed changes to premedical and medical curricula, investigators need to understand the current state of childhood obesity knowledge in pre-healthcare and medical students. There are currently no qualitative assessments of undergraduate or medical student

views of childhood obesity; therefore, it is important for investigators to explore these previously unstudied populations. Specifically, in order to determine how childhood obesity educational content can be incorporated into premedical and medical curricula, investigators need to understand the current state of students' knowledge and sources of knowledge. It follows that the ideal candidates for examination of premedical childhood obesity knowledge are pre-healthcare undergraduate seniors who have completed the majority of their undergraduate coursework. Similarly, third and fourth year medical students can provide an understanding of both didactic and clinical aspects of childhood obesity education in medical school because they have completed didactic coursework and completed some or all of clinical rotations.

Exploring these students' views might lead to an overall understanding of their self-efficacy in skills needed to prevent and treat childhood obesity. The findings from qualitative assessments can also be combined with tenants from existing counseling frameworks currently taught in medical schools to develop a valid and reliable survey to measure medical students' self-efficacy in preventing childhood obesity. It is especially important for investigators to follow a rigorous development of a computerized survey to assess self-efficacy as there is currently no valid and reliable measure of students' self-efficacy in skills needed to prevent and treat childhood obesity. Once developed, this computerized survey could be used by medical schools as both a formative and summative assessment of nutrition and behavior change counseling training programs.

## **Overview of Dissertation Chapters**

In this five chapter dissertation, we describe the exploration of premedical and medical students' views of childhood obesity. Chapter 1 is a literature review of childhood obesity, premedical and medical education, and self-efficacy. Herein, we identify gaps in the literature and provide justification for the dissertation research. In each of the three following chapters (Chapters 2-4) we describe three separate research studies. In Chapter 2, we describe a qualitative assessment of pre-healthcare seniors' perceptions of childhood obesity and the implications in light of the new MCAT 2015®. In Chapter 3, we detail a similar qualitative assessment in third and fourth year medical students, focusing on their perceived barriers and requested curricular changes. Using the findings from the two qualitative studies, we developed and validated the Childhood Obesity Prevention Self-efficacy (COP-SE) survey to quantitatively measure medical students' self-efficacy in skills needed to prevent and treat childhood obesity (Chapter 4). Finally, in Chapter 5 we summarize the major conclusions of the three studies and provide suggestions for continuing work in premedical and medical nutrition education.

**CHAPTER 2: A QUALITATIVE ASSESSMENT OF PRE-HEALTHCARE  
UNDERGRADUATES' PERCEPTIONS OF CHILDHOOD OBESITY TO INFORM  
PREMEDICAL CURRICULAR CHANGES<sup>1</sup>**

**Abstract**

**Introduction:** Little is known about undergraduates' understanding of complex health issues like childhood obesity. Researchers sought to examine to what degree pre-healthcare undergraduates can identify and describe the complexity of CO to inform premedical curricular approaches in light of the 2015 changes to the Medical College Admissions Test®.

**Method:** Researchers interviewed 30 pre-healthcare seniors at North Carolina State University about their knowledge of childhood obesity and sources of learning. Researchers transcribed audio files of in-person interviews and coded transcripts, reaching an overall inter-rater reliability Kappa of 0.83.

**Results:** Qualitative analysis surfaced two dominant emergent themes: (1) Impact of Experience and (2) Disconnect between Causes and Prevention. Students with nutrition and social science majors and health minors and significant experience with obese people or prevention programs were more knowledgeable about childhood obesity than their counterparts. All students were able to describe many causes of childhood obesity, putting a focus on the child's diet and familial influence. However, they were not as able to describe the complexity of prevention, citing mostly programs they had personally seen in practice or had heard about in popular media.

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<sup>1</sup> This chapter was submitted as a manuscript for publication with Sarah L. Ash, PhD, Kelsey L. Wilson, and L. Suzanne Goodell, PhD, RD.

**Conclusions:** Based on these findings, undergraduate institutions should provide students with specialized coursework and service-learning experiences that include exposure to health behavior-related concepts, such as the social ecological model. Because community programs targeting children are easily accessible by college students, childhood obesity is a useful context to provide this education, helping students deepen their understanding of health and reflect on their roles as future healthcare providers.

## Introduction

In a 2012 open letter to premedical students from the Association of American Medical Colleges, President Darrell Kirch said, “Our profession increasingly recognizes that our current health care model needs to do more to promote prevention and wellness for patients.” Therefore, as he noted, “[T]he health care system of tomorrow will require a different kind of doctor.” It will require one who understands “how [people] think, interact, and make decisions.”<sup>108</sup> This will be reflected in the 2015 Medical College Admissions Test® (MCAT®), which will shift from an emphasis solely on expertise in the natural and physical sciences, to an assessment of knowledge in the behavioral and social sciences as well.<sup>43</sup>

The context of the MCAT® has a direct influence on premedical curricula; therefore, as the MCAT® changes, so too will the required or recommended coursework in the behavioral and social sciences.<sup>109</sup> This will require premedical courses that foster an opportunity for meaningful development of the desired skills and dispositions, allowing students to apply discipline-based theories to specific health-related issues in the community and reflect on the role of the healthcare provider in the context of the problem.<sup>46,110</sup>

Therefore, simply adding an introductory psychology course as a prerequisite, for example, is not likely enough to maximize these newly desired student learning outcomes. Undergraduate institutions should therefore consider other ways to integrate the social and behavioral sciences into their premedical curricula.<sup>47</sup>

Childhood obesity is an excellent model for demonstrating the complex interrelationships between the biological and psychosocial determinants of health because of

the multifactorial nature of contributors to weight status.<sup>6,8</sup> More specifically, it can be used in premedical curricula to introduce students to theoretical frameworks that describe those complex interrelationships, providing a foundation for considering evidence-based approaches to prevention and treatment within the healthcare system. Due to the high prevalence of childhood obesity,<sup>1</sup> undergraduate institutions can use community programs with which they typically already have established partnerships (e.g. YMCAs) as a vehicle for students to apply this learning in a community setting.

Little is currently known about pre-healthcare undergraduate students' views regarding childhood obesity, the sources of that knowledge, and how it affects their understanding of the disease. In particular, we were interested in examining the question: To what degree can students identify and describe the complexity of childhood obesity? This understanding could provide a baseline of information from which to develop curricular approaches, using childhood obesity as a model to help integrate the social and behavioral sciences into premedical curricula.

## **Methods**

### **Participants and Recruitment**

During 2010-2011, we interviewed pre-healthcare undergraduate seniors about the etiology of childhood obesity, employing a qualitative approach to give a “complex and holistic picture” of students' perceptions.<sup>111</sup> We recruited seniors who had completed at least seven semesters of coursework and were planning to apply to or enter professional or graduate school for medicine, nutrition, social work, or public health, using flyers and

listservs, stopping data collection when saturation was reached.<sup>112-114</sup> This research was approved by the Institutional Review Board at North Carolina State University.

### **Data Collection**

Before data collection, we developed a standardized interview guide that included major questions and probes (Table 2.1), and all interviewers participated in standardized qualitative research training. We audio-recorded each in-person interview (45 to 90 minutes) after obtaining informed consent and took detailed notes, reviewing the notes with the student at the end of each interview.<sup>114,115</sup> After transcribing the audio files verbatim, we used direct content analysis to analyze data to determine when saturation occurred.<sup>112-114</sup>

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**Table 2.1. Major interview questions asked of pre-healthcare students (n=30) during qualitative interviews**

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1. Describe an obese child.
  2. What leads to childhood obesity? Who contributes to the causes?
  3. What are the consequences of childhood obesity?
  4. What should or can be done to prevent childhood obesity?
  5. Where did you learn the information you shared with me today?
-

## Data Analysis

Prior to data analysis, we developed five *a priori* main coding categories and used open coding<sup>116</sup> to develop a coding manual containing 47 sub-codes. Two of the authors coded all transcripts independently, using NVivo 9 qualitative analysis software as both a tool to code the data and to calculate reliability.<sup>117</sup> The two coders met periodically during data analysis to compare codes, reach consensus, and check inter-rater reliability.<sup>118</sup> Of note, we obtained an overall “excellent” Kappa of 0.83.<sup>119-121</sup>

The first author then independently analyzed the quotes to determine dominant emergent themes of student knowledge across each category. As a research team, we then came to consensus on the major dominant emergent themes and consulted with an expert not involved in data collection/analysis to gain an outside opinion on the relevance of themes.

## Results

Of the 30 students interviewed, the majority were majoring in biological science ( $n=20$ ) and of those with a minor, a health-related minor was most common ( $n=7$ ). Additionally, 21 students (70%) had taken or were currently taking an introductory nutrition course (Table 2.2).

Two dominant emergent themes surfaced: (1) Impact of Experience and (2) Disconnect between Causes and Prevention. The first theme suggests that the types of experiences in which students participated (both curricular and extracurricular) had an impact on their depth of knowledge regarding the etiology of childhood obesity. However, the second theme proposes that these students were not thinking about the problem

systematically and lacked awareness of the complexity of theory-based approaches to prevention and treatment.

**Table 2.2. Participant demographics of qualitative interviews with pre-healthcare students (n=30)**

<b>Characteristics</b>	<b>Students (#)</b>	<b>Percentage<sup>a</sup></b>
<b>Major</b>		
Biological Sciences	22	73%
Social Sciences/Humanities	8	27%
Physical Sciences	2	7%
Engineering	2	7%
Business	1	3%
<b>Minor</b>		
Health-related	7	23%
Biological Sciences	4	13%
Other	8	27%
<b>Gender</b>		
Male	8	27%
Female	22	73%
Had taken introductory nutrition course	21	70%

<sup>a</sup> Major and minor percentages do not add up to 100% because five students had multiple majors, and of the 16 students with minors, three were double-minors.

## Impact of Experience

When asked for their sources of knowledge about childhood obesity, students most commonly cited (1) medical school prerequisite science courses, (2) internship and community experience, (3) personal experience or observations, (4) family, and (5) media. They least frequently cited (1) scientific literature, (2) medical doctors, and (3) specialized courses/electives.

When discussing courses, all students cited science classes where they may have learned about anatomy and physiology, adult obesity, or diabetes. Additionally, the majority of students had taken an introductory nutrition class where they reported having learned about obesity.

Most students cited personal experiences interacting with obese friends and family members as a source of knowledge. When describing the opportunities for personal interactions one student said, *“I think just life experiences ... everyone’s gone to school and ... seen or [grown] up with obese children, or like me, having obese children ... runs in my family.”* These personal experiences may explain why students were able to describe the emotional consequences of childhood obesity and not just the physical effects that might have been learned in science classes.

However, the most knowledgeable students – those who could articulate a somewhat deeper understanding of the complexities of childhood obesity – also had meaningful volunteer, service-learning, or internship experiences. As one student noted, *“I’ve volunteered at the Food Bank and homeless shelters, and ... I feel like I got exposure to lower income people and realized how hard it is for them to provide healthy options.”* These

opportunities allowed students to interact with obese children and their parents in a real world setting and to see the challenges associated with prevention and treatment for both families and community programs.

Two of the other most common sources of knowledge about childhood obesity were media and everyday conversations with friends and family. Students' descriptions of knowledge from the media covered a wide span, from credible news sources to reality television shows. Similarly, students' conversations with friends and family varied from conversations with parents who are healthcare providers and friends who are nutrition majors to everyday conversations about topics in popular media. Interestingly, the least cited sources of information about childhood obesity included scientific literature, doctors, and specialized courses, all more credible sources for future physicians.

### **Disconnect Between Cause and Prevention**

The "Impact of Experience" theme purports that the more knowledgeable students were nutrition and social science majors, health minors, and students who had in-depth relationships with an obese friend or family member, and those with meaningful volunteer or internship experiences. However, even in the most knowledgeable students, we observed a disconnect between students' descriptions of contributing factors and the prevention tactics they said would target those contributing factors.

With regard to causes, the majority of students were able to describe contributors to childhood obesity closely related to the child's and family's behaviors, including diet, family, and physical activity. One student said, *"I feel like a lot of obesity in children is caused from parents ... when you're younger, especially, you ... model off your parents, and if your*

*parents aren't being very health-conscious or trying to eat in a healthy way, there's not a very high likelihood that you're [going to] do the same."* While most students' responses focused on parents and child's diet, some students discussed the impact of more external factors, including the school system and parent education. While a minority, some of the more knowledgeable students were able to give rich descriptions of the complexity of contributing factors, including the barrier of socioeconomic status. One student described socioeconomic status in this way: *"[P]eople who have low incomes or who can't afford [a store] like Whole Foods, or who can't really get nice vegetables at Harris Teeter, they have to get the cheaper food and more inexpensive food. [For example] buying a cheeseburger at McDonalds is much cheaper than buying even a sub at Subway."* Overall, all students were able to list the child and family-related contributing factors, but few students were able to describe more external impacts on healthy behaviors.

While most students' descriptions of contributing factors focused on those closely related to the child and family, students' descriptions of the causes were more comprehensive than their descriptions of solutions. In their discussions about childhood obesity prevention and treatment, students described programs targeting diet and physical activity through education with most students discussing programs they had seen or heard about. Popular topics included First Lady Michelle Obama's "Let's Move" campaign and changes to the school lunch program, two topics in the news at the time of the interviews. Additionally, students were able to describe less nutritious options from their own school lunch experience and could articulate clear changes to be made. As noted by one student, *"Just not having unhealthy options there and spending more money on making the healthy food taste good so*

*that the children can learn that 'Oh healthy food can be delicious!'*” Many students also pulled from their own experience building healthy lifestyle practices as children. Most described growing up in a supportive family, eating a healthful diet, and engaging in sporting activities. One student said, “[*W*]hen I was young, I think my parents put a big emphasis on [healthy eating], and I can tell as I’ve grown up my personal preference ... has come through based on their influence.” Many students received parental encouragement and explained that this was an important factor for developing healthy habits in children.

Interestingly, despite continued probing for additional ways to prevent childhood obesity, almost all of the students failed to mention the role of healthcare providers in preventing and treating childhood obesity. Overall, students tended to focus mainly on family and school-based interventions rather than a variety of approaches to prevention (e.g. behavior change counseling and policy changes). For example, students could see that changes needed to be made to the way the food system is run, including cost and accessibility of healthy foods and marketing to children; however, they did not give clear descriptions of how this could be accomplished. This disconnect between students’ descriptions of causes and prevention indicates that their ideas of prevention are limited and not reflective of the complexity of known contributors.

### **Discussion**

The results of this study suggest that childhood obesity could serve as a vehicle by which to prepare students for the MCAT 2015® and a more prevention-based medical education. Pre-healthcare undergraduate seniors with nutrition and social science majors, a health minor, or volunteer or internship experiences were more knowledgeable about the

behavioral and social determinants of childhood obesity than their counterparts. They gave descriptions of the barriers parents may face in providing children affordable, healthy foods (e.g. socioeconomic status) and the impact of current systems (e.g. school lunch program) on nutrition health behaviors. Students without this coursework and volunteer experience had a more limited view of the contributors of childhood obesity, focusing most of their discussion the child's diet and parental influence. Also, students rarely mentioned the role of healthcare providers in prevention and treatment of childhood obesity, despite their desire to enter this profession. In general, even the more knowledgeable students lacked depth in their understanding of the behavioral and social determinants of childhood obesity.

An understanding of the complexity of childhood obesity, leading to more effective healthcare-related approaches to prevention and treatment, can be facilitated, in part, through providing students with a social ecological perspective of the disease. This perspective on health behavior includes various levels of contributing factors and has been applied to many different health-related behaviors, such as smoking, alcohol consumption, and drug use.<sup>122</sup> Davison and Birch (2001) depict the social ecological model related to childhood obesity with three levels of contributing factors – child, parent, and community – and posits that a child's characteristic (e.g. health-related behavior) cannot be explained (and therefore ultimately changed) without an understanding of the context in which that characteristic exists. A more recent expansion of the social ecological model depicts the “6 C's” of contributors to weight status: cell, child, clan, community, country, and culture.<sup>8</sup> Each of these contexts exists within its own “ecological niche,” creating a model of ever-widening spheres of influence, from the child and her family to her community, society, and culture as

a whole. Both models also make clear the bi-directional, rather than uni-directional nature of the interactions between the level, which is key to developing successful approaches to both prevention and treatment of childhood obesity. For example, while parental eating behavior can influence a child's eating habits, research has shown that the child's characteristics (e.g. age, sex, and weight) can affect the parent's attitudes and behaviors towards feeding her.<sup>6,123</sup> This understanding of the complex bi-directional nature of interactions related to childhood obesity requires a developed sense of reasoning and analysis which the MCAT 2015® also seeks to encourage. Introducing students to a social ecological model for health behavior is one way to provide them with a framework grounded in the behavioral sciences to better understand and articulate sound prevention and treatment strategies related to childhood obesity in particular, and health-related challenges more generally, and to describe their role as future healthcare providers in the implementation of those strategies.

Premedical programs could achieve learning outcomes related to the behavioral and social science components of public health programs, such as childhood obesity, through coursework or out-of-class experiences. For example, programs could create new interdisciplinary courses specifically targeting health-related topics such as childhood obesity, or obesity more generally, or incorporate health-related social science principles into nutrition courses where there is already a lot of overlap between biological and social sciences. Topics that might be incorporated into such courses include not only etiology frameworks such as the social ecological model, but also behavior change theories (e.g. Stages of Change) and counseling approaches (e.g. motivational interviewing).<sup>122</sup> These theories could be helpful, as Kaplan et al. (2012) describe, in preparing “aspiring physicians

to understand patients' social, environmental, and personal characteristics," in order to make more effective physicians equipped to consider multiple factors in prevention and treatment.<sup>35,124</sup> This undergraduate introduction to the social and behavioral sciences is especially important because, in a survey of physicians, 44% reported that medical school did not adequately prepare them to treat patients from a behavioral standpoint.<sup>45</sup>

Coursework is not the only way for undergraduates to learn about behavioral and social sciences' connection to biological sciences. Because pre-healthcare students already seek out internship and volunteer experiences to gain experience for professional school, undergraduate institutions can encourage students to seek out valuable experience mirroring desired learning outcomes. For example, students could teach nutrition education programs in local afterschool programs like the YMCA or Boys and Girls clubs, affording them the opportunity to see barriers children and teens face and how prevention can be approached in the community. However, consistent and meaningful outcomes are not likely to be achieved without combining that experience with academic content and guided reflection – through service-learning.

Service-learning is a pedagogy that combines coursework and service in the community with critical reflection to improve academic learning, in addition to promoting civic learning and personal growth.<sup>125,126</sup> Enhancement in all three of these areas, through reflection, could benefit future physicians as they become more knowledgeable and self-aware, with a greater understanding of the multifactorial determinants of health.<sup>127</sup> In our study, students who participated in service-learning or quasi-service-learning experiences were better able to describe the complexities represented in the social ecological models of

childhood obesity. However, their descriptions of prevention tactics did not closely align with the causes of childhood obesity, suggesting a lack of connection to a psychological model. Carefully guided reflection on experience tied to academic concepts in the behavioral and social sciences, such as the social ecological model, could give students a better understanding of the complexities associated with the prevention and treatment of a health problem and given them an opportunity to consider their roles as future healthcare providers, an awareness lacking in our students' responses. Guided reflection could also help them surface prejudices (e.g. obese people are lazy), which, although not addressed in our study, are known to affect patient-caregiver interactions.<sup>25,26,30,128,129</sup>

Service-learning experiences have already been incorporated into some undergraduate pre-healthcare and graduate/professional school programs with some addressing obesity and others healthy living as a whole.<sup>130-132</sup> In fact, many medical service-learning programs seek to explore complex issues, like a multifactorial understanding of childhood obesity, and have resulted in students reporting a better understanding of childhood obesity, community issues and needs, and patient behaviors both in and out of the clinic, helping students feel more prepared and eager to work in underserved communities in the future.<sup>133-136</sup> Combining this community experience with coursework through the vehicle of service-learning may equip premedical students to not only be more successful in their MCAT® scores but also in learning about a prevention-based approach to healthcare.

Future research could explore the effectiveness of these service-learning opportunities through analysis of guided reflection assignments, through comparison of MCAT® scores, or through differences in performance once students enter medical school. Additionally, future

qualitative explorations could determine similar research questions in medical students to compare their knowledge to the knowledge of pre-medical students.

### **Limitations**

While measures were taken to ensure that the research was unbiased and applicable to the greater population, there were still limitations to the study. Because the interviews were conducted at one institution, findings might not be generalizable to all undergraduate programs in the nation. Due to the nature of recruitment, students who volunteered for the interviews might be more interested in the topic than the general pre-healthcare student population, though we sought to increase participation of students less interested in the topic by offering a Pre-Health Club participation point incentive.

### **Conclusions**

Our study provides a baseline understanding of pre-healthcare students' knowledge of childhood obesity that suggests that they need more exposure to these concepts, especially as it relates to their roles as future healthcare providers. By providing students with coursework or service-learning opportunities that link the biological and social sciences with experience with obese children in the community, students may perform better on the MCAT®, be more prepared to enter medical school with a prevention-focused mindset, and have a deeper understanding of the complexity of health.

# CHAPTER 3: MEDICAL STUDENTS' PERCEIVED EDUCATIONAL NEEDS TO OVERCOME BARRIERS TO PREVENTING AND TREATING CHILDHOOD OBESITY<sup>2</sup>

## Abstract

**Introduction:** Medical schools are challenged to respond to the demands to incorporate prevention-based education and to equip students to treat obesity as a disease. These challenges require schools of medicine to revisit approaches to nutrition education in the curricula. Childhood obesity prevention and treatment will present particular challenges for future physicians as they attempt to apply nutrition-related knowledge and skills in a family context.

**Purpose:** The purpose of this study was to explore medical students' understanding of the etiology of childhood obesity, specifically student-perceived barriers to preventing and treating childhood obesity and perceived educational needs.

**Methods:** We conducted phone interviews with third and fourth year allopathic and osteopathic medical students ( $n=78$ ) from 25 medical schools in 16 states and used a phenomenological approach to analysis, identifying five dominant emergent themes.

**Results:** Student perceived barriers to childhood obesity prevention and treatment in clinical care emerged in several domains. These included student-centered (e.g. lack of knowledge), patient-centered (e.g. lack of access), and healthcare system-centered barriers (e.g. limited time). Students requested information (e.g. applicable "how-to's") and counseling skills (e.g.

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<sup>2</sup> This chapter was submitted as a manuscript for publication with Sarah L. Ash, PhD, Matthew A. Haemer, MD, MPH, and L. Suzanne Goodell, PhD, RD.

observation and practice) to be able to prevent and treat childhood obesity. Students failed to discuss their role as physicians in preventing and treating childhood obesity.

**Conclusions:** In order to provide students with an understanding of their role in preventing and treating childhood obesity, medical schools need to provide students with childhood obesity-specific information and basic nutrition education. To build their self-efficacy in nutrition counseling, schools can use a combination of observation and practice led by skilled physicians. Increasing students' self-efficacy through training may help students overcome perceived barriers to childhood obesity prevention and treatment.

## Introduction

Obesity was recently recognized by the American Medical Association as a disease, drawing attention to the importance of prevention and treatment in clinical settings.<sup>2</sup> At the same time, the Association of American Medical Colleges promotes prevention-based medical education, which requires greater understanding of the psychological, social, and biological foundations of health behavior.<sup>108</sup> In light of these changes, medical schools will need to alter or create curricula to teach students approaches to obesity prevention and treatment within a social ecological framework.<sup>8,122</sup>

Childhood obesity affects 17% of children 2-19 years of age,<sup>1</sup> threatening their health, causing psychological and social impacts on the individual,<sup>9,137,138</sup> and placing financial burdens on the healthcare system.<sup>11</sup> Physicians who care for children play a key role in early prevention because they see children at frequent, regular intervals.<sup>14</sup> Additionally, given that adult patients believe these physicians have the authority to help them lose weight,<sup>15</sup> it is possible that this belief applies to parents, as well, emphasizing an opportunity for physicians to play a pivotal role in childhood obesity prevention and treatment.

In order to help pediatric patients prevent excess weight gain and/or lose weight, physicians need to follow best practices, including American Academy of Pediatrics' Expert Committee Recommendations, which state physicians should encourage: limiting consumption of sugar-sweetened beverages and energy dense foods; consuming high-fiber diet rich in fruits and vegetables; and participating in daily physical activity with limited screen time.<sup>10</sup> Employing nutrition behavior change counseling with patients and their parents can help promote healthier eating practices;<sup>13</sup> therefore, future physicians need to

understand both nutrition information and counseling practices to be able to engage patients in change.

Unfortunately, nutrition education in medical schools is limited,<sup>67</sup> an inadequacy that has been reported consistently since the 1950s.<sup>139</sup> Most medical schools do not have a course devoted to nutrition, and these schools provide an average of only 19.6 hours of nutrition-related education interspersed throughout the entire four years of medical school.<sup>67</sup> These statistics refer to nutrition education as a whole, which suggests that the subset of education regarding childhood obesity is even more limited. Not surprisingly, this lack of training is reflected in the beliefs and actions of practicing physicians, who as a group express low self-efficacy in obesity management.<sup>29</sup> Only half of pediatricians report using nutrition behavior change counseling,<sup>37</sup> and fewer than half follow Expert Committee Recommendations<sup>140</sup> or believe that they can help obese patients lose weight.<sup>29</sup> A survey of pediatricians, family practice physicians, and pediatrics specialists feel competent in treating childhood obesity and most do not address weight concerns in overweight children.<sup>141</sup> These inadequacies highlight the need to increase nutrition knowledge and to build self-efficacy for nutrition counseling among medical students.

Previous research has explored medical students' views of obesity and weight counseling but not childhood obesity. Additionally, methodologies have been mostly quantitative in nature.<sup>142-145</sup> In order to explore medical student-perceived barriers and needs associated with their training in the prevention and treatment of childhood obesity, we employed qualitative methodologies, specifically, a phenomenological approach<sup>146</sup> that

allowed us to determine not only student barriers and needs but also relationships between barriers and needs and why the barriers might be occurring.<sup>111</sup>

## **Methods**

### **Participants and Recruitment**

Participants were third and fourth year students recruited through listservs at allopathic and osteopathic medical schools or through referral from another medical student. The final sample ( $n=78$ ) was determined by saturation,<sup>113,114</sup> with students representing 25 medical schools in 16 different states in each of the four major Census regions of the United States,<sup>147</sup> ranging in age from 23 to 44 years old, and having varying educational backgrounds (Table 3.1). Ethical approval was granted by the North Carolina State University and East Carolina University Institutional Review Boards.

### **Data Collection and Analysis**

Two of the authors and research assistants developed a standardized interview guide to explore medical student views through major questions and probes (Table 3.2). Interviews were conducted via phone, Skype, or Google voice. During each interview, research assistants used methodologies to increase trustworthiness and accurately represent students' views (e.g. repeating descriptions back to students for them to clarify or correct).<sup>113–115,146</sup> Each interview lasted 30-90 minutes and was digitally audio-recorded. Interviews were transcribed verbatim with the exception of two files that were lost due to technical difficulties; interviewer notes were used instead.

**Table 3.1. Participant demographics of qualitative interviews with allopathic and osteopathic medical students (n=78)**

<b>Characteristic</b>	<b>Number of students</b>	<b>Percent of students</b>
Type of medical school		
Allopathic (18 schools)	57	73%
Osteopathic (7 schools)	21	27%
Year in medical school at time of interview		
Third	35	45%
Fourth	43	55%
Gender		
Male	32	41%
Female	46	59%
Prior course in nutrition	26	33%
Planning to specialize in Family Medicine or Pediatrics	32	41%
Additional degrees		
Completed/currently pursuing: Masters of Public Health or Masters of Nutrition	11	14%
Completed/currently pursuing: Other graduate degree	14	18%
Considering: Masters of Public Health	7	9%

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**Table 3.2. Major interview questions and probes asked of allopathic and osteopathic medical students (n=78) during qualitative interviews**

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**Major Questions**

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1. What do you think of when you hear the phrase “obese child”?  
How do you define “childhood obesity?”  
What do obese children look like?  
How do obese children act?  
Is there anything different between a “normal weight” child and an “obese” child?
- 

2. What leads to childhood obesity? Who contributes to the cause?
- 

3. What do you think are the consequences of childhood obesity?
- 

4A. What should or can be done to prevent childhood obesity, if anything? <sup>a</sup>

4B. What should or can be done to treat childhood obesity? <sup>a</sup>

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5A. How important do you think nutrition knowledge is in preparing you to treat obese children? <sup>b</sup>

5B. We’ve heard a lot of students say that their medical school coursework or clinical rotations did not completely equip them to treat obese children or prevent childhood obesity. What information, resources, or skills do you need to treat obese children?

What information, resources, or skills do you need to prevent childhood obesity? <sup>b</sup>

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**Probes**

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1. Think about what you may have learned about the \_\_\_\_\_ of childhood obesity in your medical school coursework. <sup>c</sup>

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2. Think about what you may have learned about the \_\_\_\_\_ of childhood obesity in your clinical experience. <sup>c</sup>

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<sup>a</sup> Question 4B was added after 34 of the 78 interviews were completed, and Question 4A was maintained.

<sup>b</sup> Question 5A was replaced by Question 5B after saturation was reached on Question 5A.

<sup>c</sup> Probes were asked after each major question.

While data were being collected, researchers began the iterative process of data analysis<sup>146</sup> through weekly meetings to determine saturation and preliminary dominant emergent themes.<sup>113,114</sup> After saturation was reached, we created a coding manual including 20 codes organized into seven coding categories.<sup>113</sup> During secondary analysis, the first author and three coders not involved in data collection used the coding manual to individually code transcripts. Coders discussed themes and arrived at final codes by consensus through a series of weekly meetings.<sup>118</sup> After codes were entered into NVivo9 Qualitative Software,<sup>117</sup> the first author reviewed quotes for final confirmation of themes and conferred with the other three authors.

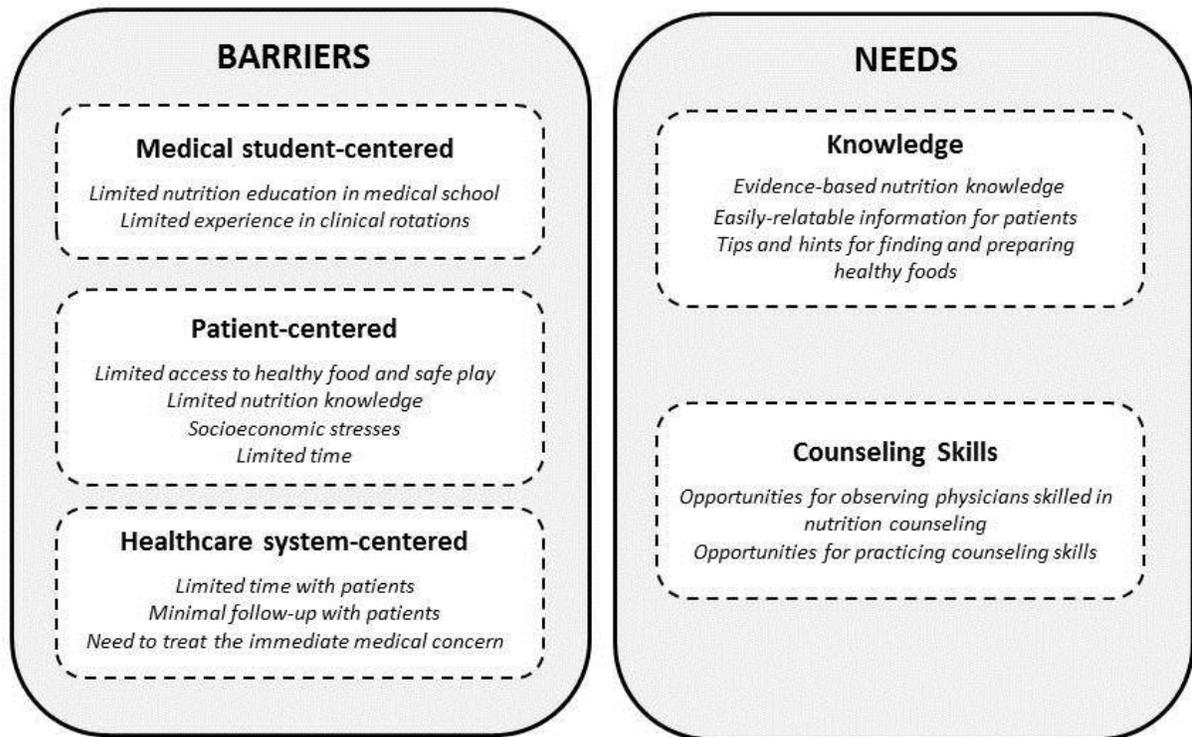
## **Results**

Analysis surfaced five dominant emergent themes relative to the phenomenon of medical students' understanding of the etiology of childhood obesity through medical school education. Figure 3.1 provides a diagrammatic representation of their perceived barriers and needs associated with preventing and treating childhood obesity.

### **Medical student-centered barriers**

Medical students described a variety of student-centered barriers, with the most prevalent student-centered barrier being limited nutrition education in medical school. Students said that they learned the biochemistry of nutrition but not the basic nutrition knowledge needed to share with patients. Recognizing their nutrition coursework was limited, students said they felt unprepared to provide nutrition recommendations in a clinical setting. One student said, *“If someone were to tell me right now, ‘We have an obese child, can you help put this child on ... a healthy diet?’ I don’t know what I would say.”* Students

explained that the nutrition coursework they received was not applicable to patients, and they were not prepared to counsel patients. One student said, “When [my future patients] ask me something about nutrition, I’m going to have to Google [it] ... because I don’t feel like I have a very solid foundation.”



**Figure 3.1.** Medical student-perceived barriers and requested needs relative to childhood obesity prevention and treatment

In addition, some students felt their clinical rotations did not prepare them to prevent and treat childhood obesity due to limited experience. Some students explained that they either did not have the opportunity to see obese children in their clinical rotations or that if they did, obesity was not addressed. One student said, *“We definitely haven’t had that much childhood obesity in the hospitals. ... [R]ight now I’m on the hospital service so pretty much all I see is asthma and URI’s.”*

### **Patient-centered barriers**

The medical students recognized that childhood obesity is a complex issue mitigated by many internal and external factors. This acknowledgement allowed them to understand there are many barriers patients face in trying to lead a healthy lifestyle, including socioeconomic status and limited access to healthy food and safe play. One student said, *“[A]ccess to things like healthy food is going to be important. I didn’t really believe this until I saw for myself here [where my medical school is located]. It’s really hard to eat healthy if the only food source within two or three miles of your house is fast food restaurants.”* Additionally, students said that patients may not be able to prepare healthy foods due to limited time. One student described this frustration by saying, *“I can’t write a prescription for you to get vegetables at your store. I can’t write a prescription for you to be able to leave work two hours early to go exercise.”* Students recognized that their patients may have limited nutrition knowledge, preventing them from being able to choose and prepare healthy foods. One said, *“I’m sure there are plenty of people out there that don’t know what’s healthy and what’s not healthy.”* Students understood these barriers prevent

patients from healthy lifestyles but did not feel confident helping patients overcome the barriers.

### **Healthcare system-centered barriers**

Students expressed problems with a healthcare system that prevented them from delivering the type of care they thought necessary. Students explained that due to limited in-office time with patients, it is difficult to provide nutrition counseling. One student said, *“I think you’re very limited in what you can do as a physician in the set-up of general clinic because ... it’s complicated and requires behavior intervention. ... [T]here’s really not enough time for that.”* Students saw this limitation in clinical experience and reported that their preceptors discussed frustration with limited time. Students saw that physicians felt a need to treat the immediate medical concern instead of the more distant concern of childhood obesity. One student explained that childhood obesity is often not addressed *because “if you don’t deal with this [immediate] thing in your office right now, today, there’s going to be a bad outcome tomorrow.”* This student went on to say, *“Well if you have problems with obesity, well come back ... and we’ll address it.”* Students frequently reported the need to treat immediate needs kept them from gaining experience counseling patients about childhood obesity. Students also expressed another time concern: minimal follow-up with patients to monitor change. Due to this limitation, students did not have a chance for patient feedback to build self-efficacy.

In addition to their discussion of barriers, students also displayed a sense of disconnect between the causes of childhood obesity and their specific role in prevention and treatment. Few students described themselves as fitting into the solution, naming mostly the

efforts of community programs that provide parent education and changes to the school system. The limited perception of their role in the solution may be due to the healthcare-system barriers, lack of training, and not feeling equipped to overcome barriers.

### **Need for knowledge**

These students wanted more nutrition education, saying it could be provided through didactic portions of medical school, pediatric rotations, or lunch seminars. Many students explained they learned about adult obesity but not childhood obesity, wanting more specifics about childhood obesity. One student said, *“We have lectures on asthma, why do we not have a lecture on childhood obesity? And not just in terms of teaching us about the epidemiology of it but actually teaching us ... what you do with your patients, and even showing us some of those skills and resources we might need later.”* As this student also expressed, students want this nutrition information to be easily-relatable to patients, including the practical aspects of how to maintain a healthy lifestyle. One student said, *“[Physicians] need to know what they can tell patients to get them to improve their lifestyle ... specific concrete advice they can give them regarding diet – where to eat, what to eat, when to eat, [and] how to eat.”* So students also wanted specific tips and hints for finding and preparing healthy food that could be shared with patients. Not only did students say they want information that patients can understand, they also said they want evidence-based nutrition knowledge. They valued recommendations based on scientific literature but reported that medical school did not provide them with this information.

### **Need for counseling skills**

In addition to more knowledge, students also said they need more skill-building in nutrition counseling. Students requested more opportunities for practicing counseling skills with children and families. They reported having had opportunities to practice motivational interviewing related to other health behaviors but wanted experience counseling about childhood obesity. One student explained how this might be facilitated by saying, “*A childhood obesity clinic ... [where] we could spend some time – that would be useful. And then we would feel comfortable knowing ... [how] to motivationally interview people.*” Students said they needed to know how to speak to children about the emotionally-charged subject of childhood obesity and how to provide effective family counseling that is culturally sensitive.

### **Discussion**

These results provide an understanding of medical students’ experience with their nutrition education relative to childhood obesity. One of the key findings is that despite repeated probing, medical students rarely described their own role in preventing and treating childhood obesity. That is, they tended to describe community programs’ role in prevention and treatment, not their own. This phenomenon, seen similarly in pre-healthcare undergraduates,<sup>148</sup> is likely due to the variety of student-perceived barriers identified in this study, which clearly connect to their perceived needs.

The medical students in this study expressed a dissatisfaction with nutrition education similar to that found in other studies.<sup>69,149,150</sup> With the lack of emphasis on childhood obesity knowledge, students may have felt that childhood obesity prevention and treatment is not a

priority. With the sheer volume of information in medical school and nutrition only just recently being made a sub-score for the Step 1 United States Medical Licensing Examination,<sup>78</sup> it is possible that students may believe that nutrition is not as important as more heavily-tested subjects.

In addition, students expressed frustration with the lack of time to discuss weight issues with patients during clinical rotations and the need to treat the immediate medical concern, which is reflective of surveys of practicing healthcare providers.<sup>22,31,34,150</sup> Experiencing these time-related healthcare system-centered barriers left many students wary of the feasibility of prevention and treatment. When preceptors failed to model the physicians' role in obesity prevention and treatment, students may have believed they do not play a role in it, which has been reported in a previous study.<sup>143</sup>

With the recognition of obesity as a disease and need for a prevention-based incorporation of the behavioral and social sciences into medical curricula,<sup>2,108</sup> schools can adapt to provide students with a better understanding of their role in preventing and treating childhood obesity through coursework and clinical experience. One innovative model, the “6 C’s” for child weight status<sup>8</sup> provides a framework by which to teach medical students through their medical education about how prevention and treatment efforts can be approached from “cell to society.”

Some medical schools have incorporated nutrition education into coursework, but childhood obesity training is typically reserved for pediatric clerkships. Students could be taught nutrition knowledge that can be transferred to patients in the limited time physicians have with the patients, including tips for finding and preparing foods. For example, culinary

education programs have been used to encourage healthy behaviors in physicians that they can transfer to patients.<sup>151</sup> Medical students may also benefit from training in settings where preceptors model how to effectively integrate dietitians or health educators into practice to make more extensive nutrition education available to patients.

Observation and experience also play an important role in building self-efficacy.<sup>93</sup> For observational skills-training, having preceptor “buy-in” could be beneficial as role models serve an important purpose in building self-efficacy.<sup>80</sup> Because few physicians feel qualified to model nutrition counseling due to their own lack of training,<sup>36</sup> preceptors may need to be trained in appropriate counseling behaviors.<sup>78,152</sup> Students should also be given opportunities to practice with patients, learning how to counsel children and their parents. This experience is important because research has shown that as students progress through medical school, their perception of the relevance of weight counseling tends to decrease, especially in students not planning to pursue primary care.<sup>142</sup> However, appropriately designed nutrition-specific counseling training can increase both students’ knowledge and self-efficacy.<sup>81,153,154</sup> Therefore, medical schools should alter their curricula to combine childhood obesity-specific knowledge with nutrition counseling training, with the ultimate goal of increasing the self-efficacy of new physicians in preventing and treating childhood obesity.

### **Strengths and limitations**

Because this was a volunteer sample, students may have been more interested in the subject or more educated than the general population of medical students. Researchers attempted to decrease this bias by offering a gift card raffle ticket incentive. Due to the

nature of the referral recruitment strategy, students may have shared the interview questions with their friends. Researchers tried to decrease this bias by asking student not to share the questions with other students. Additionally, due to timing of interviews, students may have not started their pediatrics rotation where they may have received the requested training.

### **Implications and future research**

In the future, researchers should quantitatively evaluate these qualitative findings. Nutrition knowledge<sup>155</sup> and attitudinal<sup>105</sup> surveys have been developed for medical students and residents.<sup>69</sup> However, these surveys measure nutrition knowledge and attitudes as a whole, and medical schools could benefit from a survey to assess medical students' views of childhood obesity prevention and treatment practices, specifically. The development of a survey to assess self-efficacy and belief in these childhood obesity-specific counseling practices could be used as a formative or summative assessment of students' self-efficacy and beliefs related to the information and skills that need to be incorporated into medical school curricula to address this public health problem.

## CHAPTER 4: THE DEVELOPMENT AND VALIDATION OF THE CHILDHOOD OBESITY PREVENTION SELF-EFFICACY (COP-SE) SURVEY<sup>3</sup>

### Abstract

**Purpose:** The authors sought to develop a valid and reliable computerized survey to measure medical students' self-efficacy in skills needed to prevent and treat childhood obesity.

**Methods:** The authors developed the Childhood Obesity Prevention Self-Efficacy (COP-SE) survey between November 2012 and May 2013 with input from two expert panels and cognitive interviews with medical students. The authors administered the 43-item COP-SE computerized survey to a nationwide sample of medical students between May and August 2013.

**Results:** The final sample consisted of 444 medical students from 53 medical schools. Exploratory factor analysis revealed a two-factor structure with a correlation of 0.637 between factors and high reliability within factors. The correlation between the COP-SE and a measure of general self-efficacy was moderate (0.648), and reliability within factors was high (Factor 1 = 0.946; Factor 2 = 0.927).

**Conclusions:** The 18-item COP-SE is a valid and reliable measure of childhood obesity prevention self-efficacy. Factor 1 assesses self-efficacy in nutrition counseling, and Factor 2 measures self-efficacy to assess readiness to change and to initiate nutrition lifestyle changes. The correlation between the COP-SE and the measure of general self-efficacy indicates that the COP-SE is a distinct, valid assessment of self-efficacy. The high reliability of items

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<sup>3</sup> This chapter was submitted as a manuscript for publication with John L. Nietfeld, PhD and L. Suzanne Goodell, PhD, RD.

within factors indicates that the items measure the same constructs. Therefore, medical schools can use this valid and reliable instrument as a formative or summative assessment of students' self-efficacy in childhood obesity prevention and treatment.

## Introduction

Childhood obesity is a national concern that affects 17% of children 2-19 years of age.<sup>1</sup> It was recently recognized as a disease by the American Medical Association,<sup>2</sup> which will likely encourage the medical community to have an increased focus on early prevention and treatment. Therefore, it is especially important for physicians to be equipped with skills to treat childhood obesity as they see children in frequent, regular intervals.<sup>14</sup>

The goal of medical school is to provide future physicians with the information and skills needed to treat health problems, like childhood obesity. Ideally this would involve nutrition education and counseling skill-building; however, nutrition education in medical school is limited to an average of only 19.6 hours of instruction over four years.<sup>67</sup> Not surprising, medical students are dissatisfied with nutrition education,<sup>67,69,150,156</sup> and many medical students lack confidence in their ability to provide counseling for obese children and their families.<sup>156</sup>

The lack of self-efficacy continues into practice as physicians report low self-efficacy in obesity management.<sup>29</sup> Even among physicians with additional training, like pediatricians, family practice physicians, and pediatric specialists, few feel competent in treating childhood obesity or addressing weight concerns with children.<sup>141</sup> Moreover, few physicians believe that they can help obese patients lose weight,<sup>29</sup> and they rarely use nutrition behavior change counseling<sup>37</sup> or heed American Academy of Pediatrics' Expert Committee Recommendations for assessment, prevention, and treatment of childhood obesity.<sup>140</sup>

A greater emphasis on nutrition training and behavior change is needed in medical school curricula. Recognizing the importance of this training in preventing and treating

childhood obesity, the Institutes of Medicine's Committee on Accelerating Progress in Obesity Prevention recently recommended that medical schools should provide students with nutrition education and training in motivational interviewing and counseling.<sup>86</sup> There is no standardized behavior change counseling curriculum in medical schools; however, the Transtheoretical Model, motivational interviewing, and the 5A's Model of Behavioral Counseling are commonly taught.<sup>34,87</sup> The Transtheoretical Model proposes steps in which physicians determine a patient's readiness to change and facilitate behavior change through stages of pre-contemplation to action.<sup>34,89</sup> Similarly, the 5A's Model of Behavioral Counseling involves assessing the behavior, advising about the behavior, agreeing on goals, assisting in change, and arranging a follow-up to offer additional support.<sup>34,90</sup> Motivational interviewing, a counseling language, rather than framework, is used to help patients make change based on their own motivation and is "collaborative, evocative, and honoring of patient autonomy" by nature.<sup>91</sup> These counseling frameworks and language lack utility in the absence of counseling knowledge; therefore, medical schools need to provide their students with nutrition knowledge so they can provide nutrition advice and recommendations to their patients. Employing nutrition behavior change counseling with obese children and their parents can help promote healthier eating practices,<sup>13</sup> and patients report higher satisfaction with care when physicians take time to offer advice.<sup>34</sup> Therefore, future physicians need to possess proficiency in both nutrition knowledge and counseling practices to be able to engage patients in change.

As medical schools adapt curricula to involve both nutrition education and counseling education, they will need ways to measure the effectiveness of newly adapted programs. One

option is to examine medical students' self-efficacy. Self-efficacy is confidence in the ability to complete a task, and mastery of skills is important in increasing self-efficacy.<sup>93</sup> Self-efficacy is important because in general, higher self-efficacy leads to persistence in problem-solving and subsequently to improved performance of the target skill. The addition of nutrition-specific counseling training can also increase both future physicians' knowledge and self-efficacy.<sup>81,153,154</sup>

Understanding the importance of self-efficacy as a marker of proficiency in a skill, a self-efficacy survey would assist medical schools in both formative and summative evaluation of students. Nutrition knowledge<sup>155</sup> and attitudinal<sup>105</sup> surveys have been developed for medical students and residents,<sup>69</sup> measuring nutrition knowledge and attitudes as a whole; however, these surveys do not assess medical students' self-efficacy in childhood obesity-specific nutrition counseling skills. A survey measuring how medical students feel about diagnosing childhood obesity, counseling obese children and their families, and recommending nutrition changes could be beneficial for medical schools to determine students' self-efficacy in these areas. Therefore, the purpose of this study was to develop a valid and reliable computerized survey to measure medical students' self-efficacy skills needed to prevent and treat childhood obesity.

## **Methods**

### **Instrument development**

We developed the Childhood Obesity Prevention Self-efficacy (COP-SE) survey through a rigorous multi-phase process to ensure both reliability and validity,<sup>157</sup> similar to other assessment validation studies.<sup>158</sup> During Phase 1, we determined the scope of the

proposed survey using results from a qualitative study of third and fourth year medical students' needs and barriers to preventing and treating childhood obesity.<sup>156</sup> A review of the literature including the American Academy of Pediatrics' Expert Committee Recommendations<sup>10</sup> and common behavior change theories/methodologies also informed the item content.<sup>87</sup> Based on this information, we developed an 88-item pool consisting of self-efficacy and belief items.

In Phase 2, we sent the 88-item pool to a panel of 10 experts in nutrition, childhood obesity, pediatrics, medical education, motivational interviewing, and survey development for a check of content validity. The expert panel rated each item for relevancy using a 5-point Likert scale and were encouraged to provide additional comments where appropriate. After calculating an average relevancy score for each item and compiling comments, we made revisions, deletions, and additions and finally agreed on a final pool of 48 items.

In Phase 3, we conducted cognitive interviews over the phone with 5 medical students to determine their thought processes in responding to each of the 48 items as another check of content validity. We conducted the interviews using a standardized semi-structured interview guide. Before each interview, students completed an online version of the survey, and we provided them with a paper copy of the survey to refer to during the interview. With a combination of the think aloud method and the verbal probe method,<sup>159</sup> we asked each student about (1) the meaning of each item, (2) what actions they would take to complete the skill, (3) their confidence in the skill, (4) their belief in the importance of the skill, and (5) how they might change the item. The interview protocol was approved by the Institutional Review Board at North Carolina State University.

Based on feedback from the cognitive interviews, we removed items and made revisions to the wording. In Phase 4, we shared the 46-item survey with 8 experts not in the original panel and asked them to organize the items into the proposed sub-scales as a check of face validity. The proposed subscales were: (1) Confidence in Diagnosing and Discussing Childhood Obesity, (2) Belief in Diagnosing and Discussing Childhood Obesity, (3) Confidence in General Childhood Obesity Counseling Skills, (4) Belief in General Childhood Obesity Counseling Skills, (5) Confidence in Specific Childhood Obesity Counseling Skills, and (6) Belief in Specific Childhood Obesity Counseling Skills. After receiving feedback from these experts, we decided to split double-barreled items asking about “obese children and family members” into 2 items per concept (i.e. one item about the obese child and one item about the obese child’s family members). We then prepared the final 43-item self-efficacy survey for online administration.

### **Instrument**

The survey consisted of 43 self-efficacy items organized by a header with the phrase “I am confident I can” followed by each item containing a stem (i.e. “Describe to an obese child’s family members how to choose healthy snack alternatives”). The proposed subscales included: (1) Confidence in Diagnosing and Discussing Childhood Obesity, (2) Confidence in General Childhood Obesity Counseling Skills, and (3) Confidence in Specific Childhood Obesity Counseling Skills. The items were ranked on a 5-point Likert scale from “Strongly Disagree” to “Strongly Agree.”

## **Study participants**

The survey was administered in May-August 2013 through the Qualtrics online survey system (Qualtrics, Provo, UT) to medical students in their first, second, third, or fourth year of allopathic or osteopathic medical school. We contacted medical school administrators and medical students at all allopathic and osteopathic medical schools in the U.S., providing them with a link for the online survey. Students completed a 10-question demographic survey for inclusion/exclusion purposes. Students had to be over the age of 18 and planning to specialize in Family Medicine, Internal Medicine-Pediatrics, or Pediatrics or Undecided at the time of completion. For each completed survey, \$1 was donated to the American Cancer Society as an incentive for participation. The survey administration protocol was also approved by the Institutional Review Board at North Carolina State University.

## **Validity and reliability analyses**

We used the Qualtrics software system (Qualtrics, Provo, UT) for data management during data collection and IBM-SPSS Version 21 software (IBM Corp, Armonk, NY) for data management and statistical analyses after data collection ended.

## **Data quality and descriptive statistics**

A Kaiser-Meyer-Olkin (KMO) statistic was used to determine sampling adequacy, and a Bartlett's test was used to test for sphericity.<sup>160</sup> In order to explore trends in students' self-efficacy under different demographic conditions, we calculated means and standard deviations and conducted pooled variance t-tests. Statistical significance was defined as  $p < 0.05$ .

## **Factor analysis**

We performed an exploratory factor analysis of the 43 self-efficacy items, using a Principle Axis Factoring (PAF) with an oblique rotation (Promax), allowing for correlation between items.<sup>160</sup> Scree plots and communalities aided in determining the factor structure, and items with correlations below 0.30 and loading on multiple factors in the pattern matrix were deleted to achieve the final factor structure.<sup>160</sup>

## **Concurrent validity**

There is currently no validated self-efficacy survey for healthcare providers, but we administered the New Generalized Self-Efficacy (NGSE) scale<sup>161</sup> at the same time as our survey as a test of concurrent validity. The NGSE is a valid and reliable measure of general self-efficacy.

## **Reliability assessment**

For item analysis, we used IBM-SPSS Version 21 software (IBM Corp, Armonk, NY) to calculate Cronbach's alpha for each factor determined by the factor analysis, using the cut-off of 0.70 or higher for internal consistency.<sup>159</sup> We also used the inter-item correlation matrix and new Cronbach's alpha if an item was deleted to exclude poor items from each factor.

## **Results**

### **Sample characteristics**

Of the 168 medical schools contacted, 53 schools (32%) had eligible students who completed the COP-SE survey in its entirety for a total sample size of 444 participants. Of

the 53 participating schools, 9 (17%) were osteopathic and 44 (83%) were allopathic. Table 4.1 presents the demographics of students.

**Table 4.1. Participant demographics of a nationwide sample of first, second, third, and fourth year medical students (n=444) taking the Childhood Obesity Prevention Self-efficacy (COP-SE) survey**

Characteristic	Number of students	Percent of students
Gender		
Female	324	73%
Male	120	27%
Type of medical school attended		
Allopathic	368	83%
Osteopathic	76	17%
Medical school year		
First	158	36%
Second	117	26%
Third	118	27%
Fourth	51	11%

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**Table 4.1 Continued**

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Intended specialty		
Family Medicine	92	21%
Internal Medicine-Pediatrics	45	10%
Pediatrics	119	27%
Undecided	188	42%
Completed pediatrics rotation		
Yes	108	24%
No	336	76%
Hold or currently pursuing another graduate degree		
Yes	85	19%
No	359	81%

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The majority of students who completed the survey were from allopathic medical schools ( $n=368$ ; 83%) and were female ( $n=324$ ; 73%). Roughly equal numbers of second year ( $n=117$ ; 26%) and third year medical students ( $n=118$ ; 27%) medical students completed the survey, with more first year ( $n=158$ ; 36%) and fewer fourth year students ( $n=51$ ; 11%). Most students were undecided ( $n=188$ ; 42%) or planning to specialize in Pediatrics ( $n=119$ ; 27%). Approximately one-fourth of students had completed their Pediatrics rotation ( $n=108$ ; 24%), and 19% ( $n=85$ ) were pursuing or had already completed another graduate degree.

## Factor analysis

The KMO statistic of 0.945, classified as “superb,” confirmed that the sample size was adequate for the factor analysis, and a significant Bartlett’s test of sphericity confirmed that the correlation matrix was significantly different from zero.<sup>160</sup>

The exploratory factor analysis revealed a two-factor structure with 10 items in Factor 1 and 8 items in Factor 2 (Table 4.2). In addition to factor loadings, Table 4.2 lists both initial and extraction communalities for each item, indicating the effect of the oblique rotation on the factors.

**Table 4.2. Pattern matrix for Principal Axis Factoring factor analysis with Promax oblique rotation of the two factor solution of items in the Childhood Obesity Prevention Self-efficacy (COP-SE) survey, n=444**

Item [I am confident I can ...] <sup>a</sup>	Factor 1 factor loadings	Factor 2 factor loadings	Communalities		Item mean (SD)
			Initial	Extraction	
29. Describe to an obese child what a healthy diet should include.	0.893		0.687	0.698	4.16 (0.70)
32. Describe to an obese child’s family how to choose healthy foods to consume.	0.870		0.689	0.718	4.06 (0.75)
34. Describe to an obese child how to choose healthy snack alternatives.	0.844		0.738	0.727	4.11 (0.75)

<b>Table 4.2 continued</b>					
37. Describe to an obese child's family members how to choose healthy snack alternatives.	0.817		0.702	0.694	4.06 (0.77)
35. Describe to an obese child's family members how to increase fruit and vegetable consumption.	0.817		0.735	0.729	4.09 (0.79)
25. Describe to an obese child how to choose healthy foods to consume.	0.798		0.671	0.679	4.03 (0.73)
2. Describe to an obese child's family members what a healthy diet should include.	0.751		0.547	0.518	4.13 (0.76)
38. Discuss the health impacts of obesity with an obese child's family members.	0.722		0.606	0.601	4.12 (0.78)
13. Describe to an obese child how to increase fruit and vegetable consumption	0.710		0.552	0.549	4.12 (0.75)
14. Discuss with an obese child's family members the benefits of making lifestyle changes	0.620		0.567	0.517	4.16 (0.77)
16. Determine if an obese child is ready to make lifestyle changes.		0.875	0.625	0.624	3.23 (0.98)
28. Use motivational interviewing to guide an obese child to make lifestyle changes.		0.854	0.763	0.683	3.40 (1.02)
41. Determine if an obese child's family members are ready to make lifestyle changes.		0.830	0.727	0.659	3.50 (0.94)

<b>Table 4.2 continued</b>					
27. Determine if an obese child recognizes they need to make lifestyle changes.		0.778	0.671	0.644	3.56 (0.96)
36. Determine if an obese child's family members recognize they need to make lifestyle changes.		0.725	0.744	0.640	3.67 (0.92)
30. Counsel an obese child's family members in a way that helps them overcome barriers to change.		0.703	0.695	0.642	3.50 (0.98)
8. Use motivational interviewing to guide an obese child's family member to make lifestyle changes.		0.703	0.674	0.545	3.46 (1.04)
24. Counsel an obese child in a way that helps them overcome barriers to change.		0.655	0.591	0.536	3.37 (1.00)

<sup>a</sup> Ranked on a 5-pt Likert scale: 1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

The correlation between Factor 1 and Factor 2 was 0.637, indicating that the two factors were correlated but not too highly correlated to result in a one-factor solution. Items that loaded on Factor 1 related to self-efficacy in nutrition counseling specifically while items that loaded on Factor 2 related to self-efficacy to assess readiness to change and to initiate nutrition lifestyle changes.

### **Reliability assessment**

A Cronbach's alpha of 0.946 and 0.947 for Factor 1 and Factor 2, respectively, indicated high internal consistency within each factor (Table 4.3).

**Table 4.3. Descriptive statistics for the two factors in the Childhood Obesity Prevention Self-efficacy (COP-SE) survey, n=444**

	No. items	Mean score	SD	Cronbach's alpha
Factor 1: Self-efficacy in providing nutritional counseling	10	4.10	0.62	0.946
Factor 2: Self-efficacy in assessing readiness and initiating nutritional lifestyle change	8	3.46	0.80	0.927

### **Concurrent validity**

The correlation between the NGSE and the COP-SE was 0.648 and was significant at the 0.01 level. As expected, this indicates that the COP-SE is a valid assessment of self-efficacy but not a measurement of general self-efficacy.

### **Demographic analysis**

As a whole, the mean score for items in Factor 1 was higher than Factor 2 (Table 4.3). This same trend was seen across all demographic groups (Table 4.4).

No significant differences were seen between males and females on either Factor 1 or Factor 2. For Factor 1, osteopathic students tended to score higher than allopathic students; however, there was no significant difference. For Factor 2, osteopathic students scored significantly higher than allopathic students ( $t=-2.31$ ,  $df=442$ ,  $p=.02$ ,  $r=.11$ ).

**Table 4.4. Mean scores (SD) for medical student demographic groups on each factor in the Childhood Obesity Prevention Self-efficacy (COP-SE) survey**

<b>Characteristic</b>	<b>Factor 1: Self-efficacy in providing nutritional counseling</b>	<b>Factor 2: Self-efficacy in assessing readiness and initiating nutritional lifestyle change</b>
All subjects ( <i>n</i> =444)	4.10 (0.62)	3.46 (0.80)
<b>Gender</b>		
Male ( <i>n</i> =120)	4.10 (0.60)	3.51 (0.74)
Female ( <i>n</i> =324)	4.11 (0.63)	3.44 (0.82)
<b>Type of medical school</b>		
Allopathic ( <i>n</i> =368)	4.08 (0.61)	3.42 (0.78)
Osteopathic ( <i>n</i> =76)	4.21 (0.64)	3.65 (0.84)
<b>Medical school year</b>		
First ( <i>n</i> =158)	3.99 (0.69)	3.33 (0.81)
Second ( <i>n</i> =117)	4.03 (0.62)	3.38 (0.87)
Third ( <i>n</i> =118)	4.22 (0.50)	3.60 (0.69)
Fourth ( <i>n</i> =51)	4.34 (0.53)	3.73 (0.73)
<b>Intended specialty</b>		
Family Medicine ( <i>n</i> =92)	4.20 (0.59)	3.63 (0.91)
Internal Medicine-Pediatrics ( <i>n</i> =45)	4.08 (0.66)	3.49 (0.84)
Pediatrics ( <i>n</i> =119)	4.21 (0.57)	3.56 (0.73)
Undecided ( <i>n</i> =188)	3.99 (0.64)	3.31 (0.75)

A trend of increasing scores was seen across the four medical school years with first years scoring the lowest and fourth years scoring the highest. For Factor 1, significant differences were seen between students in years 1 and 3 ( $t=-3.07$ ,  $df=274$ ,  $p<.001$ ,  $r=.18$ ); years 1 and 4 ( $t=-3.32$ ,  $df=207$ ,  $p<.001$ ,  $r=.22$ ); years 2 and 3 ( $t=-2.59$ ,  $df=233$ ,  $p=.01$ ,  $r=.17$ ); and years 2 and 4 ( $t=-3.11$ ,  $df=166$ ,  $p<.001$ ,  $r=.23$ ). There were no significant differences between years 1 and 2 or years 3 and 4. Similar results were seen for Factor 2, with significant differences being seen between students in years 1 and 3 ( $t=-2.92$ ,  $df=274$ ,  $p<.001$ ,  $r=.17$ ); years 1 and 4 ( $t=-3.14$ ,  $df=207$ ,  $p<.001$ ,  $r=.22$ ); years 2 and 3 ( $t=-2.15$ ,  $df=233$ ,  $p=.03$ ,  $r=.14$ ); and years 2 and 4 ( $t=-2.51$ ,  $df=166$ ,  $p=.01$ ,  $r=.19$ ). There were also no significant differences between years 1 and 2 or years 3 and 4 for Factor 2.

For Factor 1, those intending to specialize in Family Medicine scored significantly higher than Undecided students ( $t=2.64$ ,  $df=278$ ,  $p=.01$ ,  $r=.16$ ) and those intending to specialize in Pediatrics scored significantly higher than Undecided students ( $t=3.06$ ,  $df=305$ ,  $p<.001$ ,  $r=.17$ ). Similar results were seen for Factor 2 with those intending to specialize in Family Medicine scoring significantly higher than Undecided students ( $t=3.12$ ,  $df=278$ ,  $p<.001$ ,  $r=.18$ ) and those intending to specialize in Pediatrics scoring significantly higher than Undecided students ( $t=2.87$ ,  $df=305$ ,  $p<.001$ ,  $r=.16$ ). No other significant differences were seen in specialty.

## **Discussion**

In this study we attempted to create a valid and reliable survey to assess medical students' self-efficacy for childhood obesity-specific prevention and treatment counseling skills, resulting in the 18-item COP-SE survey. The final factor structure of the COP-SE

survey included two dimensions: (1) Self-efficacy in nutrition counseling and (2) Self-efficacy to assess readiness to change and to initiate nutrition lifestyle changes. While the two subsets of skills are correlated, they are distinct. Factor 1 requires medical students to have specific nutrition knowledge, while Factor 2 relates more to the students' comfort with general tenets of behavior change counseling theories related to nutrition. Reliability analysis confirmed high rates of internal validity for both factors. Validity checks were used for content and face validity in the development of the survey. A test of concurrent validity with the NGSE confirmed that the COP-SE is a valid assessment of domain-specific self-efficacy. A moderate correlation between the two factors indicates that the COP-SE measures a construct similar to the NGSE. Because the NGSE is a general self-efficacy survey and the COP-SE is domain-specific, it would be expected that the two are not highly correlated.

Factor 1 (Self-efficacy in providing nutritional counseling) items relate to the basic understanding of nutrition behaviors. Items loading on this factor included describing diet-related topics like how to choose healthy foods and snacks, eat more fruits and vegetables, and what a healthy diet should include. This factor also included being able to discuss health impacts of obesity and benefits of making lifestyle changes. Factor 2 (Self-efficacy to assess readiness to change and to initiate nutritional lifestyle change), however, requires a more advanced skill related to nutrition behavior change counseling. These items included using motivational interviewing, determining when a patient recognizes that a change needs to occur, determining readiness to change, and helping patients overcome barriers to change.

It is logical that students scored higher on Factor 1 than Factor 2 as more advanced counseling techniques require more practice and skill. Our previous qualitative exploration of medical students' needs to prevent and treat childhood obesity indicated that students feel inadequate in their nutrition knowledge and counseling skills and would benefit from additional training.<sup>156</sup> This inadequacy is also confirmed by moderate scores on Factor 1 (the nutrition-specific counseling techniques).

There were no significant differences in gender despite previous studies that have found that males report higher social sciences academic self-efficacy, of which behavior change counseling is a subset,<sup>162</sup> and female physicians tend to score higher on counseling self-efficacy<sup>37,163</sup> which Lowenstein et al. (2013) propose may be because female physicians tend to spend longer with patients than male physicians.<sup>163</sup> Additionally, osteopathic students scored significantly higher than allopathic students on Factor 2 only, which could be explained by the emphasis of holistic whole-body healthcare by osteopathic medical schools<sup>52</sup> and potentially more practice with behavior change counseling as a result.

We saw statistically significant differences between years 1 and 3, years 2 and 3, years 1 and 4, and years 2 and 4 on both Factor 1 and Factor 2. These differences in self-efficacy follow a natural progression of acquisition of knowledge. It can be assumed that first year medical students feel less confident in providing nutritional advice and counseling because they had not yet learned what advice to give and best practices in counseling. Medical schools typically provide students with the majority of nutrition instruction during their first two years,<sup>67</sup> but students may not feel efficacious until they have a chance to master skills instead of learning vicariously in the classroom.<sup>93</sup> Furthermore, only roughly a

quarter of students had completed their Pediatric clerkship where they would typically be able to practice these techniques, even if not in a standardized way.<sup>67</sup> It is important to note that we did not see significant differences between years 1 and 2 and years 3 and 4, indicating that self-efficacy changes can likely be attributed to the progression from didactic to clinical training.

While most self-efficacy did not differ across most specialties, we did see a statistically significant difference between students intending to specialize in Family Medicine and those who were Undecided, with those planning to specialize in Family Medicine rating their self-efficacy as higher than the Undecided students. The same trend was seen between students intending to specialize in Pediatrics and those who were Undecided. This could have been because students do not tend to choose a specialty until their third year of medical school, following the same differences seen by medical school year. This trend could also be because many medical students change their intended specialty over the course of medical school.<sup>164</sup> It is also possible that these Undecided students may not actually pursue careers where they will work with obese children, perhaps leading them to focus less effort on learning nutrition behavior change counseling techniques for Pediatrics.

While the COP-SE is a valid and reliable survey, the factor structure needs to be confirmed by a large nationwide sample of medical students of all intended specialties. This confirmatory factor analysis would confirm the structure in the medical school population as a whole, which could lead to widespread use of the survey in medical education. Because the survey is self-report, it does not measure actual skills of students, only their perceived self-

efficacy. Therefore, a performance assessment would be useful to compare self-efficacy to actual performance of skills. Additionally, there could have been a social desirability response in which students believed they should be confident in these skills and therefore rated themselves higher than their actual self-efficacy or skill level. This is a limitation common in self-report measures; however, we followed a rigorous methodology to limit this effect.

### **Conclusions**

The COP-SE is a valid and reliable survey that could be used to assess self-efficacy in childhood obesity-specific counseling practices. Future research should involve the confirmation of the factor analysis through a large nationwide sampling of medical students of all intended specialties. It is our hope that medical schools will start to use this valid and reliable instrument to assess their students' self-efficacy in counseling skills to inform future curricular changes or as a pre-post measure of self-efficacy to evaluate the effectiveness of their training programs.

## **CHAPTER 5: SUMMARY, CONTINUED WORK, FUTURE RESEARCH, AND CONCLUSIONS**

### **A qualitative assessment of pre-healthcare undergraduates' perceptions of childhood obesity to inform premedical curricular changes**

#### **Summary**

The purpose of this study was to determine pre-healthcare undergraduate seniors' views of childhood obesity and their sources of knowledge. Results confirmed that the more knowledgeable students had taken specialized coursework and/or participated in significant volunteer/internship experiences, exposing them to the complexity of childhood obesity. These sources of knowledge are important for premedical programs to consider as they can use specialized coursework and service-learning opportunities as vehicles for incorporating the newly-required social and behavioral sciences while teaching about the complexity of disease prevention and treatment (e.g. childhood obesity). Teaching students about the complexity of prevention and treatment, specifically healthcare providers' role, could help reverse the trend seen in this research (that even the most knowledgeable students failed to see healthcare providers' role in prevention and treatment). With these curricular adaptations, students may be better prepared for the MCAT 2015® and subsequently, medical school. Additionally, these changes would be the first step in equipping future healthcare providers to apply the behavioral and social sciences to disease prevention and treatment.

## **Future work**

The study outcomes provide insight for premedical curricular changes; however, it is unclear if there is a “right way” to adapt to the changes to the MCAT 2015®. Therefore, future investigations should explore the effectiveness of different models for incorporating the social and behavioral sciences into premedical education. One way to explore the effectiveness of these changes would be to identify premedical undergraduate institutions that either plan to or have already adapted to the MCAT 2015® changes. Investigators can classify premedical programs into categories: (1) traditional premedical programs, (2) programs with adapted introductory courses, (3) programs with newly-created specialized courses, and (4) programs with newly created service-learning courses. A representative sampling of students from each type of program could be interviewed to compare the knowledge of students in different types of programs. With this knowledge, investigators could make further recommendations about the effectiveness of premedical curricular changes. Another option is to target these programs as they are making changes and design an educational intervention complete with control group, using MCAT 2015® scores as the marker for effectiveness. This quantitative approach would also need to account for differences in students experiences outside of the intervention, which could complicate the research design. Both approaches, however, should be pursued with an understanding that not all premedical programs have the flexibility and resources to incorporate curricular changes in the same way, so these investigations would lead to recommendations, not absolute requirements.

## **Medical students' perceived educational needs to overcome barriers to preventing and treating childhood obesity**

### **Summary**

The purpose of this study was to determine medical students' knowledge of childhood obesity in medical school coursework and clinical rotations. Through conversations about the multifactorial nature of childhood obesity, students described student-, patient-, and healthcare system-centered barriers. Their frustration with limited nutrition education and behavior change counseling training in medical school left them feeling unprepared to help patients overcome barriers and to face healthcare-system barriers like limited time. As a result, they failed to clearly describe their role in prevention and treatment. However, while they expressed dissatisfaction with aspects of training, students listed clear changes that could be made to help overcome barriers, including applicable nutrition knowledge and counseling training through observation and practice. Given students' lack of self-efficacy in preventing and treating childhood obesity, medical schools should seek ways to better incorporate nutrition education and behavior change counseling into medical school curricula. Much like the proposed changes to premedical curricula, there appears to be no one way to incorporate these changes, however, it is clear that they should involve a combination of knowledge, observation of skills (e.g. role modeling), skills practice, and expert and/or patient feedback. With increased self-efficacy in nutrition knowledge and nutrition behavior change counseling, future physicians will be better equipped to play a role in preventing and treating childhood obesity.

### **Continued work**

Given the number of questions asked of third and fourth year medical students, this study resulted in an extensive data set. Due to timing, this dissertation only explores student-perceived barriers and needs. Another manuscript, tentatively titled “*Medical students’ definitions of childhood obesity – should they differ?*” will be written to describe medical students’ varying definitions of childhood obesity and potential implications in diagnosis, prevention, and treatment.

### **Future work**

Results from this study, like the premedical study, provide justification for medical curricular changes. As medical schools make these changes, future investigations should explore the effectiveness of these curricular changes. Investigators can use the forthcoming results of the survey assessing the current state of nutrition education in medical schools<sup>72</sup> to classify medical schools into groups based on the number of hours of nutrition education they provide as well the type of instruction. The COP-SE can be used to measure a representative sampling of students from each group of medical schools, shedding further light on the effectiveness of varying levels of nutrition education.

Investigators may also partner with medical nutrition education experts seeking to make curricular changes and both qualitatively and quantitatively assess students’ self-efficacy as a result of different ways programs incorporate nutrition into curricula. With this knowledge, medical administrators may choose be able to make recommendations for different approaches or create a unified approach to better incorporating nutrition education and behavior change counseling into their curricula.

## **The development and validation of the Childhood Obesity Prevention Self-efficacy (COP-SE) survey**

### **Summary**

The purpose of this study was to develop and validate a computerized tool to assess medical students' self-efficacy in preventing and treating childhood obesity. The two-factor Childhood Obesity Prevention Self-efficacy (COP-SE) survey was the result. Factor 1 (Self-efficacy in providing nutritional counseling) had a high internal reliability (0.946), and Factor 2 (Self-efficacy in assessing readiness and initiating nutritional lifestyle change) also had a high internal reliability (0.927). The correlation between the two factors was 0.637, indicating they are related but distinct. The correlation between the COP-SE and a generalized self-efficacy survey (0.648) also indicated related topics but distinct measures. Therefore, the result of this survey was a valid and reliable survey that can be used by medical schools as a formative or summative assessment of students' self-efficacy in childhood obesity prevention and treatment.

### **Future work**

While this study resulted in a valid and reliable assessment tool, future investigations should confirm the two-factor structure through an extensive nationwide sample of medical students. Once the factor structure is confirmed, the COP-SE survey can then be validated in different populations including premedical students, residents, and practicing physicians. Of note, the COP-SE is a survey that is very specific as it relates to childhood obesity-specific counseling skills; however, the survey may be adapted to measure self-efficacy in counseling skills for other diseases/health conditions but would require further validation.

## **Research significance & general conclusions**

This dissertation entitled, “*Assessing future healthcare providers’ views of childhood obesity to inform premedical and medical curricular changes,*” adds to the understanding of premedical and medical students’ views of childhood obesity and provides justification and recommendations for changes to both premedical and medical curricula. Through two qualitative explorations, one in undergraduate pre-healthcare seniors and the other in third and fourth year medical students, investigators determined the current state of students’ views of childhood obesity. This subject, previously lacking in the literature, provides an understanding of students’ viewpoints.

There were two major outcomes of this dissertation research: (1) Suggestions for premedical and medical curricular changes and (2) The COP-SE survey: A valid and reliable measure of medical students’ self-efficacy in childhood obesity prevention and treatment.

### **Suggestions for premedical and medical curricular changes.**

Results from both studies surfaced that, unfortunately, students do not see the role of healthcare providers in preventing and treating childhood obesity. Given this, premedical and medical programs need to describe this role in detail to students. Other than overtly telling students how they can prevent and treat childhood obesity, programs need to provide students with knowledge and skills to succeed in their role. This should begin in undergraduate education by equipping students with knowledge of the social and behavioral determinants of health in a social ecological context. Nutrition should be incorporated into this education because it is an important component of disease prevention and treatment.<sup>35</sup> Other changes to premedical programs may include development of service-learning courses

that combine coursework with relevant service in the community and guided reflection by experienced faculty. With this model, premedical students may be better equipped for medical school. Medical curricular changes should mirror that of the premedical changes, highlighting the role of physicians in disease prevention and treatment. With a foundation of knowledge of nutrition and the behavioral and social sciences, future medical students would begin medical school prepared to receive more in-depth training on applicable nutrition education and behavior change counseling training, as requested by the medical students in this investigation. Ultimately, medical students' self-efficacy would be expected to increase, allowing them to overcome barriers they reported in this study.

**The COP-SE: A valid and reliable measure of medical students' self-efficacy in childhood obesity prevention and treatment.**

This 18-item survey measures two components of self-efficacy, basic nutrition counseling skills and the more in-depth nutrition counseling skills. This survey can be used by medical schools to assess the effectiveness of curricular changes we propose in this study.

In summary, the findings of this dissertation can be used by education specialists at undergraduate and medical school institutions to leverage curricular changes and to measure the impact of those changes. With curricular changes, there is the hope that the physicians can play a more significant role in helping patients make lifestyle changes to prevent and treat childhood obesity.

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## APPENDICES

Appendix A. Study 1 Recruitment E-mail

Subject: POINT OPPORTUNITY: Senior Pre-Healthcare Students to Discuss Their Views on Childhood Obesity

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Hello-

I am looking for seniors who plan to pursue careers in healthcare in the future to help me with my dissertation. (Ex – medicine, nutrition counseling, psychiatry, social work, etc.) As future healthcare providers, I want to hear your viewpoints on childhood obesity. Please e-mail me, Natalie Cooke nkcooke@ncsu.edu, if you would be willing to participate in a 30-60 minute interview. If you are interested in helping us learn more about what future healthcare providers think about childhood obesity, please provide us with the following information:

Name:

Major:

Minor:

Age:

Classification:

Brief statement about your career goals in healthcare (e.g. what do you want to do when you grow up? ☺ )

You will receive one Pre-Health Club point for your participation in this interview. I look forward to hearing from you!

Sincerely,  
Natalie K. Cooke

Appendix B. Study 1 Consent Form

**North Carolina State University**  
**INFORMED CONSENT FORM for RESEARCH**

Title of Study: Undergraduate Student Views on Childhood Obesity

Principal Investigator: Natalie Cooke

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**What are some general things you should know about research studies?**

You are being asked to take part in a research study. Your participation in this study is voluntary. You have the right to be a part of this study, to choose not to participate or to stop participating at any time without penalty. The purpose of research studies is to gain a better understanding of a certain topic or issue. You are not guaranteed any personal benefits from being in a study. Research studies also may pose risks to those that participate. In this consent form you will find specific details about the research in which you are being asked to participate. If you do not understand something in this form it is your right to ask the researcher for clarification or more information. A copy of this consent form will be provided to you. If at any time you have questions about your participation, do not hesitate to contact the researcher(s) named above.

**What is the purpose of this study?**

We want to determine student viewpoints of childhood obesity, specifically seniors who plan to pursue a career in the healthcare field. This information will be used to develop a survey to assess student understanding of childhood obesity.

**What will happen if you take part in the study?**

If you agree to participate in this study, you will be interviewed and asked questions related to what you know about childhood obesity. We anticipate the interview will last 30 minutes to 1 hour. We will take notes and record the interview session. The interview will be held in a private place, such as a conference room or small classroom at NCSU. If a private place is not available at NCSU, public facilities will be used (e.g., the local public library or community center).

**Risks**

We will ask you questions related to your views of childhood obesity. This process may make you uncomfortable by sharing personal experiences and feelings with an interviewer. You are free to not answer any questions that you do not wish to answer.

**Benefits**

You will not receive direct benefits from participating in this project. However, we expect that project findings will be used to develop a survey to assess future students' viewpoints of

childhood obesity. Eventually we hope to use this information to improve the quality of education future healthcare providers at NCSU receive.

### **Confidentiality**

The information in the study records will be kept confidential. Data will be stored electronically on the departmental server and the Principal Investigator's research computer. All computers and servers are password protected and available only to authorized personnel. Hard copies of interview transcripts will be kept in locked file cabinets in a lock room in Schaub Food Science Building. Within ten years after the conclusion of professional development study, the digital recordings will be erased. No reference will be made in oral or written reports which could link you to the study.

### **Compensation**

If you are a member of the Pre-Health Club, then you will receive one club point for your participation in the research study. If you choose not or unable to participate in the research study, there are various other ways to receive a club point. The Pre-Health Club will not penalize you for not participating in this study. If you wish to receive a Pre-Health Club point for your participation, you will need to sign the accompanying point waiver. This waiver allows us, the researchers, to provide your name to the Pre-Health Club as a participant in this study. The Pre-Health Club advisor will not know what you said in the interview, just that you participated in the interview.

### **What if you are a NCSU student?**

If you are taking a course taught by Dr. Suzie Goodell or Natalie Cooke, neither of them will hear the interview until after you have completed their courses. Your data will be assigned an ID number and your name will be removed from the transcript of your interview, so that Dr. Goodell and Natalie will be able to read the reports from the interviews and discuss outcomes with the interviewer without knowing your identity. Participation in the project or refusal to participate in the project will not impact your academic standing.

### **What if you have questions about this study?**

If you have questions at any time about the study or the procedures, you may contact the researcher, Natalie Cooke, at 218 Schaub Food Science Building, NC State University, or [XXX-XXX-XXXX].

### **What if you have questions about your rights as a research participant?**

If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Deb Paxton, Regulatory Compliance Administrator, Box 7514, NCSU Campus (919/515-4514).

**Consent To Participate**

*"I have read and understand the above information. I have received a copy of this form. I agree to participate in this study with the understanding that I may choose not to participate or to stop participating at any time without penalty or loss of benefits to which I am otherwise entitled."*

**Subject's signature** \_\_\_\_\_ **Date** \_\_\_\_\_

**Investigator's signature** \_\_\_\_\_ **Date** \_\_\_\_\_

Appendix C. Study 1 Pre-Health Club Point Waiver

**North Carolina State University  
PRE-HEALTH CLUB POINT WAIVER**

Title of Study: Undergraduate Student Views on Childhood Obesity  
Principal Investigator: Natalie Cooke

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*Dr. Flick will be informed of your participation in this study so that you may receive one Pre-Health Club point. She will only be informed of your name and will not be told any of the information discussed during the research interview.*

*Should you choose to withdraw from the research study at any time, you will still receive a Pre-Health Club point for your participation, and Dr. Flick will only be informed of your name, not that you withdrew from the research study.*

*I agree to the above stated.*

**Subject's signature** \_\_\_\_\_ **Date** \_\_\_\_\_  
**Investigator's signature** \_\_\_\_\_ **Date** \_\_\_\_\_

-----  
(cut here)

Dr. Flick,

\_\_\_\_\_ participated in the research study "Undergraduate Student Views on Childhood Obesity" as a Pre-Health Club point opportunity.

Thank you,

Interviewer/Researcher \_\_\_\_\_

Date \_\_\_\_\_

## Appendix D. Study 1 Moderator Guide

### **1. Opening**

- A. (Introductions) *My name is \_\_\_\_\_, and I...* (brief introduction: Example: am a first year doctoral student in Nutrition Sciences. I just graduated from NCSU in May.)
- B. (Purpose) The purpose of this study is to see what you think about childhood obesity. I will ask you questions about the causes and prevention of childhood obesity. We want to hear what you have to say because you are a senior hoping to have a career in healthcare. If you do not feel comfortable answering a question, please let me know, and I will continue to the next question.
- C. (Confidentiality) I will not share any information from our interview with others except those working on this research project. That includes Dr. Goodell, Natalie Cooke, Kelsey Wilson, and Emily Bissett. If you are currently enrolled in a course taught by Dr. Goodell or Natalie, they will not hear this interview until after you have been given your final grade, so participating in this interview will NOT affect your academic standing.
- D. (Use of audio recorder) I would like to use an audio recorder during the interview session so that I can refer back to the interview when I write the report. Do you mind recording this interview session?
- a . (NO) Thank you! (Start recording) If you feel uncomfortable with being recorded, please let me know at any time. This audio recording and transcription of the recording will be destroyed at a future date to assure your anonymity.
- b . (YES) OK. Can we still talk and I can take notes while we are talking?
- E. (Timeline) The interview should take about 30 minutes to an hour. Do you have any questions before we begin? If not, please read and sign the consent form.

### **2. Demographic Information**

*Now that I've told you a little bit about me, let me ask a few questions about you:*

1. *What are you majoring in? Do you have any minors?*
2. *How many semesters have you completed? What is your year classification?*
3. *What are your career plans?*

### **3. Interview**

1. *Describe an obese child.*

Probe: *What do they look like?*

Probe: *How do they act?*

Probe: *Is there anything different between a “normal weight” child and an “obese” child?*

Probe: *Can you think of anything else?*

2. *What leads to childhood obesity? Who contributes to the cause? (Can repeat the first or second part of the question if needed)*

Probe: *Can you think of anything else?*

Probe: *Think of your past experiences.*

3. *What are the consequences of childhood obesity?*

Probe: *Can you think of anything else?*

Probe: *Think of your past experiences.*

4. *What should or can be done to prevent childhood obesity, if anything?*

Probe: *Can you think of anything else?*

Probe: *Think of your past experiences.*

5. *You’ve told me a lot of great information. I’d like to know a little bit more about how you knew all of this. Can you please tell me, where did you learn the information you shared with me today?*

Probe: *Where did you learn how to describe an obese child?*

Probe: *Where did you learn the causes of childhood obesity?*

Probe: *Where did you learn about the prevention of childhood obesity?*

Probe: *Is there anywhere else you might have learned this information?*

#### **4. Interviewer Feedback**

*Based on my notes, I hear that you are saying that:*

[discuss key concepts surfaced by the interviewee]

*Is that correct?*

*Is there anything else you would like to add?*

#### **5. Demographic Info (Continued)**

*I would like to ask a few more questions:*

- a. How would you classify your race? For example, African American, Asian, White, etc.*
- b. What is your age?*
- c. Have you taken NTR 301 or any other introductory nutrition course? If so, who was your instructor?*

#### **6. Closing**

Thank you for talking with me today! We appreciate your help. I hope you have a great rest of the day!

## Appendix E. Study 1 Coding Manual

### **How to use this coding manual:**

#### Purpose:

The purpose of this coding manual is to analyze transcripts of qualitative interviews of undergraduate pre-healthcare seniors' viewpoints of childhood obesity. This coding manual is designed to highlight areas of knowledge expressed in qualitative interviews.

Transcripts of each individual interview are loaded into the NVivo software, and the codes listed in this manual are programmed into the NVivo program.

#### Codes:

The codes listed in the manual are organized by each question asked in the interview process. Use the definitions to appropriately determine the subject of the quote you are analyzing.

#### Overlapping Codes:

Some quotes may contain more than one code. For example:

“When I was little, my mom used to make me eat spinach, but I hated it. I snuck cookies and candy when she wasn’t looking, and I started gaining weight.”

This quote would be coded as “causes - family” and “causes - diet.”

#### Off-topic:

Due to the nature of the interview, the subject may give the answer to a later question when answering the current question. For example, during the description of an obese child, they may discuss that the child is picked on. This is a description as well as a consequence. This would be coded as “describe – personality/psychological tendencies” and “consequences – mental/emotional/psychological.”

#### Process of Coding:

Code the entire statement, not just the sentence in which the code is found. If the statement does not stand alone, include the “probe question” in the coding.

#### General Precautions:

In “Sources” as well as “Describe”, make sure to ask, is this answering another questions as well – i.e. – could this also be coded as “Cause”, “Consequence”, or “Prevention”?

Make sure to ask yourself: “Is this statement talking about what leads to childhood obesity or what prevents childhood obesity?” For example, if the person begins to describe a healthy

diet in “causes” by the nature of the conversation, make sure to code this as “Prevention – Diet” instead of “Cause – Diet,” even though it was said following the “What leads to childhood obesity?” question.

If the student is talking about an internship/volunteer experience, code the entire statement as “Source – Classes/Extracurricular Activities”, not just when they mention the experience.

#### Marking great quotations:

Is this a good quote? If so, you can insert a “comment” into the transcript in NVivo for use during the analysis process.

### **Description of an Obese Child**

**This section of codes corresponds to the first question asked during the interview. “Describe an obese child.” The purpose of this question is to have the senior describe both how the child might look or how they might act. This is a “warm-up” question to the topic.**

#### Describe - Activity

*Definition: Level, desire, and ability to move.*

(Examples: Sedentary, Lack of activity, Flushed, Breathing problems, Lack of desire to play outside, Lazy, Prefer inside activities)

#### Describe - Diet

*Definition: Anything pertaining to what the child eats or how the child thinks about food.*

(Examples: Food, Focus on food, Appetite, Junk food, Dieting)

#### Describe - Family Influences

*Definition: How the family (parents, siblings, grandparents, aunts, uncles, cousins) and others’ (friends) interactions affect the child*

(Examples: Eat what parents eat, Obese family members)

#### Describe – Other

*Definition: Any descriptions that do not fall under the other headings.*

#### Describe - Personality/Psychological Tendencies

*Definition: Traits pertaining to mental condition*

(Examples: Stubborn, Ignorant, Low self-esteem, Lack of self-discipline, Picked-on, Lazy, Lethargic, Comfortable or uncomfortable with weight)

### Describe - Physical Description

*Definition: Details about outward, visual characteristics, internal health problems, and ethnicity/race.*

(Examples: Size, Structure, Height, Cheeks, Calves, Ankles, Arm Weight, Thighs, Neck, Stomach, Body Mass Index, Age, Fat vs. muscle proportion, Pear-shaped, Heart Problems, Ethnicity/Race)

### Causes

**This section of codes corresponds to the second question asked during the interview: “What leads to childhood obesity? Who contributes to the cause?” The purpose of this question is to have the subject describe what the causes of childhood obesity are. These causes can either be individuals like parents or concepts like income level.**

#### Cause - Diet

*Definition: Anything pertaining to what the child eats and what the mother eats during pregnancy*

(Examples: Sugar, Fat, Southern cooking, Fast Food, Processed Food, Corn Syrup, Portion control, Caloric intake, Diet during pregnancy)

#### Cause - Economy/Socioeconomic Status

*Definition: Pertaining to the financial state of the family and whether or not the parents are employed or not. Also pertaining to the monetary state of the nation including prices of commodities and government allocations of spending.*

(Examples: Price of Food, Parents can't afford children, Low-income, Cutting program funds, High gas prices, Cheap)

#### Cause - Education

*Definition: Anything related to transfer of knowledge from one individual to another, both formal and informal.*

(Examples: Lack of education)

#### Cause - Environment

*Definition: The community in which the child lives. This community does not include the family/home environment but rather the child's surroundings outside of the home).*

(Examples: Playgrounds, Neighborhood, Not safe/dangerous community)

#### Cause - Family

*Definition: Characteristics about the family; how the family (parents, siblings, grandparents, aunts, uncles, cousins) affects the child; and anything pertaining to the home environment.*

(Examples: Feeding; Messages; Teaching; Parents working multiple jobs; Role Model; Parents rely on school and government for nutrition, nutrition education, and physical activity; Pressure to finish plate; Single parent; Modeling – eating or physical activity)

#### Cause - Food Industry

*Definition: Businesses that develop and supply food for the public and the foods they produce. Not marketing.*

(Examples: Processed foods, chemicals, control of food)

#### Cause - Genetics

*Definition: Inherited traits of the child, not learned*

(Examples: Genes, Height, **Pre-disposed** lower metabolism, Evolutionary)

#### Cause - Health Problems

*Definition: Any health related issue that may affect weight status*

(Examples: Metabolism, Thyroid disorders)

#### Cause - Media

*Definition: Any form of public communication*

(Examples: Television, Marketing)

#### Cause – Other

*Definition: Any causes that do not fall under the other headings.*

#### Cause - Peer Influence

*Definition: How individuals close to the child's age affect the child's decisions – NOT family members.*

(Examples: Peer influence, Role model)

#### Cause – Physical Activity

*Definition – Lack of movement*

(Examples – Sedentary lifestyle, Video games, Lack of physical activity)

#### Cause - Psychological/Emotional

*Definition: Anything relating to the mind, personality, or the child's ability to cope*

(Examples: Personality, Eating as a Coping Mechanism)

#### Cause - Race and/or Culture

*Definition: People related by common heritage and/or the beliefs of a certain group of people*

(Examples: Specific race, Specific culture, Evolution, American living/way, Lifestyle, Time period)

### Cause - Schools

*Definition: Anything pertaining to the school environment*

(Examples: Lunch, Vending Machines, Parents don't know what kids eat, Physical Education)

### Cause - Time

*Definition: How time is prioritized*

(Examples: Convenience, Vending Machines, Fast Food, Time to exercise, Fast paced society)

## Consequences

**This section of codes corresponds to the third question asked during the interview: “What are the consequences of childhood obesity?” The purpose of this question is to have the subject describe what effects childhood obesity has on the child both during childhood and later in life.**

### Consequence - Behavioral

*Definition: How weight status affects their day-to-day life but NOT how behavior affects other people*

(Examples: Poor eating habits later in life)

### Consequence - Economic/Socioeconomic Status

*Definition: Pertaining to the financial state of the individual and any costs to the individual. Also pertaining to the allocation of government funds.*

(Examples: Government Spending, Healthcare, Future employment, Too big to fit)

### Consequence - Mental/Emotional/Psychological

*Definition: How weight status affects the mental state of the child*

(Examples: Poor Self Esteem, Picked on, Coping Mechanism, Marry someone like them, Trouble finding significant other, School Performance, Cognitive Ability)

### Consequence – Other

*Definition: Any consequence that do not fall under the other headings.*

### Consequence – Other People

*Definition: How obesity affects others around the individual, both family and society*

(Examples: Negative impact on the people around you, Society's view of normal weight, Stereotypes/judgments about obese people, effect on their children)

### Consequence – Physical/Health Problems

*Definition: Any health-related issue (both inward and outward) that is a result of the child's weight status*

(Examples: Diabetes, Heart Problems, Joint Problems, High blood pressure, Breathing problems, Shorter Life Span, Bariatric Surgery, Cancer, Cholesterol/Triglycerides, Adult Obesity, Lethargic, Decreased likelihood of surviving surgery, Physically can't fit)

### Prevention

**This section of codes corresponds to the fourth question asked during the interview: “What should or can be done to prevent childhood obesity, if anything?” The purpose of this question is to have the subject describe prevention of childhood obesity.**

#### Prevention - Access to Resources

*Definition: Availability of resources to lead a healthy lifestyle*

(Examples: Gardens, Information, Transportation, Physical Activity)

#### Prevention - Diet

*Definition: Anything pertaining to what the individual eats, but NOT related to education about diet*

(Examples: School Lunches, Healthy Options, Balanced Meal/Diet)

#### Prevention - Economy/Socioeconomic Status

*Definition: Pertaining to the allocation of government funds and how the family's money is spent.*

(Examples: Health Options for Low-income, Government Spending/Healthcare, Cost, Free Summer Camps)

#### Prevention - Education

*Definition: Anything related to transfer of knowledge from one individual to another, both formal and informal.*

(Examples: Parent, Child, Infant-Parent, Doctor's visit, Fun, Hands-on, Field Trips, School curriculum, After school programs, Government programs)

#### Prevention – Extracurricular Activities

*Definition – Any out of school activities, not team sports, that the child engages in*

(Ex – afterschool programs, music, art, Boys and Girls Club, YMCA)

#### Prevention - Family

*Definition: How the family (parents, siblings, grandparents, aunts, uncles, cousins) affects the child to lead a healthy lifestyle. NOT parent education.*

(Examples: Parent Encouragement, Model Physical Activity)

#### Prevention - Food Industry

*Definition: Businesses that develop and supply food for the public and the agencies that monitor those businesses*

(Examples: Healthy Options, Shift in public opinion, FDA)

#### Prevention - Media

*Definition: Any form of public communication*

(Examples: Healthy eating marketing)

#### Prevention – Mental/Emotional

*Definition: Anything pertaining to improving the mental state of the child*

(Ex – Increased self-esteem from sports, Empowered, “I feel smart”, Lifestyle changes)

#### Prevention – Other

*Definition: Any preventative measure that do not fall under the other headings.*

(Ex – Blanket statement: “healthy living”)

#### Prevention - Physical Activity

*Definition: Changes in level, desire, and ability to move.*

(Examples: Required physical activity, Video Games, Team Sports, Variety, After school programs)

### **Sources of Learning**

**This section of codes corresponds to the fifth and final question asked during the interview: “You’ve told me a lot of great information. I’d like to know a little bit more about how you knew all of this. Can you please tell me, where did you learn the information you shared with me today?” The purpose of this question is to have the subject list where they learned the information they shared.**

#### Sources – Classes/Extracurricular Activities

*Definition: Any course taken in high school or college, a specific teacher who taught one of the classes, or any internship/volunteer experience*

(Examples: Health/PE, College Health/PE, NTR 301 – Introduction to Nutrition, Nutrition NUTS, Pre-Health Club, Internships, “Talked about in class”, Class project)

#### Sources - Doctors

*Definition: Any information provided by healthcare providers including things doctors say and information given in written word.*

(Examples: Doctors, Nurses, Health Center, Health Education Pamphlets)

Sources – Family/Friends

*Definition: Anything pertaining to how the individual was raised, information given by family and guardians, and information from peers/conversations with peers.*

(Examples: Parents, Friends, Example from family experience growing up)

Sources - Media

*Definition: Any form of public communication*

(Documentary, News, Newspaper, TV, Online, Radio, Ad Council, Handouts/Pamphlets, Michelle Obama, Celebrities, Parenting Magazines)

Sources - Observations

*Definition: Anything the individual has **seen** in their environment but not had a direct interaction with*

(Examples: At the grocery store, Party City, State Fair)

Sources – Other

*Definition: Any sources that do not fall under the other headings.*

Sources - Scientific Knowledge

*Definition: Information backed-up by scientific studies*

(Examples: Journal articles)

Sources - Society and Culture

*Definition: Anything pertaining to the beliefs and behaviors of the community as a whole*

(Examples: American)

Sources – Uncategorized/Personal Experience

*Definition: Blanket statement of “personal experience” just related to the interview subject and their personal opinions.*

(Examples: Personal experience, Personal opinion)

## Appendix F. Study 2 Interview Protocol

### Schedule an interview:

1. Natalie will forward you an e-mail containing a filled-out medical student survey
2. E-mail the student within 24 hours of receiving the survey e-mail from Natalie. Use the standardized e-mail (“MSVCO\_Scheduling E-mail”) **Please CC Natalie ([nkcooke@ncsu.edu](mailto:nkcooke@ncsu.edu)) on all your e-mail communication.**
3. Locate a private room in your home or elsewhere (ex – library study room) where the interview will be conducted. Make sure nobody will overhear your conversation and nobody will interrupt you.
4. Once you have scheduled a time, e-mail a copy of the consent form (“MSVCO\_Consent Form”) to the student and ask them to read it beforehand. Be brief but informational in your e-mail, remembering med students don’t have a lot of time to spare.

### Before the interview:

1. Send a reminder e-mail 24 hours before the interview. Make sure they tell you what technology they would like to use: voice or video and Gmail, Skype, or iChat.
2. Make sure you have all the supplies you need for the interview:
  - a. “MSVCO\_Interview Guide”
  - b. “MSVCO\_Consent Form”
  - c. Audio recorder
  - d. Extra Battery
  - e. Folder with random ID number (get random number from folder in Dr. G’s office)
  - f. Sign for your door
  - g. Pens/ pencils/highlighter
3. Arrive to your interview location 30 minutes early.
4. If you’ll be conducting a video chat, please look respectable and make sure the background they will see looks clean.
5. Put a sign on your door saying “Do not disturb: Interview in progress”
6. Make sure your computer is plugged in, not running on battery.
7. Test that the audio recorder has enough battery and have additional battery ready
8. Test to make sure your speakers work and that the audio recorder can pick up the sound. Pull up a YouTube video and record the audio from the video. Play it back on the recorder to ensure you can hear it well.

9. Pull up Skype or Gmail Phone Chat and have it ready to call the phone number.

During the interview:

1. Start by typing: “Hello, \_\_\_\_\_. It’s \_\_\_\_\_. I just wanted to make sure now is a good time to call. Are you ready for me to call you?”
2. Follow the Interview Guide
3. Periodically check to make sure the audio recorder’s red light is blinking.

After the interview:

1. E-mail referral form (see “MSVCO\_Recruiting E-mail) and Virtual Ticket (get ticket from Natalie). CC Natalie on this e-mail.
2. Record in your notebook using the Initial Analysis Template (see “MSVCO\_Initial Analysis)
3. Follow the Data Collection Protocol (see “MSVCO\_Data Collection Protocol)
4. Follow the Transcription Protocol using the Transcript Template (see “MSVCO\_Transcription Protocol” and “MSVCO\_Transcript Template”)

Appendix G. Study 2 Recruitment E-mail

Subject: Looking for Third and Fourth Years to Discuss Their Views on Childhood Obesity

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Hello!

Are you interested in sharing your viewpoints on childhood obesity?

We are a team of researchers at NC State University in Raleigh, North Carolina who are conducting individual interviews with third and fourth year medical students across the nation. As a future doctor, we want to hear YOUR viewpoints on childhood obesity!

If you are interested in participating in a 30-60 minute phone interview, please fill out the info at the bottom of this e-mail and return it to Natalie Cooke [nkcooke@ncsu.edu](mailto:nkcooke@ncsu.edu).

For your participation in this project, your name will be entered in a raffle to win a \$100 Amazon gift card.

If you are interested in helping us learn more about what future doctors think about childhood obesity, please provide us with the following information:

Name:

Medical School:

Year:

Age:

Phone Number:

Days and times you would be most accessible for a 30-60 minute interview (including weekends):

How far along are you in your coursework?:

How far along are you in your clinical experience?:

I look forward to hearing from you!

Natalie Cooke

North Carolina State University

Appendix H. Study 2 Scheduling E-mail

Subject: Childhood Obesity Interview

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Hello!

My name is [INSERT NAME], and I am a researcher in the research team at NC State University talking to med students about their views of childhood obesity. Natalie Cooke gave me your name and e-mail address to schedule an interview.

I want to find a time that is most convenient given your busy schedule. The interview will take between 30-60 minutes, depending on how much you would like to share with me. I would ask that you set aside 15 minutes after the interview so that you do not feel rushed to get to your next engagement. Can you send me times you would be available for 1 hr and 15 minutes during the next week?

Days:Times:

This will be either a Gmail Chat or Skype interview, not an in-person interview. To make sure that you feel as comfortable as possible, I would ask that you find a private room where we can have this conversation. I will also be in a private room during our conversation. This ensures that nobody should overhear our conversation and your identity is kept confidential.

Are you able to find a private room for the time of our conversation? (Yes/No)

I can either call your phone via Gmail or Skype. Which do you prefer? We can either video chat or voice chat, whichever way you feel most comfortable. Do you prefer to talk via video chat or voice chat?

Gmail or Skype?:Video or Voice?:

I've attached a copy of the consent form for the study. Please take a chance to read over the consent form. We'll talk more about this before the interview begins. Please keep the consent form handy for when we talk.

Thank you again for agreeing to talk to me. I look forward to hearing from you!

Sincerely,  
[INSERT NAME]  
[e-mail address]

## Appendix I. Study 2 Consent Form

### North Carolina State University INFORMED CONSENT FORM for RESEARCH

Title of Study: Medical Student Views on Childhood Obesity

Principal Investigator: Natalie Cooke

Faculty Advisor: Dr. Suzie Goodell

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#### **What are some general things you should know about research studies?**

You are being asked to take part in a research study. Your participation in this study is voluntary. You have the right to be a part of this study, to choose not to participate or to stop participating at any time without penalty. The purpose of research studies is to gain a better understanding of a certain topic or issue. You are not guaranteed any personal benefits from being in a study. Research studies also may pose risks to those that participate. In this consent form you will find specific details about the research in which you are being asked to participate. If you do not understand something in this form it is your right to ask the researcher for clarification or more information. A copy of this consent form will be provided to you. If at any time you have questions about your participation, do not hesitate to contact the researcher(s) named above.

#### **What is the purpose of this study?**

We want to determine medical student viewpoints of childhood obesity, specifically third and fourth year medical students. This information will be used to develop a quantitative survey to assess student understanding of childhood obesity.

#### **What will happen if you take part in the study?**

If you agree to participate in this study, you will be interviewed and asked questions related to what you know about childhood obesity. We anticipate the interview will last 30 minutes to 1 hour. We will take notes and audio-record the interview session. The interview will be a phone interview conducted through Gmail Voice Chat/iChat or Skype software. Both you and the interviewer will be in private rooms.

#### **Risks**

We will ask you questions related to your views of childhood obesity. This process may make you uncomfortable by sharing personal experiences and feelings with an interviewer. You are free to not answer any questions that you do not wish to answer.

### **Benefits**

You will not receive direct benefits from participating in this project. However, we expect that project findings will be used to develop a quantitative survey to assess future students' viewpoints of childhood obesity. Eventually we hope to use this information to improve the quality of education future healthcare providers receive.

### **Confidentiality**

The information in the study records will be kept confidential. Since both you and the interviewer will be in private rooms, no one should be able to hear your conversation. We will ask you to provide a pseudonym to ensure your anonymity. The interviewer will not keep record of your Skype ID or phone number in Gmail Voice Chat/iChat. Data will be stored electronically on the NCSU departmental server and the Principal Investigator's research computer. All computers and servers are password protected and available only to authorized personnel. Hard copies of interview transcripts will be kept in locked file cabinets in a lock room in Schaub Food Science Building, NCSU. Within ten years after the conclusion of the study, the digital recordings will be erased. No reference will be made in oral or written reports which could link you to the study.

### **Compensation**

For participation in the study, you will be e-mailed one "Participation Raffle" ticket for a chance to win a \$100 Amazon gift card. The "Participation Raffle" will be held after all interviews have been conducted nationwide. Your chances of winning the "Participation Raffle" are one out of the total number of people who participate. You will be given the opportunity to participate in a second raffle for a chance to win a \$100 Amazon gift card. This "Refer-A-Student Raffle" is a referral raffle. If you decide to send a recruiting e-mail to other third or fourth year students at any medical school in the nation and they participate, you will be e-mailed a raffle ticket for the "Refer-A-Student Raffle." You will only receive a ticket if that person completes the study. You will receive one raffle ticket for each person you recruit who completes the study. Your chances of winning the "Refer-A-Student Raffle" are based on the number of people you recruit and the number of people other medical students recruit.

### **What if you have questions about this study?**

If you have questions at any time about the study or the procedures, you may contact the researcher, Natalie Cooke, at 218 Schaub Food Science Building, NC State University, or [XXX-XXX-XXXX] or [nkcooke@ncsu.edu](mailto:nkcooke@ncsu.edu).

### **What if you have questions about your rights as a research participant?**

If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Deb Paxton, Regulatory Compliance Administrator, Box 7514, NCSU Campus (919/515-4514).

**Consent To Participate**

*"I have read and understand the above information. I have received a copy of this form. I give verbal consent to participate in this study with the understanding that I may choose not to participate or to stop participating at any time without penalty or loss of benefits to which I am otherwise entitled."*

**Subject's name** \_\_\_\_\_ **Date** \_\_\_\_\_  
**Investigator's signature** \_\_\_\_\_ **Date** \_\_\_\_\_

## Appendix J. Study 2 Interview Guide

# I

### OPENING

Hello, [insert med student name]. I want to make sure that Skype/Gmail Voice Chat/iChat is working properly. Can you hear me clearly?

We've been e-mailing, but I want to take a chance to introduce myself in person. My name is \_\_\_\_\_ and I am a student at North Carolina State University.

I want to tell you a little bit about this study. Do you mind pulling up the e-mail I sent you with a copy of the consent form? Did you have a chance to look over the consent form?

*[If the student does not have the e-mail, e-mail them the consent form again.]*

*[If using Skype/Gmail Voice Chat and you are NOT calling their cell phone say: At this time could you put your cell phone on vibrate so we won't have any distractions?]*

Before we get started, I want to go through each section of the consent form and explain what it means. It's long, so bear with me.

At the end, I will ask you to give verbal consent to participate in this interview. Is it alright if I begin?

A. General Information about research studies:

This is a research study, and your participation in this study is voluntary. You have the right to be a part of this study, to choose not to participate or to stop participating at any time without penalty. The purpose of research studies is to gain a better understanding of a certain topic or issue. You are not guaranteed any personal benefits from being in a study. Research studies also may pose risks to those that participate. In this consent form you will find specific details about the research in which you are being asked to participate. If you do not understand something in this form it is your right to ask me for clarification or more information. A copy of this consent form has been provided to you. If at any time you have questions about your participation, do not hesitate to contact Natalie Cooke or me.

B. Purpose of this study:

The purpose of this study is to see what you think about childhood obesity. I will ask you questions about the causes, consequences, and prevention of childhood obesity. I want to know what you've learned during your medical school education. We want to hear what you have to say because you are a third or fourth year medical student.

If you do not feel comfortable answering a question, please let me know, and I will continue to the next question.

C. What will happen if you take part in the study?

If you agree to participate in this study, we will talk between 30 minutes and an hour, depending on how much you want to share with me. I will take notes and record the interview session. We will have this conversation here on Skype, but since we are both in private rooms, nobody should be able to overhear our conversation.

Audio recorder: I would like to use an audio recorder during the discussion so that I can refer back to the discussion when I write my research report. Do you mind if I record this interview session?

a . (NO) Thank you!

b . (YES) OK. I'm afraid we have to audio record the interview. Because of that, you will not be able to participate in the interview today. Thank you for your time.

[PRESS BUTTON HERE]

It's on. You are now being recorded.

D. Risks

We will ask you questions related to your views of childhood obesity. This process may make you uncomfortable as you will be asked to share personal experiences and feelings with me. You are free to not answer any questions that you do not wish to answer.

E. Benefits

You will not receive direct benefits from participating in this project. However, we plan to use the project findings to develop a quantitative survey to assess future students' viewpoints of childhood obesity. We hope to use this information to improve the quality of education for future health care providers.

F. Confidentiality

The information in the study documents will be kept confidential. Since both you and I are in private rooms, no one should be able to overhear our conversation. I will not keep record of your Skype ID/Gmail ID/iChat ID. Data will be stored electronically on password protected computers to which only the research team has access. Hard copies of interview transcripts will be kept in a secure and locked location on NCSU's campus. Within ten years after the conclusion of the study, the digital recordings will be erased. If we use quotes when presenting the findings, your name will not be linked to the response, and we will not use quotes that could identify you.

We would ask that you not share the questions we ask in this interview with anyone else to avoid contaminating our sample.

Additionally, I would like to ask you to provide a pseudonym for yourself. That is, I would like you to make up a name for me to call you. What name would you like me to call you?

Ok, [INSERT PSEUDONYM]. We only have a few paragraphs left.

G. Compensation

For participation in the study, you will be e-mailed one “Participation Raffle” ticket for a chance to win a \$100 Amazon gift card. The raffle will be held after all interviews have been conducted nationwide. Your chances of winning the “Participation Raffle” are one out of the total number of people who participate. You will be given the opportunity to participate in a second raffle, the “Refer-A-Student Raffle,” for a chance to win a \$100 Amazon gift card. If you decide to send the recruiting e-mail to another third or fourth year at any medical school in the nation and that student participates, you will be e-mailed a “Refer-A Student Raffle” ticket. You will only receive a ticket if that person completes the study. Your chances of winning the “Refer-A-Student Raffle” are based on the number of people you recruit and the number of people other medical students recruit.

H. Questions

If you have any questions about this project, please contact Natalie Cooke. If you have questions about your rights and you would rather contact NC State, please contact Deb Paxton. Both of their contacts are on the consent form you have in front of you.

I. Consent To Participate

Do you have any questions?

If you agree to participate, would you please read the statement at the bottom of the consent form, giving your consent to participate today?

Participant reads:

*“I have read and understand the above information. I have received a copy of this form. I give verbal consent to participate in this study with the understanding that I may choose not to participate or to stop participating at any time without penalty or loss of benefits to which I am otherwise entitled.”*

*[Indicate on your copy of the consent form that they agreed by writing their name in the participant line and signing your name on the investigator line and dating the document.]*

# II

## DEMOGRAPHIC INFO:

Great! Thank you for agreeing to talk today. Before we get started, I would like to ask you a few questions about yourself. You've told me a bit in the e-mail, but I'd like to have it recorded on the audio recorder.

- A. What medical school do you attend?
- B. What undergraduate institution did you attend?
- C. What was your major as an undergraduate?
- D. What was your minor as an undergraduate?
- E. What is your year classification in medical school?  
[*If the student is not a 3<sup>rd</sup> or 4<sup>th</sup> year: I'm sorry. There must have been a misunderstanding. We are only interviewing 3<sup>rd</sup> and 4<sup>th</sup> years at this time.*]
- F. When you graduate, will you be a DO or an MD?
- G. Do you have any other degrees or are you planning on pursuing additional degrees?  
*If yes: What will your degree be in?*
- H. What is your age?  
[*if the student is under 18 years of age: I'm sorry. There must have been a misunderstanding. We are only allowed to speak with people 18 years of age and older.*]
- I. What is your gender?
- J. What is your race/ethnicity? For example, African American, Asian, White, etc.?
- K. In what area do you plan to specialize after you complete medical school?  
*Probe: So far, what do you think is most interesting?*

# III

## INTERVIEW:

Okay! Let's go ahead and get started. I'm going to start off with a simple question just to get our conversation going. Then, I'll ask you four more questions. At the end of our talk, I'll recap our conversation and give you a chance to add to or correct anything that's said during our talk today.

Remember, I'm interested in hearing about what you've learned in your medical school education, so please give me a lot of examples and tell stories. When you tell stories, please do not refer to people in your stories by their real name. You can make up a pseudonym for that person or refer to them by their relationship to you.

At the end of each question, I'll ask you to think back to your medical school coursework. I will also ask you to think about what you may have seen in your clinical experience. Remember, this is all about what you think. No information is too simple or too complex.

Do you have any questions?

Alright. The first question is an icebreaker to start our discussion about childhood obesity.

# 1

## DESCRIBE

What do you think of when you hear the phrase “obese child”?

REQUIRED PROBES	GENERAL PROBES
<i>How do you define “childhood obesity?”</i>	<i>Can you explain this more?</i>
<i>What do obese children look like?</i>	<i>Can you give an example?</i>
<i>How do obese children act?</i>	<i>Can you think of anything else?</i>
<i>Is there anything different between a “normal weight” child and an “obese” child?</i>	<i>I’m looking for where you might have learned this information. Do you remember where you might have learned about that?</i>

REVIEW PROBES
<i>Did I get that right?</i>
<i>Do you have anything else to add?</i>

[Optional Transition: Now that we've described what an obese child is, let's talk about the causes of childhood obesity.]

# 2 |

## CAUSES

What leads to childhood obesity?

Who contributes to the cause?

*(Can repeat the first or second part of the question if needed)*

	REQUIRED PROBES		GENERAL PROBES
	<i>Think about what you may have learned about the causes of childhood obesity in your medical school coursework.</i>		<i>Can you explain this more?</i>
	<i>Think about what you may have learned about the causes of childhood obesity in your clinical experience.</i>		<i>Can you give an example?</i>
			<i>Can you think of anything else?</i>
			<i>I'm looking for where you might have learned this information. Do you remember where you might have learned about that?</i>

	REVIEW PROBES
	<i>Did I get that right?</i>
	<i>Do you have anything else to add?</i>

[Optional Transition: Ok. You've given me a lot of good information about what causes childhood obesity.]

# 3 |

## CONSEQUENCES

Now, what do you think are the consequences of childhood obesity?

	REQUIRED PROBES		GENERAL PROBES
	<i>Think about what you may have learned about the consequences of childhood obesity in your medical school coursework.</i>		<i>Can you explain this more?</i>
	<i>Think about what you may have learned about the consequences of childhood obesity in your clinical experience.</i>		<i>Can you give an example?</i>
			<i>Can you think of anything else?</i>
			<i>I'm looking for where you might have learned this information. Do you remember where you might have learned about that?</i>

	REVIEW PROBES
	<i>Did I get that right?</i>
	<i>Do you have anything else to add?</i>

[Optional Transition: Ok, so we just talked about the consequences of childhood obesity. Let's talk about prevention. ]

# 4 |

## PREVENTION:

What should or can be done to prevent childhood obesity, if anything?  
 What should or can be done to treat childhood obesity?

REQUIRED PROBES	GENERAL PROBES
<i>Think about what you may have learned about the prevention of childhood obesity in your medical school coursework.</i>	<i>Can you explain this more?</i>
<i>Think about what you may have learned about the prevention of childhood obesity in your clinical experience.</i>	<i>Can you give an example?</i>
<i>Think about what you may have learned about the treatment of childhood obesity in your medical school coursework.</i>	<i>Can you think of anything else?</i>
<i>Think about what you may have learned about the treatment of childhood obesity in your clinical experience.</i>	<i>I'm looking for where you might have learned this information. Do you remember where you might have learned about that?</i>

REVIEW PROBES
<i>Did I get that right?</i>
<i>Do you have anything else to add?</i>

# 5A |

## NUTRITION KNOWLEDGE:

How important do you think nutrition knowledge is in preparing you to treat obese children?

REQUIRED PROBES	GENERAL PROBES
<i>Think of your medical school coursework related to nutrition and how that might have helped you.</i>	<i>Can you explain this more?</i>
<i>Think of your clinical experience. What might you have experienced in that setting related to nutrition that prepared you to treat obese children?</i>	<i>Can you give an example?</i>
	<i>Can you think of anything else?</i>
	<i>I'm looking for where you might have learned this information. Do you remember where you might have learned about that?</i>

*[If they say they are not going to be treating obese children: Ok, but what if you were?]*

REVIEW PROBES
<i>Did I get that right?</i>
<i>Do you have anything else to add?</i>

# 5B |

## RESOURCES YOU NEED:

We've heard a lot of students say that their medical school coursework or clinical rotations do not completely equip them to treat obese children or prevent childhood obesity.

What information, resources, or skills do you need to treat obese children?

What information, resources, or skills do you need to prevent childhood obesity?

How do you want to get those things?

	REQUIRED PROBES		GENERAL PROBES
	<i>Think of your medical school coursework.</i>		<i>Can you explain this more?</i>
	<i>Think of your clinical experience.</i>		<i>Can you give an example?</i>
	<i>What information do you need to treat obese children? Prevent childhood obesity?</i>		<i>Can you think of anything else?</i>
	<i>What resources do you need to treat obese children? Prevent childhood obesity?</i>		
	<i>What skills do you need to treat obese children? Prevent childhood obesity?</i>		

[If they say they are not going to be treating obese children: Ok, but what if you were?]

	REVIEW PROBES
	<i>Did I get that right?</i>
	<i>Do you have anything else to add?</i>

# IV

## REVIEW

Now I'm going to take a few minutes to review what you've said. After each question I'm going to ask you if I got that right and if there's anything else you'd like to add. Please feel free to stop me at any time and clarify what I am saying or add to things. This is a very important step in the process to make sure we have the right information from you.

# V

## DEMOGRAPHIC INFO (CONT'D)

I would like to ask you one more question, if you don't mind:

1. While at your undergraduate institution, did you take courses related to nutrition? If so, could you describe the course or courses you took?

# VI

## CLOSING:

Thank you for sharing with me today! We appreciate your help.

Now that the interview is over, we would like to talk to you about sending information about our study to other third and fourth years you might know. This will help us with our recruitment. You don't have to help us, if you don't want to. If you do help us and some of your friends complete the interview too, your name will be entered into another drawing to win a \$100 Amazon gift card. Can we talk for a few minutes about this?

- a. (YES) Okay. If you know of students who may want to participate, I can send you an e-mail for you to forward to them. Do not feel any pressure to do this. While you will receive a raffle ticket if they participate, if you do not send the e-mail to other students your chances of winning the Amazon gift card in the "Participation Raffle" does not change. The referral raffle is completely separate from the participation raffle. Do you want me to forward you the e-mail? Again, if you have questions, you can contact me or Natalie Cooke at any time.
- b. (NO) Alright! Thank you for your time!

While we would love for you to get your friends to participate, we ask that you do not share any of the questions we asked you today. This contaminates our sample. Thank you for understanding!

I hope you have a great rest of the day!

Appendix K. Study 2 Raffle Ticket E-mails

Subject: Childhood Obesity Interview Participation Raffle Ticket

---

[INSERT NAME],

Thank you for participating in the childhood obesity interview.  
Please find attached a raffle ticket for your records.

We will hold the raffle at the completion of the study and will let you know if have the winning raffle ticket.

Please let me know if you have any questions about referring your friends to participate in the study. You may contact me at any time.

Thank you,

[INSERT YOUR NAME]

Subject: Childhood Obesity Interview Refer-A-Student Raffle Ticket

---

[INSERT NAME],

Thank you for recruiting a friend for the childhood obesity interviews.  
Please find attached a raffle ticket (Refer-A-Student Raffle) for your records.

We will hold the raffle at the completion of the study and will let you know if have the winning raffle ticket.

I hope you will consider referring more friends. Please let me know if you have any questions. You may contact me at any time.

Thank you,  
Natalie

## Appendix L. Study 2 Transcription Protocol

### Setting up the Audio File:

1. Put on headphones
2. Plug audio recorder into your computer
3. Copy file to a research USB. You will delete this after you've transcribed the document and made sure the file is copied in 3 locations in Schaub Hall.
4. Unplug audio recorder from your computer to make sure you do not accidentally delete the file.
5. Open up file on Windows Media Player (or Mac alternative)
6. Right click >> Enhancements >> Play Speed Settings
7. Slide the bar to the left to slow down the audio file. Somewhere between 0.5 and 0.7 is ideal. Make sure you can understand both you and the medical student.

### Transcribing Technique:

1. Use the transcription template. Make sure you've formatted the transcript exactly as the template says, including page numbers, etc.
2. Play the file at slower speed (between 0.5 and 0.7)
3. Start typing while the file is playing. Do not rewind if you did not understand what was said.
4. If you do need to pause to catch up, press Fn and the pause button on your keyboard.
5. Start typing again.
6. Once you are done, listen to the file again at full speed and fill in parts you missed. You will need to pause to make sure you get everything.
7. Re-read the transcript to look for typos.

### Common Questions about Transcripts:

#### **Q1: What do I do when the interviewer says “mmhmm” multiple times while the subject is talking?**

A1: Do not transcribe “mmhmm”s when they interrupt the flow of the subjects' answer. If the “mmhmm” is said before the interview asks an additional question, you should transcribe it. The same goes for any other generic verbal indication that the interviewer is listening.

#### **Q2: What do I do when the interviewer interrupts the subject or the subject interrupts the interviewer?**

A2: You denote an interruption by a dash mark “-“.

For example:

N: So what you're saying is that you went –

123: I went to the beach.

N: - to the beach on Saturday?

The interrupting statement is not denoted by a dash mark, only the interrupted statement.

**Q3: What do I do when the interviewer or subject uses a “stalling phrase”?**

A3: Like the interrupted statement, you denote these with a dash mark “-“. Examples of “stalling phrases” are: like, um, uh, you know.

For example:

123: When I was a child, my favorite food was – um – pizza, and – uh – it was only my favorite food – um – because – like - my friends liked to eat it – you know – all the time.

Visually, this makes it so the person analyzing the data can read the statement as:

123: When I was a child, my favorite food was pizza, and it was only my favorite food because my friends liked to eat it all the time.

**Q4: What happens if I cannot understand what is said?**

A4: Denote this in parentheses.

For example:

123: My grandmother taught me to cook when I was 7 years old. Or maybe it was when ... (inaudible). Anyway, I was really young when I first learned how to cook.

Only use this if you've listened to the file 5 or 6 times and can still not understand what was said.

**Q5: How do I transcribe laughter?**

A5: You can denote this as “(Laughs)” when it is real laughter and “(Chuckles)” when it is polite laughter. This helps the analyzer know the context better than if the transcript merely said “Haha.” You may also use “(Nervous laughter)” in some situations where you can tell the subject is laughing to divert the interviewer's attention from a politically incorrect statement.

**Q6: What if there is an action like a head nod that is not heard on the recorder?**

A6: If you can tell from the audio file that an action occurred but is not an audible indication, denote this in parentheses. Since you were the interviewer, you will be able to determine what action you need to insert in parentheses.

For example, in the audio file, N is reviewing information with 123. Transcribed verbatim the conversation reads:

N: And you believe that the best way to prevent childhood obesity is educating the parents. Do you have anything else to add to that?

N: Okay. So then you said that your experience with Nutrition NUTS helped you ...

You can tell from this statement that the subject had to give an indication of either “yes” or “no” for the interviewer to move to the next statement. You should denote this as:

N: And you believe that the best way to prevent childhood obesity is educating the parents. Do you have anything else to add to that?

123: (Nonverbal indication of yes)

N: Okay. So then you said that your experience with Nutrition NUTS helped you ...

Appendix M. Study 2 Initial Analysis Template

Interview Number:

Interviewer:

Date:

Time:

Length: (use audio file to record the exact length)

---

Medical School:

Year in Medical School:

Undergraduate Institution:

Undergraduate Major/Minor:

DO or MD?:

Other degrees?:

Specialty?:

Nutrition classes?:

Student personality:

*(How open was the student? Did you have trouble getting them to talk? Did they seem to be in a good mood? Did they tell you they were tired, etc.?)*

Themes:

*(What are themes you've seen from this interview that you will share with the research team?)*

## Appendix N: Study 2 Coding Manual

### **How to use the Coding Manual:**

#### Purpose:

The purpose of this coding manual is to analyze transcripts of qualitative interviews of third and fourth year medical students' viewpoints of childhood obesity. This coding manual is designed to highlight areas of knowledge expressed in qualitative interviews.

Areas of the coding manual include:

Barriers: Things that stand in the way of the medical student preventing/treating childhood obesity

Cause: Contributors to childhood obesity

Consequence: Results of childhood obesity

Definition: Things related to the description or definition of the term “childhood obesity”

Needs: Things the medical student currently does not have but that would aid in their preventing/treating childhood obesity.

Prevention/Treatment: Things that keeps childhood obesity from occurring in the first place or remedies childhood obesity once it occurs.

Source: From where the students gained their information

Transcripts are to be coded by hand (using colored markers) and then entered into NVivo9 qualitative analysis software.

#### Codes:

Under each category of codes are found specific sub-codes and their definitions. They are detailed on the following pages.

#### Overlapping Codes:

Some quotes may contain more than one code.

#### Process of Coding:

Code the entire statement, not just the sentence in which the code is found in order to gain context for the statement. If the statement does not stand alone, include the “probe question” in the coding. Statements found within large paragraphs should be parsed out to only contain sentences related to the statement/code.

#### Marking great quotations:

Is this a good quote? If so, you can insert a “comment” into the transcript in NVivo for use during the analysis process.

**Barriers: Things that stand in the way of the medical student preventing/treating childhood obesity**

Barrier-Patient: Characteristics about the patient that stand in the way of the medical student preventing/treating childhood obesity.

(Ex. – lack of motivation, lack of funds, no desire to change)

Barrier-Personal: Characteristics about the medical student that stand in the way of the medical student preventing/treating childhood obesity.

(Ex. – lack of nutrition knowledge, lack of skills to counsel)

Barrier-System: Characteristics about the healthcare system/hospital that stand in the way of the medical student preventing/treating childhood obesity.

(Ex. – limited time with patient, cost of referral programs, limited time in medical school)

**Causes: Contributors to childhood obesity**

Cause-Multifactorial: A statement or evidence of the student’s understanding of the causes of childhood obesity as being multifactorial.

(Ex. – Multifactorial)

**Consequence: Results of childhood obesity**

Consequence-External: Factors related to how the child’s obesity affects other people/society

(Ex. – Price of healthcare, family stress)

Consequence-Mental: Results of childhood obesity that affect the child’s mental state.

(Ex. – Bullying)

Consequence-Physical: Results of childhood obesity that affect the child’s physical state.

(Ex. – Diabetes, high blood pressure)

**Definition: Things related to the description or definition of the term “childhood obesity”**

Definition-Clinical: A technical/clinical definition of childhood obesity

(Ex. – BMI)

Definition-Compare: Described differences/similarities between obese children and normal weight children.

(Ex. – No difference, Obese children more withdrawn)

Definition-Description: Anecdotal descriptions of children, not clinically definitions

(Ex. – Fat, Rolls of fat)

**Needs: Things the medical student currently does not have but that would aid in their preventing/treating childhood obesity.**

Needs-Counseling/Communication Skill: Any skill the student needs to talk to an obese child or his family during an office visit.

(Ex. - Motivational interviewing skills)

Needs- Information: Anything the student needs to know more about in order to be a more effective practitioner.

(Ex. - Dietary requirements of children, parenting tips for getting children to eat healthy foods)

Needs-Resource: Any outside program, person, or organization the student needs access to in order to be a more effective practitioner.

(Ex. - Pamphlets, Access to a Registered Dietitian)

Needs-Experience/Exposure: Anything related to seeing more obese children or more practice with obese children and their families.

(Ex. – More time)

**Prevention/Treatment: Things that keeps childhood obesity from occurring in the first place or remedies childhood obesity once it occurs.**

Prevention/Treatment –Existing Programs: Descriptions of programs already in existence with which the student is familiar or has experience.

(Ex. - Physical activity programs, Nutrition education programs)

Prevention/Treatment-General: Anything related to prevention/treatment of childhood obesity that is not the description of an existing program. General descriptions.

**Source: From where the students gained their information**

Source-Clinical: Anything the student states was learned in clinical rotations or the hospital setting.

(Ex. - Pediatric rotation)

Source-Coursework: Anything the student states was learned in medical school.

(Ex. - Diabetes and obesity lecture)

Source-Personal Experience: Experience the medical student has had with obese children/programs outside of medical school or personal research.

(Ex. – Obese as a child, personal research, volunteer experiences)

Source-Previous Education: Experiences outside of medical school which shape the student's knowledge and views of childhood obesity.

(Ex. – Nutrition undergraduate or Masters program)

Appendix O. Study 3 Expert Panel 1 Interest E-mail

Subject: Request for expert review of survey to measure medical students' self-efficacy and belief in preventing and treating childhood obesity

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Dear \_\_\_\_\_,

[INSERT PERSON-SPECIFIC SALUTATIONS]

I am writing to ask for your help in my dissertation research. For the third stage of my dissertation research, I am developing and validating a survey to measure medical students' self-efficacy and beliefs in childhood obesity.

The goal of this survey is to determine medical students' self-efficacy in childhood obesity prevention and treatment skills and their belief in if those skills are actually effective. The hope is that by validating this tool specifically for medical students, we will be able to determine the state of medical students' confidence in preventing and treating childhood obesity and inform potential curricular changes.

In order to develop a relevant survey that will not being too burdensome in length (medical students are busy!), I need your help in narrowing down the questions to the most important and clearly worded questions. We would like for the final survey to be taken in under 30 minutes.

If you agree to help, I will send you a follow-up e-mail with the draft of the survey and a rating form. I know your time is valuable, so I appreciate your consideration in helping with this stage of my research. Please let me know either way by Friday, January 25<sup>th</sup> so that I may make plans accordingly.

Thank you!

Natalie K. Cooke

Appendix P. Study 3 Expert Panel 1 Instructions E-mail

Subject: Re: Request for expert review of survey to measure medical students' self-efficacy and belief in preventing and treating childhood obesity

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Dear \_\_\_\_\_,

Thank you for agreeing to help with this content validity piece of survey development! I appreciate your honest and analytical opinion of the survey.

Attached you will find two documents:

- (1) A PDF of the survey so you can see it in its entirety.
- (2) A rating form

You can type directly into the rating form and return it to me via e-mail.

If you could please return the completed form by Monday, February 4<sup>th</sup> at 5:00pm, I would greatly appreciate it. I will send a one-week reminder e-mail on Monday, January 28<sup>th</sup> and a one-day reminder e-mail on Sunday, February 3<sup>rd</sup>.

Please let me know if you have any questions. Thank you again for helping me with this part of the project. I really appreciate it!

Thank you,

Natalie K. Cooke

## Appendix Q. Study 3 Expert Panel 1 Packet

### About the survey:

The survey is a two-column survey with a 5-point Likert scale. All the self-efficacy questions are in the left-hand column, and all the corresponding belief questions are in the right-hand column. Not all questions are in pairs due to the nature of the questions.

For simplicity of rating, questions are grouped by topic in this version. In the final survey they will be randomly ordered but paired questions will be kept together. The rationale is that it will be easier for medical students to rate their confidence in a skill and then rate their belief in the effectiveness of that same skill.

### Directions:

Before filling out the rating form on the following page, please read the PDF of all survey questions. Once you have read the survey in entirety, complete the content validity rating form on the following page.

On the following page, you will find each question and a corresponding box. In each box, please indicate the relevance of the question to the overall goal of the scale and comments if you have them. Then provide any suggestions for rewording the question. At the end of each section, there is a box for you to write suggestions for questions to add to the section.

(Next Page)

### Rater Information

Name:

Institution:

Expertise: (Choose all that apply)

Childhood Obesity

Nutrition

Pediatrics

Survey Development

Medical Education

Motivational Interviewing

## Section 1: Skills in Diagnosing Childhood Obesity and Comorbidities

1A: I know how to classify a child's weight status as obese.

*How important is this question to the overall goal of the survey?*

Unimportant    Of Little Importance    Moderately Important    Important    Very Important

*Suggestions for wording revisions:*

1B: I believe a child should be classified as obese.

*How important is this question to the overall goal of the survey?*

Unimportant    Of Little Importance    Moderately Important    Important    Very Important

*Suggestions for wording revisions:*

2A: I know how to use BMI-for-age growth charts to determine a child's weight status.

*How important is this question to the overall goal of the survey?*

Unimportant    Of Little Importance    Moderately Important    Important    Very Important

*Suggestions for wording revisions:*

2B: I believe using BMI-for-age growth charts is effective in determining a child's weight status.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

3A: I know how to look at a child to determine his weight status.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

3B: I believe looking at a child is an effective way to determine weight status.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

4A: I know how to talk to a child about his weight status.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

4B: I believe talking to a child about his weight status is important.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

5A: I know how to talk to a parent about their child's weight status.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

5B: I believe talking to a parent about their child's weight status is important.

*How important is this question to the overall goal of the survey?*

Unimportant    Of Little Importance    Moderately Important    Important    Very Important

*Suggestions for wording revisions:*

6: I feel comfortable talking to a child about his weight status.

*How important is this question to the overall goal of the survey?*

Unimportant    Of Little Importance    Moderately Important    Important    Very Important

*Suggestions for wording revisions:*

7: I feel comfortable talking to a parent about their child's weight status.

*How important is this question to the overall goal of the survey?*

Unimportant    Of Little Importance    Moderately Important    Important    Very Important

*Suggestions for wording revisions:*

*Suggestions for additional questions to be included in Section 1: Skills in Diagnosing Childhood Obesity and Comorbidities:*

*Additional Comments:*

## Section 2: Skills in Counseling Children for Lifestyle Changes

8A: I know how to assess if an obese child is ready to make lifestyle changes.

*How important is this question to the overall goal of the survey?*

Unimportant    Of Little Importance    Moderately Important    Important    Very Important

*Suggestions for wording revisions:*

8B: I believe it is important to assess if an obese child is ready to make lifestyle changes.

*How important is this question to the overall goal of the survey?*

Unimportant    Of Little Importance    Moderately Important    Important    Very Important

*Suggestions for wording revisions:*

9A: I know how to talk with an obese child about the pros and cons of making lifestyle changes.

*How important is this question to the overall goal of the survey?*

Unimportant    Of Little Importance    Moderately Important    Important    Very Important

*Suggestions for wording revisions:*

9B: I believe it is important to talk with an obese child about the pros and cons of making lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

10A: I know how to guide an obese child to make small, attainable goals about lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

10B: I believe it is important to guide an obese child to make small, attainable goals about lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

11A: I know how to determine an obese child's confidence in making a lifestyle change.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

11B: I believe it is important to determine an obese child's confidence in making a lifestyle change.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

12A: I know how to use skills to decrease an obese child's resistance to change.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

12B: I believe it is important to use skills to decrease an obese child's resistance to change.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

13A: I know how to counsel an obese child to remove barriers to change.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

13B: I believe it is important to counsel an obese child to remove barriers to change.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

14A: I know how to apply a behavior change model (e.g. transtheoretical model) in counseling an obese child to make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

14B: I believe it is important to apply a behavior change model (e.g. transtheoretical model) in counseling an obese child to make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

15A: I know how to use open-ended questions when counseling an obese child about lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

15B: I believe it is important to use open-ended questions when counseling an obese child about lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

16A: I know how to use motivational interviewing to counsel an obese child about lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

16B: I believe it is important to use motivational interviewing to counsel an obese child about lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

17A: I know how to use reflexive listening to communicate with an obese child.

*How important is this question to the overall goal of the survey?*

Unimportant    Of Little Importance    Moderately Important    Important    Very Important

*Suggestions for wording revisions:*

17B: I believe it is important to use reflexive listening to communicate with an obese child.

*How important is this question to the overall goal of the survey?*

Unimportant    Of Little Importance    Moderately Important    Important    Very Important

*Suggestions for wording revisions:*

18: I believe that motivational interviewing can be effective in treating childhood obesity.

*How important is this question to the overall goal of the survey?*

Unimportant    Of Little Importance    Moderately Important    Important    Very Important

*Suggestions for wording revisions:*

19: I believe that behavior change models can be effective in treatment of childhood obesity.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

20: I believe that small, attainable goals are the best way to make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

21: I believe that reflexive listening is an effective way to communicate with a child.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

22A: I know how to assess an obese child's current nutrition-related behaviors.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

22B: I believe that assessing an obese child's current nutrition-related behaviors will help him make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

23A: I know how to advise an obese child in changing a diet-related behavior.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

23B: I believe that advising an obese child in changing a diet -related behavior is effective in helping him make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

24A: I know how to mutually agree with an obese child on a goal to change his diet-related behavior.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

24B: I believe that mutually agreeing with an obese child on a goal to change his diet-related behavior is effective helping him make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

25A: I know how to assist an obese child in finding resources to help him change a diet-related behavior.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

25B: I believe that assisting an obese child in finding resources to help him change a diet-related behavior is effective in helping him make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

26A: I know how to arrange a follow-up appointment to assess an obese child's progress in changing a diet-related behavior.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

26B: I believe that arranging a follow-up appointment to assess an obese child's progress in changing a diet-related behavior is effective in helping him make lifestyle changes.

*How important is this question to the overall goal of the survey?*

Unimportant    Of Little Importance    Moderately Important    Important    Very Important

*Suggestions for wording revisions:*

*Suggestions for additional questions to be included in Section 2: Skills in Counseling Children for Lifestyle Changes:*

*Additional Comments:*

### Section 3: Skills in Counseling Families for Lifestyle Changes

27A: I know how to assess if an obese child's family members are ready to make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

27B: I believe it is important to assess if an obese child's family members are ready to make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

28A: I know how to talk with an obese child's family members about the pros and cons of making lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

28B: I believe it is important to talk with an obese child's family members about the pros and cons of making lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

29A: I know how to guide an obese child's family members to make small, attainable goals about lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

29B: I believe it is important to guide an obese child's family members to make small, attainable goals about lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

30A: I know how to determine an obese child's family members' confidence in making a lifestyle change.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

30B: I believe it is important to determine an obese child's family members' confidence in making a lifestyle change.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

31A: I know how to use skills to decrease an obese child's family members' resistance to change.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

31B: I believe it is important to use skills to decrease an obese child's family members' resistance to change.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

32A: I know how to counsel an obese child's family members to remove barriers to change.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

32B: I believe it is important to counsel an obese child's family members to remove barriers to change.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

33A: I know how to apply a behavior change model (e.g. transtheoretical model) in counseling an obese child's family members to make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

33B: I believe it is important to apply a behavior change model (e.g. transtheoretical model) in counseling an obese child's family members to make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

34A: I know how to use open-ended questions when counseling an obese child's family members to make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

34B: I believe it is important to use open-ended questions when counseling an obese child's family members to make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

35A: I know how to use motivational interviewing to counsel an obese child's family members to make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

35B: I believe it is important to use motivational interviewing to counsel an obese child's family members to make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

36A: I know how to use reflexive listening to communicate with an obese child's family members.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

36B: I believe it is important to use reflexive listening to communicate with an obese child's family members.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

37A: I know how to assess an obese child's family members' current nutrition-related behaviors.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

37B: I believe that assessing an obese child's family members' current nutrition-related behaviors will help him make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

38A: I know how to advise an obese child's family members in changing a diet-related behavior.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

38B: I believe that advising an obese child's family members in changing a diet-related behavior is effective in helping him make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

39A: I know how to mutually agree with an obese child's family members on a goal to change his diet-related behavior.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

39B: I believe that mutually agreeing with an obese child's family members on a goal to change his diet-related behavior is effective helping him make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

40A: I know how to assist an obese child's family members in finding resources to help him change a diet-related behavior.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

40B: I believe that assisting an obese child's family members in finding resources to help him change a diet-related behavior is effective in helping him make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

41A: I know how to arrange a follow-up appointment to assess an obese child's progress in changing a diet-related behavior.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

41B: I believe that arranging a follow-up appointment to assess an obese child's progress in changing a diet-related behavior is effective in helping him make lifestyle changes.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

*Suggestions for additional questions to be included in Section 3: Skills in Counseling Families for Lifestyle Changes:*

*Additional Comments:*

#### Section 4: Recommending Nutrition and Physical Activity Changes

42A: I know how to give advice on healthy foods to consume.

*How important is this question to the overall goal of the survey?*

Unimportant    Of Little Importance    Moderately Important    Important    Very Important

*Suggestions for wording revisions:*

42B: I believe giving advice on healthy foods to consume can help change an obese child's weight status.

*How important is this question to the overall goal of the survey?*

Unimportant    Of Little Importance    Moderately Important    Important    Very Important

*Suggestions for wording revisions:*

43A: I know how to apply the dietary guidelines for children ages birth through 18.

*How important is this question to the overall goal of the survey?*

Unimportant    Of Little Importance    Moderately Important    Important    Very Important

*Suggestions for wording revisions:*

43B: I believe applying the dietary guidelines for children ages birth through 18 can be effective in childhood obesity treatment.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

44A: I know how to describe what a balanced diet should include.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

44B: I believe describing what a balanced diet should include can be effective in childhood obesity prevention and treatment.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

45A: I know how to determine energy requirements for an obese child.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

45B: I believe determining energy requirements for an obese child can be effective in childhood obesity treatment.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

46A: I know how to give advice on physical activity modifications.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

46B: I believe giving advice on physical activity modifications can be effective in childhood obesity treatment.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

47A: I know how to give recommendations to change an obese child's activity level.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

47B: I believe making recommendations to change an obese child's activity level can be effective in childhood obesity treatment.

<i>How important is this question to the overall goal of the survey?</i>				
Unimportant	Of Little Importance	Moderately Important	Important	Very Important
<i>Suggestions for wording revisions:</i>				

*Suggestions for additional questions to be included in Section 4: Recommending Nutrition and Physical Activity Changes:*

*Additional Comments:*

Thank you for taking the time to complete this form. Your feedback is important in this stage of my dissertation research!

Appendix R. Study 3 Cognitive Interviews Recruitment E-mail

**Subject:** Help with Dissertation Research – Participate in Interview about Survey about Prevention and Treatment of Childhood Obesity?

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Hello!

I am writing to ask for your help in my dissertation research. I am developing a survey about medical students' childhood obesity prevention and treatment practices. I have developed a survey and have sent it to faculty experts for their review. Before I send it out to all medical students to take the survey, I want to test it out with a few medical students.

The whole process should take approximately 2 hours of your time, split into two parts:

1. Take the online survey (approximately 30 minutes)
2. Participate in a phone interview with me about the content of the questions covered in the survey and suggest any revisions (approximately 90 minutes)

If you are willing, please respond with times you would be available to talk for 90 minutes, and I will then send you the link for the survey. Thank you in advance for considering investing your valuable time in helping with my dissertation. I appreciate it! Please let me know if you have any questions.

Thank you,

Natalie K. Cooke

Appendix S. Study 3 Cognitive Interviews Instructions E-mail

Subject: Interview Instructions – Medical Student Childhood Obesity Prevention and Treatment Survey

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[INSERT STUDENT NAME]:

Thank you for agreeing to help!

The whole process should take approximately 2 hours (or less!) of your time:

Before we talk on the phone, please:

1. Take the online survey: [http://ncsu.qualtrics.com//SE/?SID=SV\\_1C82u8cG6Z2c1ed](http://ncsu.qualtrics.com//SE/?SID=SV_1C82u8cG6Z2c1ed)

>> **Please choose “undecided” when asked about your area of specialty.**

2. Read the attached consent form

3. Have the attached consent form and paper copy of the survey available during our phone call

I look forward to talking with you! Thank you again!

Thank you,

Natalie K. Cooke

Appendix T. Study 3 Cognitive Interviews Consent Form

**North Carolina State University**  
**INFORMED CONSENT FORM for RESEARCH**

Title of Study: Validation of Medical Student Childhood Obesity Prevention and Treatment Survey

Principal Investigator: Natalie Cooke

Faculty Advisor: Dr. Suzie Goodell

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**What are some general things you should know about research studies?**

You are being asked to take part in a research study. Your participation in this study is voluntary. You have the right to be a part of this study, to choose not to participate or to stop participating at any time without penalty. The purpose of research studies is to gain a better understanding of a certain topic or issue. You are not guaranteed any personal benefits from being in a study. Research studies also may pose risks to those that participate. In this consent form you will find specific details about the research in which you are being asked to participate. If you do not understand something in this form it is your right to ask the researcher for clarification or more information. A copy of this consent form will be provided to you. If at any time you have questions about your participation, do not hesitate to contact the researcher(s) named above.

**What is the purpose of this study?**

We want to determine medical student viewpoints of childhood obesity prevention and treatment practices through an online survey, and before distributing the survey to all medical students, we want feedback from current medical students for editing purposes.

**What will happen if you take part in the study?**

If you agree to participate in this study, you will be asked to take the online survey, answering questions about your confidence in certain prevention and treatment practices and your belief in the effectiveness of those practices. After completing the online survey, you will be interviewed about the survey questions for editing purposes. We anticipate the interview will last approximately 90 minutes. We will take notes and audio record the interview. The interview will be a phone interview or Gmail voice chat call. Both you and the interviewer will be in private rooms.

**Risks**

You will answer survey questions and be asked interview questions related to your views of childhood obesity prevention and treatment. This process may make you uncomfortable by sharing personal opinions with an interviewer. You are free to not answer any questions that you do not wish to answer.

**Benefits**

You will not receive direct benefits from participating in this project. However, your responses will be used to validate this survey about medical students’ viewpoints of childhood obesity prevention and treatment practices. Eventually we hope to use this information to improve the quality of education future healthcare providers receive.

**Confidentiality**

You will be asked to provide your name and e-mail address to ensure there are no duplicate survey responses, but your name will not be linked with your survey responses. You will be assigned a unique number to accompany your responses. The information in the study records will be kept confidential. Since both you and the interviewer will be in private rooms, no one should be able to hear your conversation. We will ask you to provide a pseudonym to ensure your anonymity. Data will be stored electronically on the NCSU departmental server and the Principal Investigator’s research computer. All computers and servers are password protected and available only to authorized personnel. Hard copies of interview transcripts will be kept in locked file cabinets in a locked room in Schaub Food Science Building, NCSU. Within ten years after the conclusion of the study, the digital recordings will be erased. No reference will be made in oral or written reports which could link you to the study.

**Compensation**

You will not receive compensation for participation in this study.

**What if you have questions about this study?**

If you have questions at any time about the study or the procedures, you may contact the researcher, Natalie Cooke, at 218 Schaub Food Science Building, NC State University, or [XXX-XXX-XXXX] or [nkcooke@ncsu.edu](mailto:nkcooke@ncsu.edu).

**What if you have questions about your rights as a research participant?**

If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Deb Paxton, Regulatory Compliance Administrator, Box 7514, NCSU Campus (919/515-4514).

**Consent To Participate**

*“I have read and understand the above information. I have printed a copy of this form. I give verbal consent to participate in this study with the understanding that I may choose not to participate or to stop participating at any time without penalty or loss of benefits to which I am otherwise entitled.”*

Subject's name \_\_\_\_\_

Date \_\_\_\_\_

Investigator's signature \_\_\_\_\_

Date \_\_\_\_\_

## Appendix U. Study 3 Cognitive Interviews Interview Guide

Hello \_\_\_\_\_.

Thank you for agreeing to help me with developing this survey for my dissertation research. The purpose of the survey is to determine medical students' viewpoints of childhood obesity prevention and treatment practices.

Consent Form: I want to start by talking about the consent form I e-mailed you. Did you have a chance to look over the consent form?

*[If no]* Okay, can you take a few minutes to read the consent form?

*[If yes or after they have read the consent form while on the phone]* Okay, do you have any questions about the consent form?

- >> About the general information about research studies?
- >> About the purpose of the study?
- >> About what will happen if you take part in this study?
- >> About risks?
- >> About benefits?
- >> About confidentiality?
- >> About compensation?
- >> About who to contact if you have questions?

Consent to Participate:

If you agree to participate, would you please read the statement at the bottom of the consent form, giving your consent to participate today?

Participant reads:

*"I have read and understand the above information. I have received a copy of this form. I give verbal consent to participate in this study with the understanding that I may choose not to participate or to stop participating at any time without penalty or loss of benefits to which I am otherwise entitled."*

*[Indicate on your copy of the consent form that they agreed by writing their name in the participant line and signing your name on the investigator line and dating the document.]*

Great! Thank you.

Audio recorder: I would like to use an audio recorder during the discussion so that I can refer back to the discussion if needed. Do you mind if I record this interview session?

[If no] Thank you!  
[PRESS BUTTON HERE]  
It's on. You are now being recorded.

[If yes] OK. I'll just take notes about our conversation.

Pseudonym: Additionally, I would like to ask you to provide a pseudonym for yourself. That is, I would like you to make up a name for me to call you. What name would you like me to call you?

Ok, [INSERT PSEUDONYM], let's get started with the interview!

I sent you a PDF of screen captures of the survey. Do you mind pulling up the file?

Thank you!

Interview:

I'm going to ask you questions about the survey questions you completed online to help me improve the survey. Remember to give your honest opinion. Do you have any questions before we begin?

Let's start with the directions. Please read them to yourself.

**“For each question, indicate your level of agreement by clicking one of the 5 options in the column, ranging from Strongly Disagree to Strongly Agree. Each question has two parts, so make sure you indicate an answer in each column. For the purpose of this survey, "child" is defined as being between the ages of 5 and 10.”**

**“Indicate your (1) level of confidence and (2) belief in the importance of the following skill”**

Can you describe to me in your own words what the directions tell you to do?

When you think of a **“child”** what age do you think of?

What does the heading **“I am confident I can ...”** mean to you?

What does the heading **“I believe it is important to ...”** mean to you?

➤Do you read this as *believe in general* or *believe for you*?

Now on to the actual survey questions:

1. Let's start with the first statement on the first page. Read the statement to yourself.

**“Guide an obese child and family members to help make small, attainable goals about lifestyle changes”**

- Describe what this statement means in your own words.
- Describe how you would **guide an obese child and family members to help make small, attainable goals about lifestyle changes.**
- When you read **“obese child and family members”** what do you think of?
- When you read **“small, attainable goals”** what do you think of?
- When you read **“lifestyle changes”** what do you think of?
- If you were to change the question, what edits would you make?

2. Now the second statement. Read the statement to yourself.

**“Describe to an obese child and family members what a healthy diet should include”**

- Describe what this statement means in your own words.
- Describe how you would **describe to an obese child and family members what a healthy diet should include.**
- When you read **“healthy diet”** what do you think of?
- If you were to change the question, what edits would you make?

3. Please read the third statement to yourself.

**“Assist an obese child and family members in finding resources to help them change physical activity-related behaviors”**

- Describe what this statement means in your own words.
- Describe how you would **assist an obese child and family members in finding resources to help them change physical activity-related behaviors.**
- When you read **“resources”** what do you think of?
- When you read **“physical activity-related behaviors”** what do you think of?
- If you were to change the question, what edits would you make?

4. Moving on to the fourth question.

**“Classify a child's weight status using a BMI-for-age growth chart”**

- Describe what this statement means in your own words.
- Describe how you would **classify a child's weight status using a BMI-for-age growth chart.**
- When you read **“weight status”** what do you think of?
- When you read **“BMI-for-age growth chart”** what do you think of?
- If you were to change the question, what edits would you make?

5. Now read the final statement on this page.

**“Describe to an obese child and family members how to eat more meals together as a family”**

- Describe what this statement means in your own words.
- Describe how you would **describe to an obese child and family members how to eat more meals together as a family.**
- If you were to change the question, what edits would you make?

6. Now flip or scroll to the second page and read the first statement.

**“Talk with an obese child and family members about the benefits of making lifestyle changes”**

- Describe what this statement means in your own words.
- Describe how you would **talk with an obese child and family members about the benefits of making lifestyle changes.**
- If you were to change the question, what edits would you make?

7. Now read the second statement on this page.

**“Determine if an obese child and family members recognize they need to make lifestyle changes”**

- Describe what this statement means in your own words.

- Describe how you would **determine if an obese child and family members recognize they need to make lifestyle changes.**
- If you were to change the question, what edits would you make?

8. Please read the third statement on the page.

**“Assess an obese child and family members' current physical activity-related behaviors”**

- Describe what this statement means in your own words.
- Describe how you would **assess an obese child and family members' current physical activity-related behaviors.**
- If you were to change the question, what edits would you make?

9. Now the fourth statement.

**“Assist an obese child and family members in finding resources to help them change food-related behaviors”**

- Describe what this statement means in your own words.
- Describe how you would **assist an obese child and family members in finding resources to help them change food-related behaviors.**
- When you read **“food-related behaviors”** what do you think of?
- If you were to change the question, what edits would you make?

10. Now the final statement on this page.

**“Describe to an obese child and family members how to choose healthy foods to consume”**

- Describe what this statement means in your own words.
- Describe how you would **describe to an obese child and family members how to choose healthy foods to consume.**
- If you were to change the question, what edits would you make?

11. Now, please turn to the third page and read the first statement.

**“Use motivational interviewing to counsel an obese child and family members about lifestyle changes”**

- Describe what this statement means in your own words
- Describe how you would **use motivational interviewing to counsel an obese child and family members about lifestyle changes.**
- When you read “**motivational interviewing**” what do you think of?
- If you were to change the question, what edits would you make?

12. Now for the second statement on this page.

**“Classify a child's weight status visually”**

- Describe what this statement means in your own words.
- Describe how you would **classify a child's weight status visually.**
- If you were to change the question, what edits would you make?

13. Now read the third statement.

**“Talk to a child about their weight status”**

- Describe what this statement means in your own words.
- Describe how you would **talk to a child about their weight status.**
- If you were to change the question, what edits would you make?

14. Now the fourth statement:

**“Describe to an obese child and family members how to engage in physical activity”**

- Describe what this statement means in your own words.
- Describe how you would **describe to an obese child and family members how to engage in physical activity.**
- If you were to change the question, what edits would you make?

15. And now read the final statement on this page.

**“Describe to an obese child and family members how to determine appropriate portion sizes”**

- Describe what this statement means in your own words.
- Describe how you would **describe to an obese child and family members how to determine appropriate portion sizes.**
- If you were to change the question, what edits would you make?

16. Ok, now flip to the fourth page. We're over halfway done!

**“Determine if an obese child and family members are ready to make lifestyle changes”**

- Describe what this statement means in your own words.
- Describe how you would **determine if an obese child and family members are ready to make lifestyle changes.**
- If you were to change the question, what edits would you make?

17. Now for the second statement.

**“Assess an obese child and family members' current food-related behaviors”**

- Describe what this statement means in your own words.
- Describe how you would **assess an obese child and family members' current food-related behaviors.**
- If you were to change the question, what edits would you make?

18. Read the third statement to yourself.

**“Talk to a parent about their child's weight status”**

- Describe what this statement means in your own words.
- Describe how you would **talk to a parent about their child's weight status.**
- If you were to change the question, what edits would you make?

19. Now read the fourth statement.

**“Advise an obese child and family members in changing food-related behaviors”**

- Describe what this statement means in your own words.
- Describe how you would **advise an obese child and family members in changing food-related behaviors.**
- If you were to change the question, what edits would you make?

20. And now for the final statement on this page.

**“Describe to an obese child and family members how to choose healthy snack alternatives”**

- Describe what this statement means in your own words.
- Describe how you would **describe to an obese child and family members how to choose healthy snack alternatives.**
- If you were to change the question, what edits would you make?

21. Now flip to the fifth and final page and read the first statement.

**“Advise an obese child and family members in changing physical activity-related behaviors”**

- Describe what this statement means in your own words.
- Describe how you would **advise an obese child and family members in changing physical activity-related behaviors.**
- If you were to change the question, what edits would you make?

22. Now for the second statement.

**“Talk to an obese child and family members about removing barriers to change”**

- Describe what this statement means in your own words.
- Describe how you would **talk to an obese child and family members about removing barriers to change.**
- If you were to change the question, what edits would you make?

23. The third statement:

**“Describe to an obese child and family members how to increase fruit and vegetable consumption”**

- Describe what this statement means in your own words.
- Describe how you would **describe to an obese child and family members how to increase fruit and vegetable consumption.**
- If you were to change the question, what edits would you make?

24. And finally, the last statement.

**“Know when to refer an obese child and family members to a registered dietitian”**

- Describe what this statement means in your own words.
- Describe how you would **know when to refer an obese child and family members to a registered dietitian.**
- If you were to change the question, what edits would you make?

Great!

One final question:

Do you have any final thoughts about edits I can make to the survey to make it easier to understand?

Thank you for helping me out today! I really appreciate your feedback and look forward to making changes. Since I will be sending this survey to your peers, I ask that you keep the questions and nature of the questions to yourself. We don't want to contaminate our sample. Thank you for understanding!

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Additional researcher notes/thoughts:

Appendix V. Study 3 Expert Panel 2 Recruitment E-mail

Subject: Request for expert review of survey to measure medical students' self-efficacy and belief in preventing and treating childhood obesity

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Dear \_\_\_\_\_,

[INSERT PERSON-SPECIFIC SALUTATIONS]

I am writing to ask for your help in my dissertation research. For the third stage of my dissertation research, I am developing and validating a survey to measure medical students' self-efficacy and beliefs in childhood obesity.

The goal of this survey is to determine medical students' self-efficacy in childhood obesity prevention and treatment skills and their belief in if those skills are actually effective. The hope is that by validating this tool specifically for medical students, we will be able to determine the state of medical students' confidence in preventing and treating childhood obesity and inform potential curricular changes.

We are currently in the third and final stage of survey development. Survey questions were written by our research team and then reviewed for relevancy by a team of experts. Questions were eliminated, and we conducted cognitive interviews with medical students. Questions were then slightly modified based on medical student suggestions. The result was a 46-item survey.

The next step involves expert review this survey for face validity before it is administered online to a nationwide sample of medical students. Since you are an expert in the field of \_\_\_\_\_, we value your opinion.

Participating in this expert review of the survey should take approximately 15 minutes of your time. The review involves reading each question and indicating into what category each question appears to fall.

If you agree to help, I will send you a follow-up e-mail with the survey and instructions. I know your time is valuable, so I appreciate your consideration in helping with this stage of my research. Please let me know either way by **Tuesday, April 9<sup>th</sup>** so that I may make plans accordingly.

Thank you!  
Natalie K. Cooke

Appendix W. Study 3 Expert Panel 2 Instructions E-mail

Subject: Re: Request for expert review of survey to measure medical students' self-efficacy and belief in preventing and treating childhood obesity

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Dear \_\_\_\_\_,

Thank you for agreeing to help with this face validity piece of survey development! I appreciate your honest and analytical opinion of the survey.

Attached you will find two documents:

- (1) A PDF of the survey so you can see it in its entirety
- (2) A face validity form

Directions:

1. Read the PDF of the survey (first attachment):
  - a. Please read all 5 pages of the survey before completing the face validity form.
2. Complete the face validity form (second attachment):
  - a. In the document, you will find the 46 survey questions with a blank to the left of each question.
  - b. Please indicate in which subcategory you would categorize each question by typing a number (1-6) in the blank. If you believe the question could fall into more than one category, please type multiple numbers in the blank.

If you could please return the completed form by **Tuesday, April 23rd at 5:00pm PST**, I would greatly appreciate it. I will send both a one-week and a one-day reminder for your convenience.

Please let me know if you have any questions. Thank you again for helping me with this part of the project. I really appreciate it!

Thank you,  
Natalie

## Appendix X. Study 3 Expert Panel 2 Face Validity Form

### About the survey:

The survey is a two-column survey with a 5-point Likert scale. All the self-efficacy questions are in the left-hand column, and all the corresponding belief questions are in the right-hand column.

Questions fall into 6 proposed sub-categories:

- (1) Confidence in Diagnosing and Discussing Childhood Obesity
- (2) Belief in Diagnosing and Discussing Childhood Obesity
- (3) Confidence in General Childhood Obesity Counseling Skills
- (4) Belief in General Childhood Obesity Counseling Skills
- (5) Confidence in Specific Childhood Obesity Counseling Skills
- (6) Belief in Specific Childhood Obesity Counseling Skills

### Directions:

1. Read the PDF of the survey (other attachment):
  - a. Please read all 5 pages of the survey before completing the face validity form on the following pages of this document.
2. Complete the face validity form (this document):
  - a. On the following pages of this document, you will find the 46 survey questions with a blank to the left of each question.
  - b. Please indicate in which subcategory you would categorize each question by typing a number (1-6) in the blank. If you believe the question could fall into more than one category, please type multiple numbers in the blank.

If you have any additional comments or advice to provide, please type that at the end of the survey.

Thank you again for your help!

**Directions:** *Please indicate in which subcategory you would categorize each question by typing a number (1-6) in the blank.*

- (1) Confidence in Diagnosing and Discussing Childhood Obesity**
- (2) Belief in Diagnosing and Discussing Childhood Obesity**
- (3) Confidence in General Childhood Obesity Counseling Skills**
- (4) Belief in General Childhood Obesity Counseling Skills**
- (5) Confidence in Specific Childhood Obesity Counseling Skills**
- (6) Belief in Specific Childhood Obesity Counseling Skills**

*If you believe the question could fall into more than one category, please type multiple numbers in the blank.*

-----

\_\_\_\_\_ 1. I am confident that I can guide an obese child and family members to help them make small, attainable goals about lifestyle changes.

\_\_\_\_\_ 2. I believe it is important to guide an obese child and family members to help them make small, attainable goals about lifestyle changes.

\_\_\_\_\_ 3. I am confident that I can describe to an obese child and family members what a healthy diet should include.

\_\_\_\_\_ 4. I believe it is important to describe to an obese child and family members what a healthy diet should include.

\_\_\_\_\_ 5. I am confident that I can assist an obese child and family members in finding resources to help them change physical activity-related behaviors.

\_\_\_\_\_ 6. I believe it is important to assist an obese child and family members in finding resources to help them change physical activity-related behaviors.

\_\_\_\_\_ 7. I am confident that I can classify a child's weight status using a BMI-for-age growth chart.

\_\_\_\_\_ 8. I believe it is important to classify a child's weight status using a BMI-for-age growth chart.

\_\_\_\_\_ 9. I am confident that I can describe to an obese child and family members how to eat more meals together as a family.

\_\_\_\_\_ 10. I believe it is important to describe to an obese child and family members how to eat more meals together as a family.

**Directions:** *Please indicate in which subcategory you would categorize each question by typing a number (1-6) in the blank.*

- (1) Confidence in Diagnosing and Discussing Childhood Obesity**
- (2) Belief in Diagnosing and Discussing Childhood Obesity**
- (3) Confidence in General Childhood Obesity Counseling Skills**
- (4) Belief in General Childhood Obesity Counseling Skills**
- (5) Confidence in Specific Childhood Obesity Counseling Skills**
- (6) Belief in Specific Childhood Obesity Counseling Skills**

*If you believe the question could fall into more than one category, please type multiple numbers in the blank.*

-----

\_\_\_\_\_ 11. I am confident that I can talk with an obese child and family members about the benefits of making lifestyle changes.

\_\_\_\_\_ 12. I believe it is important to talk with an obese child and family members about the benefits of making lifestyle changes.

\_\_\_\_\_ 13. I am confident that I can determine if an obese child and family members recognize they need to make lifestyle changes.

\_\_\_\_\_ 14. I believe it is important to determine if an obese child and family members recognize they need to make lifestyle changes.

\_\_\_\_\_ 15. I am confident that I can assess an obese child and family members' current physical activity-related behaviors.

\_\_\_\_\_ 16. I believe it is important to assess an obese child and family members' current physical activity-related behaviors.

\_\_\_\_\_ 17. I am confident that I can assist an obese child and family members in finding resources to help them change food-related behaviors.

\_\_\_\_\_ 18. I believe it is important to assist an obese child and family members in finding resources to help them change food-related behaviors.

\_\_\_\_\_ 19. I am confident that I can describe to an obese child and family members how to choose healthy foods to consume.

\_\_\_\_\_ 20. I believe it is important to describe to an obese child and family members how to choose healthy foods to consume.

**Directions:** *Please indicate in which subcategory you would categorize each question by typing a number (1-6) in the blank.*

- (1) Confidence in Diagnosing and Discussing Childhood Obesity**
- (2) Belief in Diagnosing and Discussing Childhood Obesity**
- (3) Confidence in General Childhood Obesity Counseling Skills**
- (4) Belief in General Childhood Obesity Counseling Skills**
- (5) Confidence in Specific Childhood Obesity Counseling Skills**
- (6) Belief in Specific Childhood Obesity Counseling Skills**

*If you believe the question could fall into more than one category, please type multiple numbers in the blank.*

-----

\_\_\_\_\_ 21. I am confident that I can use motivational interviewing to counsel an obese child and family members about lifestyle changes.

\_\_\_\_\_ 22. I believe it is important to use motivational interviewing to counsel an obese child and family members about lifestyle changes.

\_\_\_\_\_ 23. I am confident that I can talk to a child about their weight status.

\_\_\_\_\_ 24. I believe it is important to talk to a child about their weight status.

\_\_\_\_\_ 25. I am confident that I can describe to an obese child and family members how to engage in physical activity.

\_\_\_\_\_ 26. I believe it is important to describe to an obese child and family members how to engage in physical activity.

\_\_\_\_\_ 27. I am confident that I can describe to an obese child and family members how to determine appropriate portion sizes.

\_\_\_\_\_ 28. I believe it is important to describe to an obese child and family members how to determine appropriate portion sizes.

\_\_\_\_\_ 29. I am confident that I can determine if an obese child and family members are ready to make lifestyle changes.

\_\_\_\_\_ 30. I believe it is important to determine if an obese child and family members are ready to make lifestyle changes.

**Directions:** *Please indicate in which subcategory you would categorize each question by typing a number (1-6) in the blank.*

- (1) Confidence in Diagnosing and Discussing Childhood Obesity**
- (2) Belief in Diagnosing and Discussing Childhood Obesity**
- (3) Confidence in General Childhood Obesity Counseling Skills**
- (4) Belief in General Childhood Obesity Counseling Skills**
- (5) Confidence in Specific Childhood Obesity Counseling Skills**
- (6) Belief in Specific Childhood Obesity Counseling Skills**

*If you believe the question could fall into more than one category, please type multiple numbers in the blank.*

-----

\_\_\_\_\_ 31. I am confident that I can assess an obese child and family members' current food-related behaviors.

\_\_\_\_\_ 32. I believe it is important to assess an obese child and family members' current food-related behaviors.

\_\_\_\_\_ 33. I am confident that I can talk to a family member about their child's weight status.

\_\_\_\_\_ 34. I believe it is important to talk to a family member about their child's weight status.

\_\_\_\_\_ 35. I am confident that I can advise an obese child and family members how to change food-related behaviors.

\_\_\_\_\_ 36. I believe it is important to advise an obese child and family members how to change food-related behaviors.

\_\_\_\_\_ 37. I am confident that I can describe to an obese child and family members how to choose healthy snack alternatives.

\_\_\_\_\_ 38. I believe it is important to describe to an obese child and family members how to choose healthy snack alternatives.

\_\_\_\_\_ 39. I am confident that I can advise an obese child and family members how to change physical activity-related behaviors.

\_\_\_\_\_ 40. I believe it is important to advise an obese child and family members how to change physical activity-related behaviors.

**Directions:** *Please indicate in which subcategory you would categorize each question by typing a number (1-6) in the blank.*

- (1) Confidence in Diagnosing and Discussing Childhood Obesity**
- (2) Belief in Diagnosing and Discussing Childhood Obesity**
- (3) Confidence in General Childhood Obesity Counseling Skills**
- (4) Belief in General Childhood Obesity Counseling Skills**
- (5) Confidence in Specific Childhood Obesity Counseling Skills**
- (6) Belief in Specific Childhood Obesity Counseling Skills**

*If you believe the question could fall into more than one category, please type multiple numbers in the blank.*

-----

\_\_\_\_\_ 41. I am confident that I can talk to an obese child and family members about removing barriers to change.

\_\_\_\_\_ 42. I believe it is important to talk to an obese child and family members about removing barriers to change.

\_\_\_\_\_ 43. I am confident that I can describe to an obese child and family members how to increase fruits and vegetable consumption.

\_\_\_\_\_ 44. I believe it is important to describe to an obese child and family members how to increase fruits and vegetable consumption.

\_\_\_\_\_ 45. I am confident that I can know when to refer an obese child and family members to a registered dietitian.

\_\_\_\_\_ 46. I believe it is important to know when to refer an obese child and family members to a registered dietitian.

Additional comments:

Thank you for taking the time to help us with the development of this survey. We appreciate it!

Appendix Y. Study 3 Survey Recruitment E-mail

Subject: Looking for Medical Students to Participate in Survey about Prevention and Treatment of Childhood Obesity

---

Hello!

We are developing a survey about medical students' childhood obesity prevention and treatment practices, and we need your help!

The survey takes approximately 15-30 minutes to complete, and for every survey completed, we will donate \$1 to the American Cancer Society.

You can complete the survey by clicking here:

[http://ncsu.qualtrics.com//SE/?SID=SV\\_6rkhpHfQTUGwaY5](http://ncsu.qualtrics.com//SE/?SID=SV_6rkhpHfQTUGwaY5)

We appreciate your help. Please feel free to share this e-mail with any other medical students at your medical school or other medical schools.

Thank you,

Natalie Cooke  
North Carolina State University  
nkcooke@ncsu.edu

## Appendix Z. Study 3 Online Survey

(Consent Form, Demographic Questions, COP-SE Survey)

**NC STATE UNIVERSITY**

Medical Student Childhood Obesity Prevention and Treatment Survey

**North Carolina State University  
INFORMED CONSENT FORM for RESEARCH**

Title of Study: Validation of Medical Student Childhood Obesity Prevention and Treatment Survey

Principal Investigator: Natalie Cooke

Faculty Advisor: Dr. Suzie Goodell

**What are some general things you should know about research studies?**

*You are being asked to take part in a research study. Your participation in this study is voluntary. You have the right to be a part of this study, to choose not to participate or to stop participating at any time without penalty. The purpose of research studies is to gain a better understanding of a certain topic or issue. You are not guaranteed any personal benefits from being in a study. Research studies also may pose risks to those that participate. In this consent form you will find specific details about the research in which you are being asked to participate. If you do not understand something in this form it is your right to ask the researcher for clarification or more information. A copy of this consent form will be provided to you. If at any time you have questions about your participation, do not hesitate to contact the researcher(s) named above.*

**What is the purpose of this study?**

*We want to determine medical student viewpoints of childhood obesity prevention and treatment practices through an online survey.*

**What will happen if you take part in the study?**

*If you agree to participate in this study, you will be asked to answer questions about your confidence in certain prevention and treatment practices, your belief in the effectiveness of those practices, and general confidence questions. It will take approximately 15-30 minutes of your time.*

**Risks**

*You will answer survey questions related to your views of childhood obesity prevention and treatment. This process may make you uncomfortable by sharing personal opinions with an interviewer. You are free to not answer any questions that you do not wish to answer.*

**Benefits**

*You will not receive direct benefits from participating in this project. However, your responses will be used to validate this survey about medical students' viewpoints of childhood obesity prevention and treatment practices. Eventually we hope to use this information to improve the quality of education future healthcare providers receive.*

**Confidentiality**

*You will be asked to provide your name and e-mail address to ensure there are no duplicate survey responses, but your name will not be linked with your survey responses. You will be assigned a unique number to accompany your responses. All data will be stored in a locked location in Schaub Food Science Building, NC State University.*

**Compensation**

*For participation in the study, we will donate \$1 to the American Cancer Society. We will only donate the funds if you complete the entire survey.*

**What if you have questions about this study?**

*If you have questions at any time about the study or the procedures, you may contact the researcher, Natalie Cooke, at 218 Schaub Food Science Building, NC State University, or (919-513-2632) or [nkcooke@ncsu.edu](mailto:nkcooke@ncsu.edu) .*

**What if you have questions about your rights as a research participant?**

*If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Deb Paxton, Regulatory Compliance Administrator, Box 7514, NCSU Campus (919-515-4514).*

**Consent To Participate**

*"I have read and understand the above information. I have printed a copy of this form. I give electronic consent to participate in this study with the understanding that I may choose not to participate or to stop participating at any time without penalty or loss of benefits to which I am otherwise entitled."*

---

What is your first name?

---

What is your last name?

---

What is your e-mail address?



Questions? Contact: Natalie Cooke (nkcooke@ncsu.edu)

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**NC STATE UNIVERSITY**

## Medical Student Childhood Obesity Prevention and Treatment Survey

What is your age?



Questions? Contact: Natalie Cooke (nkcooke@ncsu.edu)

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In what year of medical school are you currently?

- 1
- 2
- 3
- 4

>>

Questions? Contact: Natalie Cooke (nkcooke@ncsu.edu)

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In what area do you plan to specialize?

- Anesthesiology
- Cardiology
- Dermatology
- Family Medicine
- Gastroenterology
- Oncology
- Internal Medicine-Pediatrics
- Neurology
- OBGyn
- Surgery
- Pediatrics
- Psychiatry
- Radiology
- Urology
- Undecided
- Other



Questions? Contact: Natalie Cooke (nkooke@ncsu.edu)

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What is your sex?

- Male
- Female
- Other

What medical school do you attend?



Questions? Contact: Natalie Cooke (nkcooke@ncsu.edu)

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What were your undergraduate majors/minors?

Do you hold or are you currently pursuing any other graduate degrees? If yes, please describe.



Questions? Contact: Natalie Cooke (nkcooke@ncsu.edu)

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Medical Student Childhood Obesity Prevention and Treatment Survey

Approximately how many patient contact hours have you had with obese children and/or their families

Have you completed your Pediatrics rotation?

- Yes
- No

Have you completed any internships or volunteer experience where you worked with obese children and/or their families? If so, please describe. If not, please type "no."



Questions? Contact: Natalie Cooke (nkcooke@ncsu.edu)

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Medical Student Childhood Obesity Prevention and Treatment Survey

Note: For the purpose of this survey, "child" is defined as being between the ages of 5 and 10.



Questions? Contact: Natalie Cooke (nkcooke@ncsu.edu)

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**Medical Student Childhood Obesity Prevention and Treatment Survey**

For each question, indicate your level of agreement by clicking one of the 5 options in the column, ranging from Strongly Disagree to Strongly Agree. Each question has two parts, so make sure you indicate an answer in each column. **For the purpose of this survey, "child" is defined as being between the ages of 5 and 10.**

Indicate your (1) level of confidence and (2) belief in the importance of the following skill:

	I am confident that I can ....					I believe it is important to ...				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. Guide an obese child to help them make small, attainable goals about lifestyle changes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Describe to an obese child's family members what a healthy diet should include.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Assess an obese child's current physical activity-related behaviors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Assist an obese child in finding resources to help them change food-related behaviors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Describe to an obese child how to engage in physical activity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Questions? Contact: Natalie Cooke (nkcooke@ncsu.edu)

**Medical Student Childhood Obesity Prevention and Treatment Survey**

For each question, indicate your level of agreement by clicking one of the 5 options in the column, ranging from Strongly Disagree to Strongly Agree. Each question has two parts, so make sure you indicate an answer in each column. **For the purpose of this survey, "child" is defined as being between the ages of 5 and 10.**

Indicate your (1) level of confidence and (2) belief in the importance of the following skill:

	I am confident that I can ...					I believe it is important to ...				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
6. Advise an obese child how to change physical activity-related behaviors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Discuss a child's weight status with a child.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Use motivational interviewing to guide an obese child's family members to make lifestyle changes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Advise an obese child's family members how to change food-related behaviors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Assist an obese child in finding resources to help them change physical activity-related behaviors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Questions? Contact: Natalie Cooke (nkooke@ncsu.edu)

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**Medical Student Childhood Obesity Prevention and Treatment Survey**

For each question, indicate your level of agreement by clicking one of the 5 options in the column, ranging from Strongly Disagree to Strongly Agree. Each question has two parts, so make sure you indicate an answer in each column. **For the purpose of this survey, "child" is defined as being between the ages of 5 and 10.**

Indicate your (1) level of confidence and (2) belief in the importance of the following skill:

	I am confident that I can ...					I believe it is important to ...				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
11. Describe to an obese child how to determine appropriate portion sizes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Assess an obese child's current food-related behaviors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Describe to an obese child how to increase fruit and vegetable consumption.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Discuss with an obese child's family members the benefits of making lifestyle changes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Describe to an obese child's family members how to determine appropriate portion sizes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Questions? Contact: Natalie Cooke (nkcooke@ncsu.edu)

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**Medical Student Childhood Obesity Prevention and Treatment Survey**

For each question, indicate your level of agreement by clicking one of the 5 options in the column, ranging from Strongly Disagree to Strongly Agree. Each question has two parts, so make sure you indicate an answer in each column. **For the purpose of this survey, "child" is defined as being between the ages of 5 and 10.**

Indicate your (1) level of confidence and (2) belief in the importance of the following skill:

	I am confident that I can ...					I believe it is important to ...				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
16. Determine if an obese child is ready to make lifestyle changes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. Describe to an obese child's family members how to eat more meals together as a family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. Classify a child's weight status using a BMI-for-age growth chart.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. Discuss a child's weight status with a child's family members.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. Advise an obese child how to change food-related behaviors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Questions? Contact: Natalie Cooke (nkcooke@ncsu.edu)

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**Medical Student Childhood Obesity Prevention and Treatment Survey**

For each question, indicate your level of agreement by clicking one of the 5 options in the column, ranging from Strongly Disagree to Strongly Agree. Each question has two parts, so make sure you indicate an answer in each column. **For the purpose of this survey, "child" is defined as being between the ages of 5 and 10.**

Indicate your (1) level of confidence and (2) belief in the importance of the following skill: \_\_\_\_\_

	I am confident that I can ...					I believe it is important to ...				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
21. Describe to an obese child's family members how to engage in physical activity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. Assist an obese child's family members in finding resources to help them change physical activity-related behaviors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. Discuss the health impacts of obesity with an obese child.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. Counsel an obese child in a way that helps them overcome barriers to change.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25. Describe to an obese child how to choose healthy foods to consume.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Questions? Contact: Natalie Cooke (nkcooke@ncsu.edu)

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**Medical Student Childhood Obesity Prevention and Treatment Survey**

For each question, indicate your level of agreement by clicking one of the 5 options in the column, ranging from Strongly Disagree to Strongly Agree. Each question has two parts, so make sure you indicate an answer in each column. **For the purpose of this survey, "child" is defined as being between the ages of 5 and 10.**

Indicate your (1) level of confidence and (2) belief in the importance of the following skill: \_\_\_\_\_

	I am confident that I can ...					I believe it is important to ...				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
26. Guide an obese child's family members to help them make small, attainable goals about lifestyle changes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27. Determine if an obese child recognizes they need to make lifestyle changes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28. Use motivational interviewing to guide an obese child to make lifestyle changes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
29. Describe to an obese child what a healthy diet should include.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
30. Counsel an obese child's family members in a way that helps them overcome barriers to change.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Questions? Contact: Natalie Cooke (nkooke@ncsu.edu)

**Medical Student Childhood Obesity Prevention and Treatment Survey**

For each question, indicate your level of agreement by clicking one of the 5 options in the column, ranging from Strongly Disagree to Strongly Agree. Each question has two parts, so make sure you indicate an answer in each column. **For the purpose of this survey, "child" is defined as being between the ages of 5 and 10.**

Indicate your (1) level of confidence and (2) belief in the importance of the following skill:

	I am confident that I can ...					I believe it is important to ...				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
31. Assess an obese child's family members' current food-related behaviors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
32. Describe to an obese child's family members how to choose healthy foods to consume.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
33. Discuss with an obese child the benefits of making lifestyle changes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
34. Describe to an obese child how to choose healthy snack alternatives.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
35. Describe to an obese child's family members how to increase fruit and vegetable consumption.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Questions? Contact: Natalie Cooke (nkcooke@ncsu.edu)

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For each question, indicate your level of agreement by clicking one of the 5 options in the column, ranging from Strongly Disagree to Strongly Agree. Each question has two parts, so make sure you indicate an answer in each column. **For the purpose of this survey, "child" is defined as being between the ages of 5 and 10.**

Indicate your (1) level of confidence and (2) belief in the importance of the following skill:

	I am confident that I can ...					I believe it is important to ...				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
36. Determine if an obese child's family members recognize they need to make lifestyle changes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
37. Describe to an obese child's family members how to choose healthy snack alternatives.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
38. Discuss the health impacts of obesity with an obese child's family members.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
39. Advise an obese child's family members how to change physical activity-related behaviors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
40. Assess an obese child's family members' current physical activity-related behaviors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Questions? Contact: Natalie Cooke (nkooke@ncsu.edu)

Medical Student Childhood Obesity Prevention and Treatment Survey

For each question, indicate your level of agreement by clicking one of the 5 options in the column, ranging from Strongly Disagree to Strongly Agree. Each question has two parts, so make sure you indicate an answer in each column. **For the purpose of this survey, "child" is defined as being between the ages of 5 and 10.**

Indicate your (1) level of confidence and (2) belief in the importance of the following skill:

	I am confident that I can ...					I believe it is important to ...				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
41. Determine if an obese child's family members are ready to make lifestyle changes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
42. Assist an obese child's family members in finding resources to help them change food-related behaviors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
43. Refer an obese child to a registered dietitian.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Questions? Contact: Natalie Cooke (nkcooke@ncsu.edu)

Survey Powered By Qualtrics

Medical Student Childhood Obesity Prevention and Treatment Survey

Thank you for your time!

If you have any questions, please contact: Natalie Cooke (nkcooke@ncsu.edu)

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## **Medical students: Participate in a survey about childhood obesity prevention and treatment**

By: Natalie Cooke

Childhood obesity is a nationwide epidemic affecting seventeen percent of children and adolescents between the ages of two and nineteen. Childhood obesity is unique because it involves not just the child but also family members of the child. In fact, childhood obesity can be described as being multifactorial, with contributors including not just the child's diet and physical activity and parental role modeling but also socioeconomic status, access to healthy foods, and access to safe places to play. Childhood is important for building healthy habits and correcting habits that could lead to adult obesity.

While prevention and treatment of childhood obesity can be approached from multiple angles, researchers at North Carolina State University are seeking to prevent childhood obesity through healthcare providers. Healthcare providers, including physicians, nurses, and registered dietitians, can play a role in preventing and treating childhood obesity.

These North Carolina State University researchers sought to explore the etiology of childhood obesity through in-depth individual interviews with individuals in two populations: undergraduate seniors planning to pursue careers in healthcare and third and fourth year medical students at allopathic and osteopathic medical schools throughout the nation. In the qualitative study of 30 undergraduate seniors, researchers found that students are limited in their ideas of the prevention of childhood obesity and are not always able to give solutions for the myriad of contributors to childhood obesity. Additionally, they tend to find solutions to childhood obesity prevention and treatment in programs they have volunteered with or heard about through popular media. This research speaks to the value of undergraduate experience with programs targeting childhood obesity and nutrition and health education.

In the similar qualitative exploration of 78 third and fourth year medical students' views of childhood obesity, researchers found that medical students had an understanding of the contributors to childhood obesity, both individual and societal, as well as the complex biochemistry of nutrition. While students felt prepared in that capacity, they also felt they would benefit from more basic nutrition education in either formal or informal settings, more nutrition and physical activity resources to share with patients, and more practice interacting with obese children and their families.

As continuation of these qualitative studies, the researchers developed a survey about medical students' childhood obesity prevention and treatment practices. The survey is designed to assess medical students' confidence in certain childhood obesity prevention and treatment practices and belief in the effectiveness of those practices. In order to validate this

survey, the research team would like to hear from medical students in their first, second, third, or fourth year at allopathic and osteopathic medical schools across the nation.

The [survey](#) takes approximately 15-30 minutes to complete, and for every survey completed, the researchers will donate \$1 to the American Cancer Society. The research is approved by the North Carolina State University Institutional Review Board (IRB #3062).

Responses will be used to validate the Medical Student Childhood Obesity Prevention and Treatment survey. A validated survey would benefit the medical school population because it could be used in medical schools throughout the nation to improve the quality of education future physicians receive. Additionally, medical schools may choose to assess students' confidence and belief in childhood obesity prevention and treatment practices at various points throughout their medical education career. By gaining insight into confidence and belief in prevention and treatment skills, medical schools may be better equipped to provide students with the information, resources, skills, and experience medical students are seeking.

This research is not funded, and the researchers do not have any conflicts of interest to disclose. Questions or comments may be directed to Natalie Cooke, PhD Candidate, North Carolina State University ([nkcooke@ncsu.edu](mailto:nkcooke@ncsu.edu)).