



Transforming Pediatric Specialty Care through Virtual Health Technologies

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12/4/2018

Objectives

- **Review the definition, prevalence, etiology, and complications of pediatric obesity**
- **Outline recommendations for treatment and identify the barriers of delivering treatment**
- **Describe how telemedicine can be utilized in delivering care in pediatric obesity**

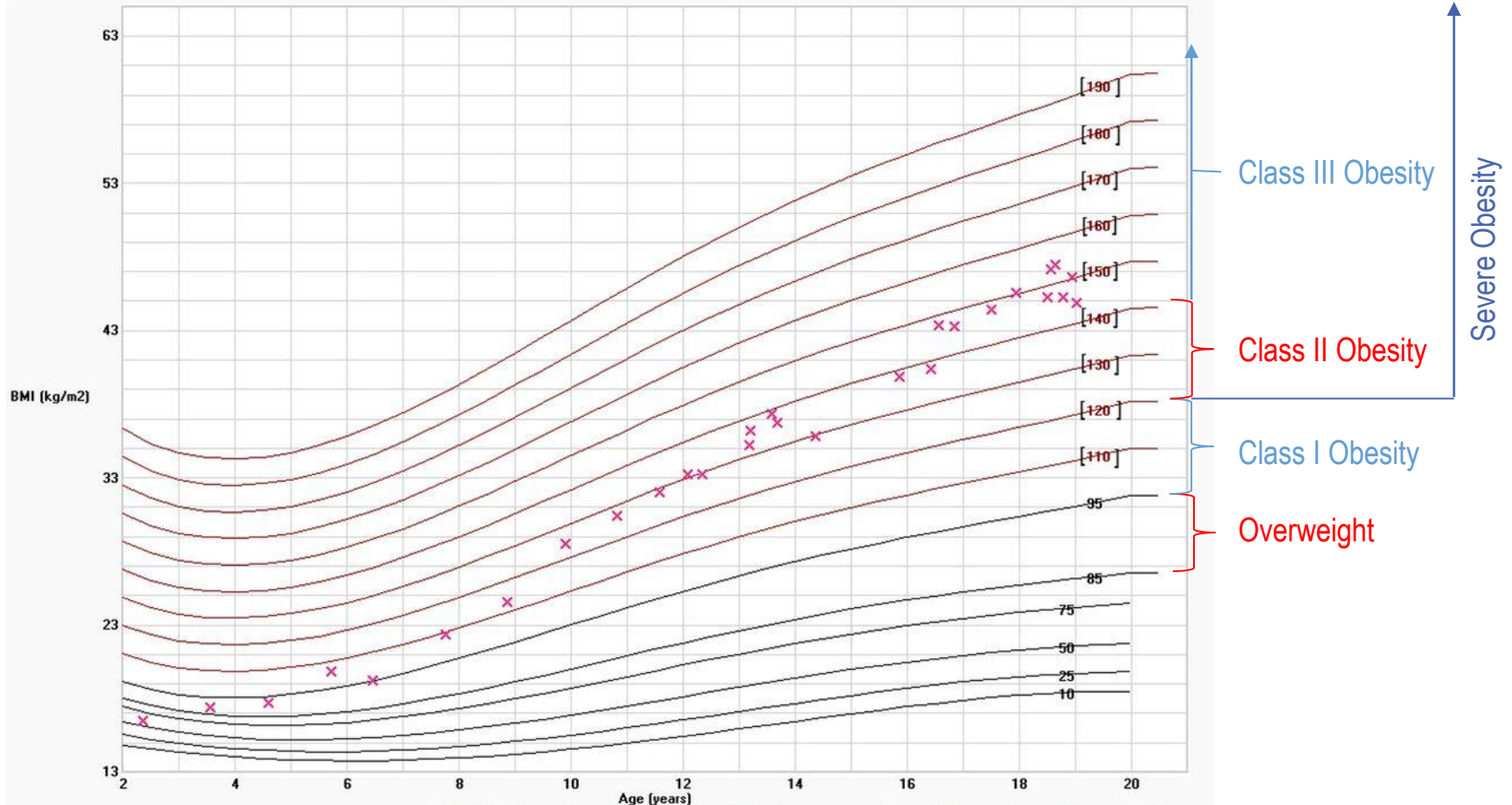
Defining Obesity

- **BMI = kg/ m²**

Category	Adults	Youth
Underweight	BMI < 18.5	BMI < 5 th ile
Normal Weight	BMI ≥18.5 to < 25	BMI ≥ 5 th ile to < 85 th ile
Overweight	BMI ≥25 to < 30	BMI ≥85 th ile to < 95 th ile
Obesity	BMI ≥30 to < 35	BMI ≥ 95 th ile to < 99 th ile
Severe Obesity	BMI ≥ 35 to < 40 (Class II obesity)	BMI ≥120% of the 95 th ile
	BMI ≥ 40 to < 50 (Class III Obesity)	BMI ≥140% of the 95 th ile
Super Obesity	BMI ≥ 50	

Obesity Growth Chart

Girls BMI - Percent of the 95th Percentile (Girls, 2-20 years)



Source: BMI table from CDC. Obese BMI curves are calculated as the percent of the 95th percentile, e.g. 150% is 1.5 x 95th.

Prevalence

- **Overweight and Obesity**

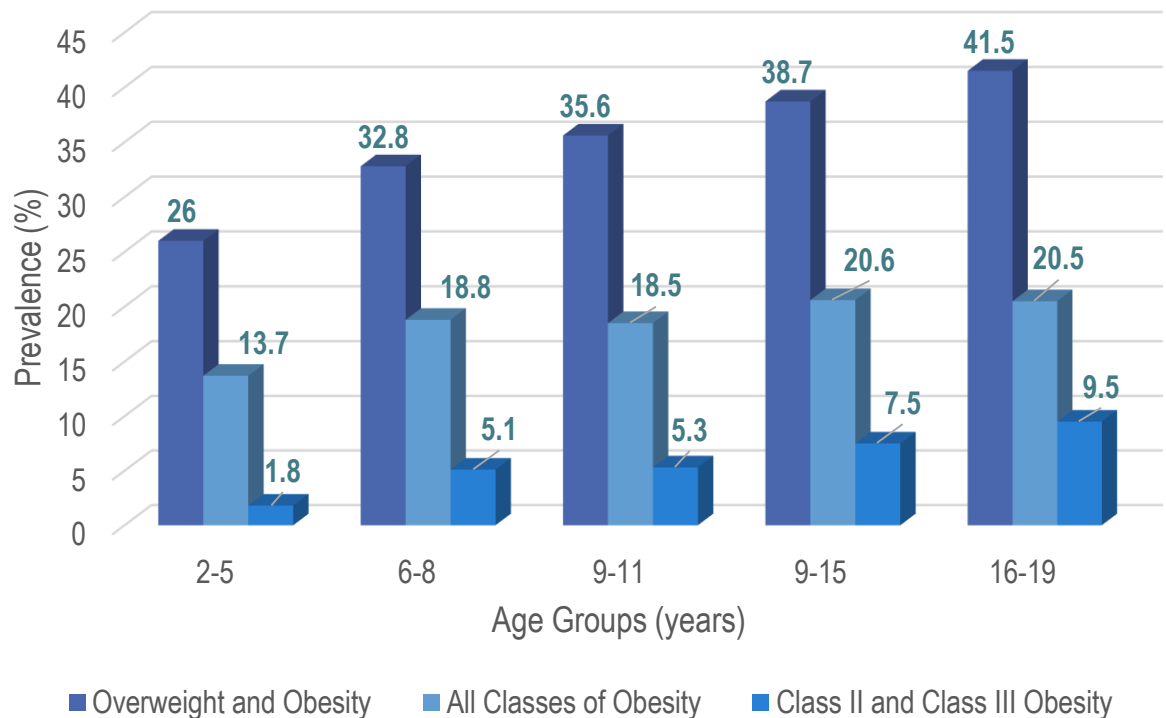
- 35.1%

- **Obesity**

- 18.5%

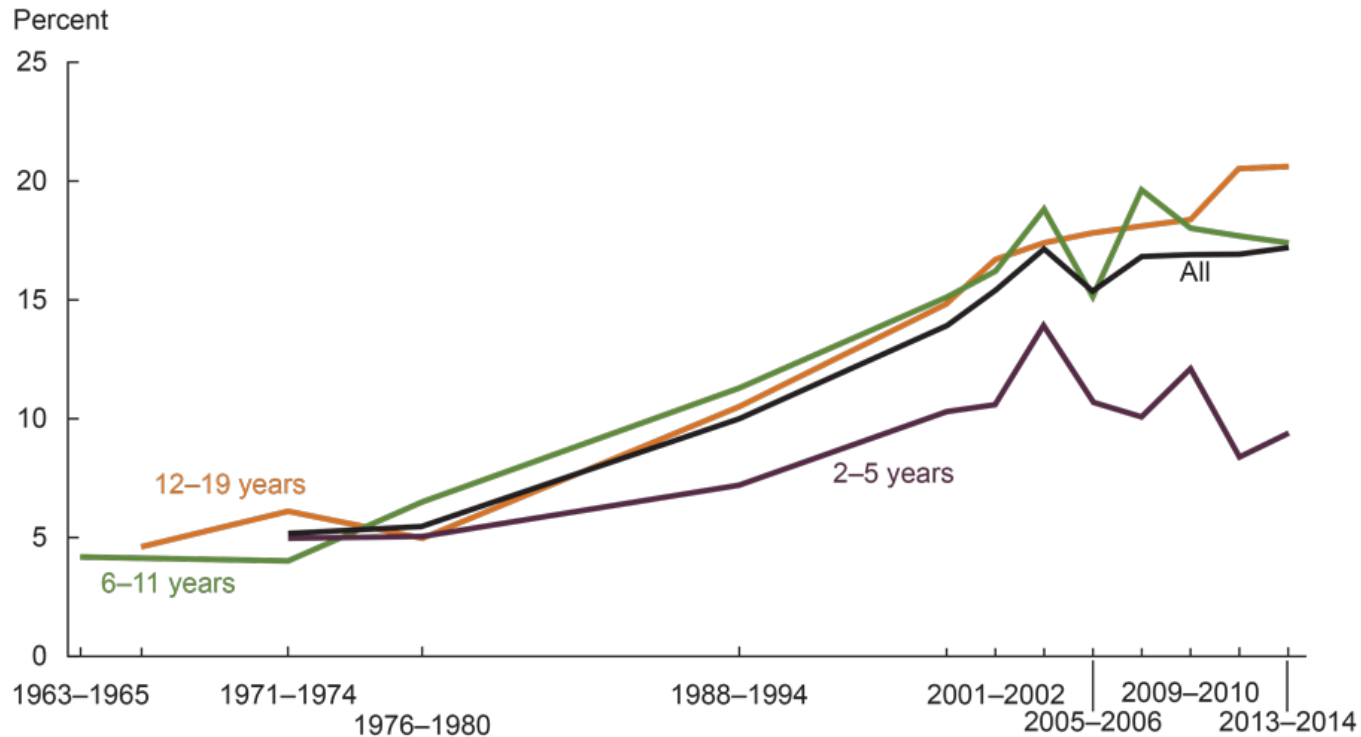
- 13.7 million children and adolescents

National Prevalence of Overweight and Obesity in U.S. Youth, 2015-2016



Trend of Prevalence

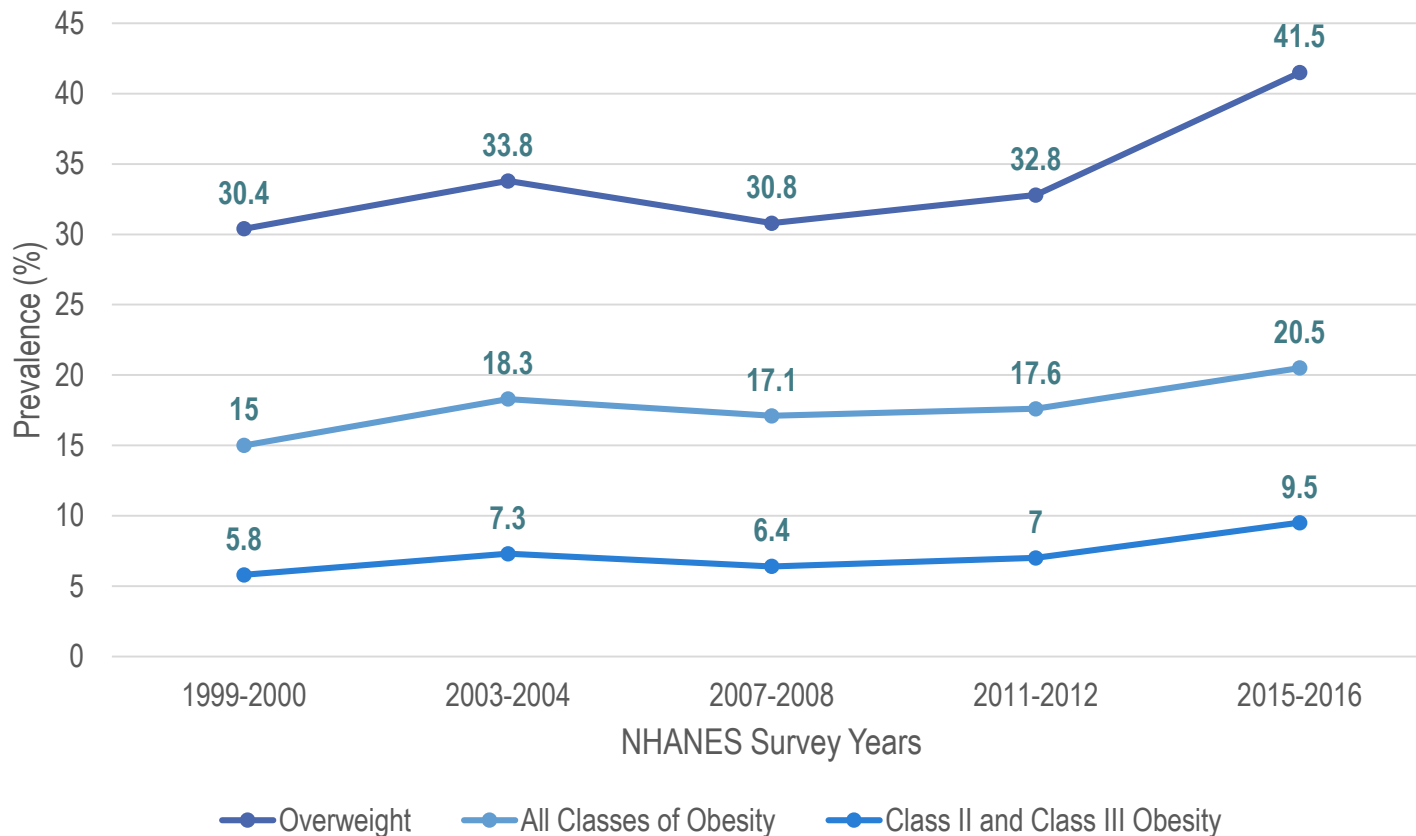
Figure. Trends in obesity among children and adolescents aged 2–19 years, by age: United States, 1963–1965 through 2013–2014



NOTES: Obesity is defined as body mass index (BMI) greater than or equal to the 95th percentile from the sex-specific BMI-for-age 2000 CDC Growth Charts.
 SOURCES: NCHS, National Health Examination Surveys II (ages 6–11) and III (ages 12–17); and National Health and Nutrition Examination Surveys (NHANES) I–III, and NHANES 1999–2000, 2001–2002, 2003–2004, 2005–2006, 2007–2008, 2009–2010, 2011–2012, and 2013–2014.

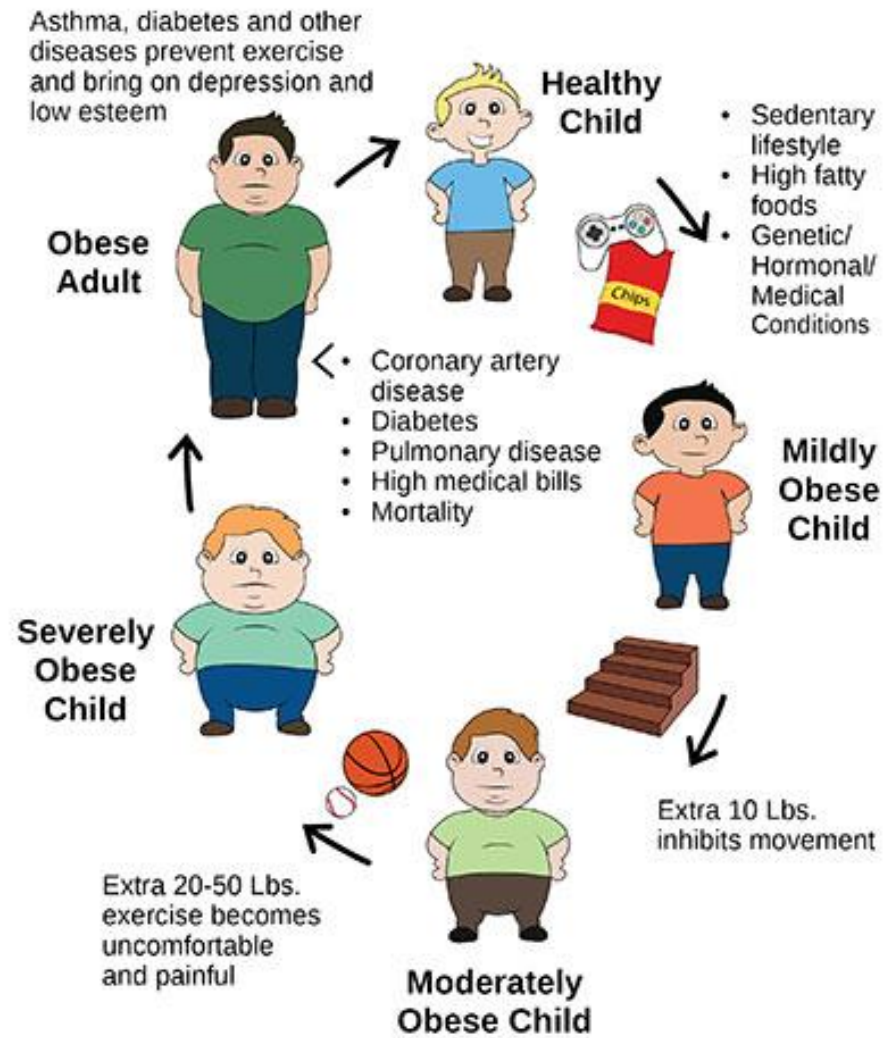
Trend of Prevalence in Adolescents

Trend of Prevalence of Overweight and Obesity in Adolescents
16-19 Years Old from 1999-2016

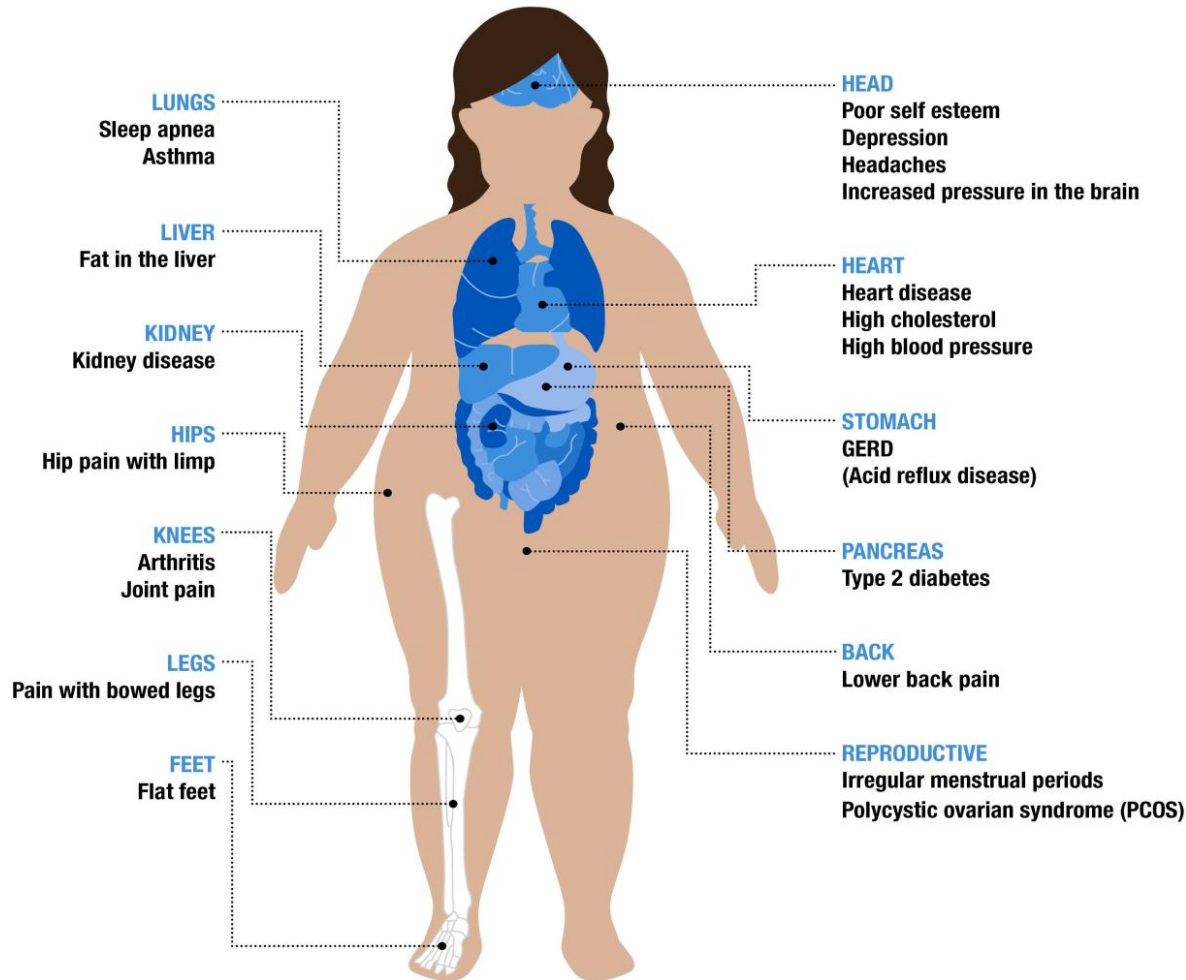


Etiology

- Genetics
- Psychosocial Factors
- Drug-induced weight gain
- Endocrine or Genetic Disorders
- Hypothalamic Obesity
- Other



Complications of Childhood Obesity

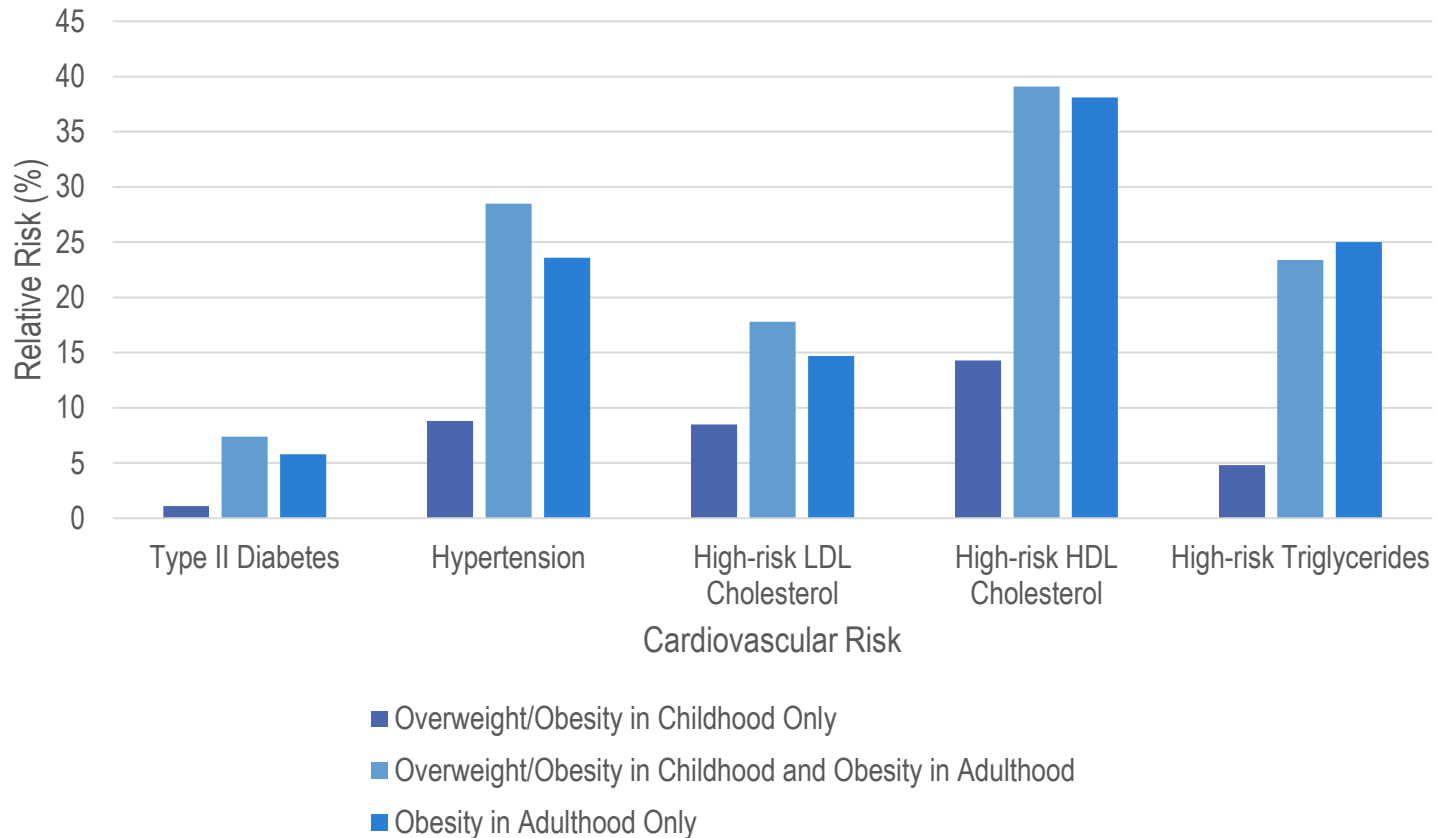


Persistence into Adulthood

- **More than 80% of children with obesity remain obese in adulthood¹**
- **Simulation of growth trajectory models using data from longitudinal studies predict that close to 60% of today's children will be obese at age 35 years²**

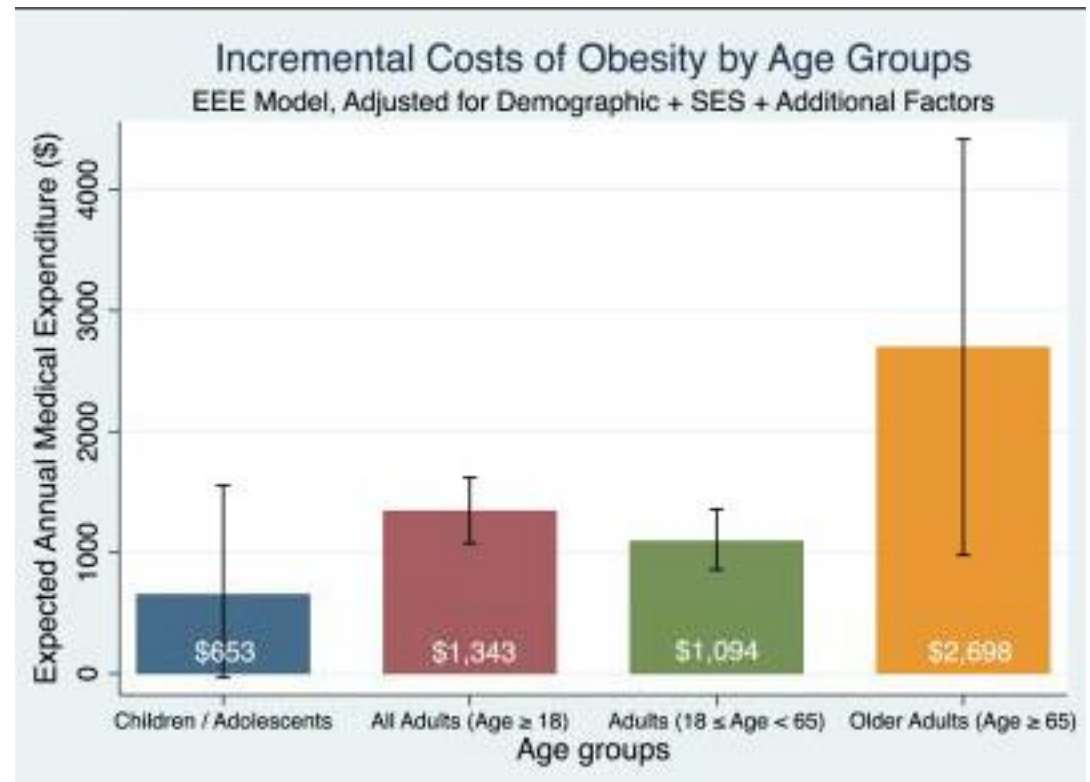
Cardiovascular Risk Based on Duration of Obesity

Relative Risk of High-Risk Outcomes in Adulthood According to Adiposity Status in Childhood and Adulthood



Medical Cost of Adult Obesity in 2014

- Annual medical cost attributable to obesity was about \$1900
- \$149.4 billion nationally
- Prevention and early intervention are key!



Treatment of Pediatric Obesity

- **Treatment is aimed at behavioral interventions**
- **Tertiary Care Weight Management Clinic**
 - Multidisciplinary team that usually includes:
 - Medical Provider
 - Dietitian
 - Exercise Physiologist or Physical Therapist
 - Psychologist and/ or Social Worker
 - Medications to manage comorbidities
 - Surgery is also offered for qualifying patients at some clinics
- **~ 70% of patients who return for a follow-up visit decrease or maintain BMI-z at subsequent visits**

USPTF Recommendations

- **≥ 26 contact hours behavioral interventions in a 2-12 month time period results in weight loss**
- **Lower adherence to clinic visits led decreased benefit of intervention**

Barriers of Treatment

- High rates of attrition (~27-73%)¹
- Parent-reported reasons for non-adherence²

Table 3. Level of Influence of Reasons for Patient Attrition.

Domain	No/Low Influence, n (%)	Moderate Influence, n (%)	High Influence, n (%)	Missing, n (%)
→ Scheduling	36 (24.5)	70 (47.6)	18 (12.2)	23 (15.6)
Implementation barriers	45 (30.6)	75 (51.0)	4 (2.7)	23 (15.6)
→ Transportation	54 (36.7)	62 (42.2)	14 (9.5)	17 (11.6)
Mismatched expectations	64 (43.5)	53 (36.1)	1 (0.7)	29 (19.7)
Finances	75 (51.0)	32 (21.8)	17 (11.6)	23 (15.6)
Motivation	79 (53.7)	44 (29.9)	14 (9.5)	10 (6.8)
Program characteristics	86 (58.5)	48 (32.7)	0 (0)	10 (6.8)
Child physical/emotional health	86 (58.5)	40 (27.2)	11 (7.5)	10 (6.8)
Parent physical/emotional health	88 (59.9)	45 (30.6)	5 (3.4)	9 (6.1)
Communication	97 (66.0)	28 (19.0)	17 (11.6)	5 (3.4)

Weight Management Clinic at Nemours/Alfred I duPont Hospital for Children

Multidisciplinary team

- Physicians
- Physician Assistant
- Psychologists
- Registered Dietitians
- Exercise Physiologist
- Rotating students, residents, interns







Welcome to the Nemours Weight Management Program

Our child's best care will be made up of our medical providers. We will make sure all of your child's health needs are addressed and will work with the whole family to create a personalized treatment plan.

We have a team of providers who are dedicated to their jobs and eager to do what they do. Our health care providers are all over 10 years with each one of our family doctors with extensive experience. We'll work with you to develop an individualized weight management program for your child.

We are excited to get to know you and hope this sheet will help you get to know us a little better.

Our Medical Providers

 Mary Lou Davis, MD Lead of Behavioral Medicine and Director of Child and Adolescent Health at Nemours Health System, Planning and Research	 George Davis, MD Director of Weight Management Clinic Behavioral, Exercise and Diet Program at Nemours Health System, Planning and Research	 Thao Ly Phan, MD, MPH Senior Physician and Director of Family Medicine at Nemours Health System, Planning and Research
 Jennifer Robinson, MD Pediatric Psychologist Lead in working with community centers at Nemours	 Lindita Nguyen, PA-C Physician Assistant Behavioral for Nemours Children's Hospital of Delaware	 Bia Evenden, MD Lead in the care of adolescents complex medical issues at Nemours Health System, Planning and Research



Your child, Our passion.

Nemours Alfred I. duPont Hospital for Children

Our Psychologists

What to expect during visits with our psychologists

We focus on behavior management, behavior and education plan, a multi-management model. Our goal is to support your family in making that the change easier and improve your child's health, functioning and self-worth.

 Jason Boyd, PhD Licensed Psychologist Behavioral Medicine Program, Director at Nemours Health System, Planning and Research	 Megan Cohen, PhD Licensed Psychologist Behavioral Medicine Program at Nemours Health System, Planning and Research
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Our Healthy Lifestyle Experts

What to expect during visits with our exercise specialists

We will discuss your child's current activity level and how to increase it. We will also discuss your child's diet and how to make it healthier. We will also discuss your child's sleep and how to make it better. We will also discuss your child's stress and how to manage it. We will also discuss your child's overall health and how to make it better.

What to expect during visits with our dietitians

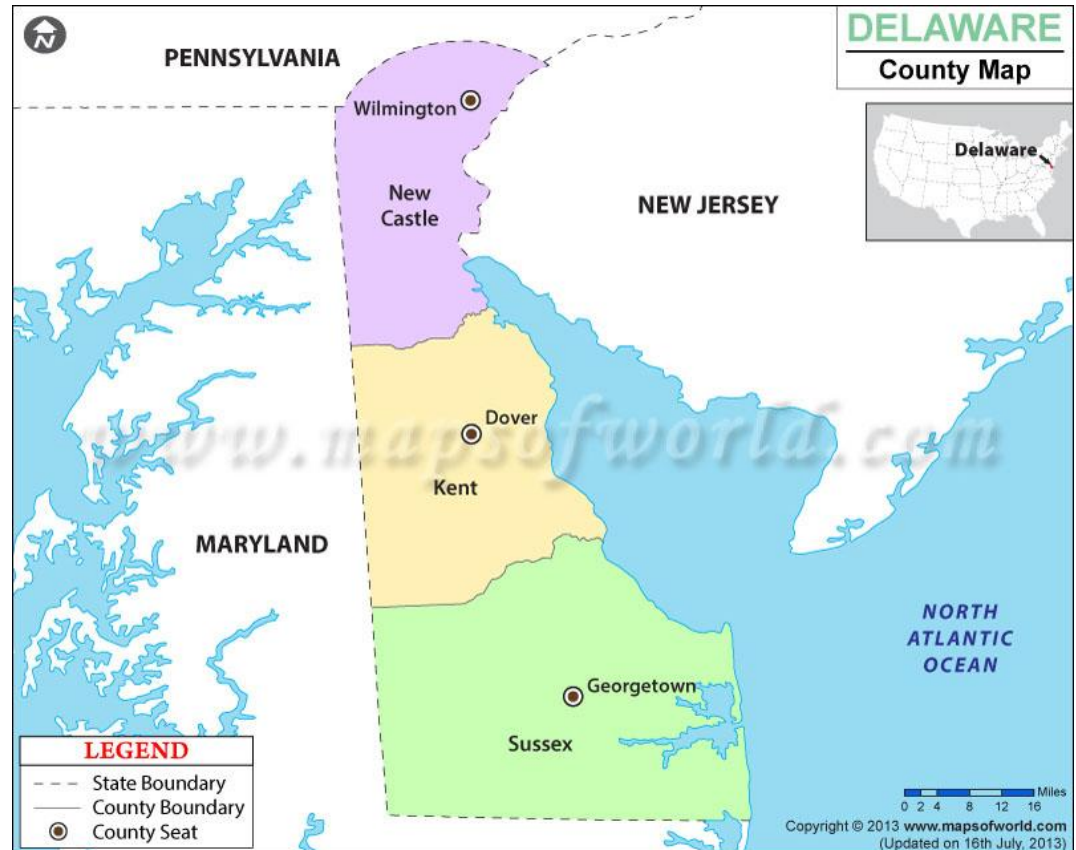
We will discuss your child's current diet and how to make it healthier. We will also discuss your child's overall health and how to make it better. We will also discuss your child's stress and how to manage it. We will also discuss your child's overall health and how to make it better.

 Loren Falk, MS Exercise Specialist Behavioral Medicine Program at Nemours Health System, Planning and Research	 Mary Catherine Perry, BS, RD Behavior Specialist Behavioral Medicine Program at Nemours Health System, Planning and Research	 RaeAnn Barbery, BS, RD Behavior Specialist Behavioral Medicine Program at Nemours Health System, Planning and Research
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Prevalence of Obesity in DE

- 35% statewide
- 38% in Sussex County



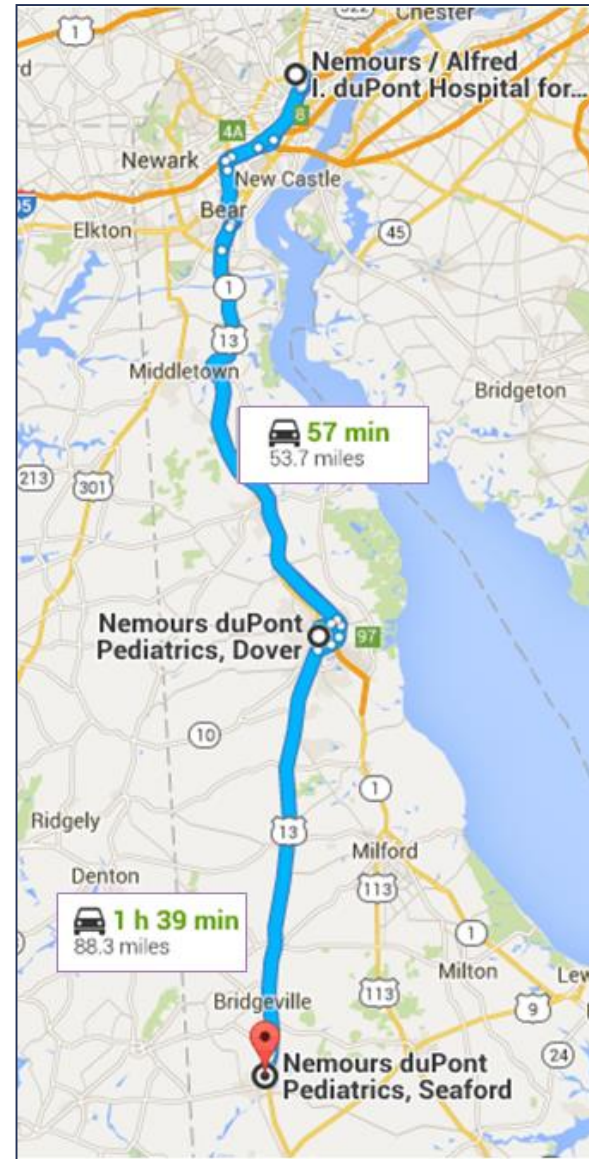
Telemedicine

- **Potential Benefits**
 - Improve patient access
 - Incorporated into provider template
 - Improve patient satisfaction
 - Cost-effective



Pilot – Started 11/2014

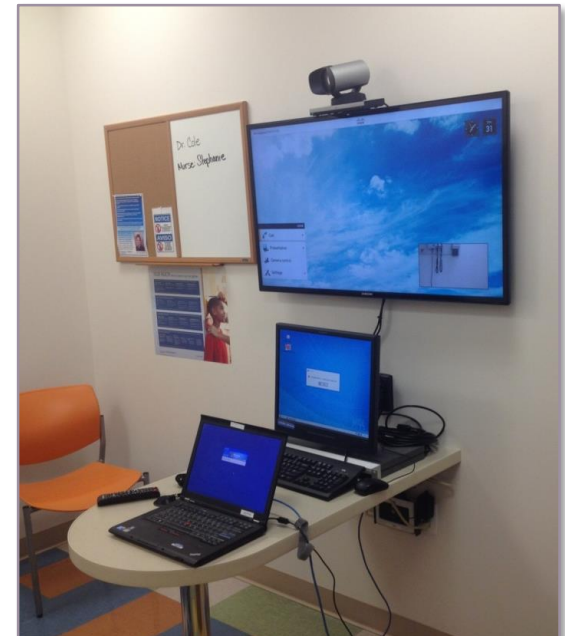
- **One treatment site**
 - AIDHC
- **Two remote sites (Kent and Sussex Counties)**
 - Nemours Primary Care Dover
 - Nemours Primary Care Seaford
- **Participating providers:**
 - Physicians
 - Physician Assistant
 - Dietitians



Software-based Technology

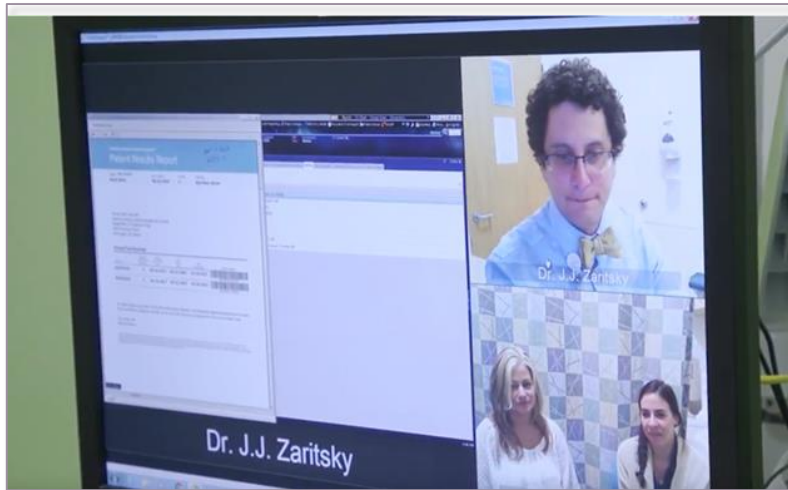
- **Portability: essential for clinic integration**
 - Computer
 - Laptop
 - Smartphone

Type	Provider
WEIGHT MANAGEMENT FOLLOW-UP	Linhda Nguyen, PA
TELEMED WGMT FP REMOTE	Linhda Nguyen, PA
TELEMED WGMT FP REMOTE	Linhda Nguyen, PA
WEIGHT MANAGEMENT FOLLOW-UP	Linhda Nguyen, PA



Software-based Technology

- **Functionality**
 - Split screen
 - Share screen

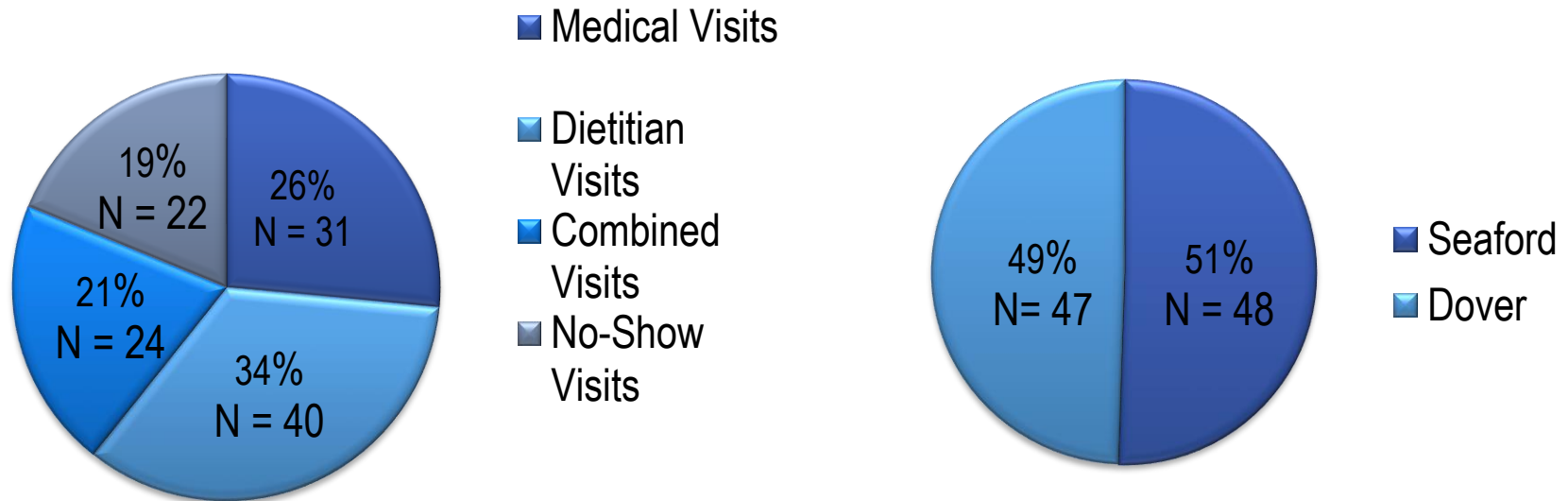


Assessing Satisfaction

- **A 4-item survey was administered during the initial 6 months**
 - What was your overall satisfaction with the telehealth appointment?
 - 4-point Likert scale ranging from Very Satisfied to Very Dissatisfied
 - 9/10 – Very Satisfied; 1/10-Satisfied
 - Was your telehealth visit easier than going to the hospital in Wilmington, DE?
 - Yes/No
 - 100% - Yes
 - What did you like best about your telehealth visit?
 - Free-text response
 - “No long ride to the hospital”
 - “I didn’t have to take a lot of time off of work”
 - What did you like least about your visit?
 - Free-text response
 - 2 responses regarding technical difficulties with video output

Review of First Year of Implementation

- **117 scheduled visits (not including cancellations)**
 - 95 total visits completed
 - 58 families



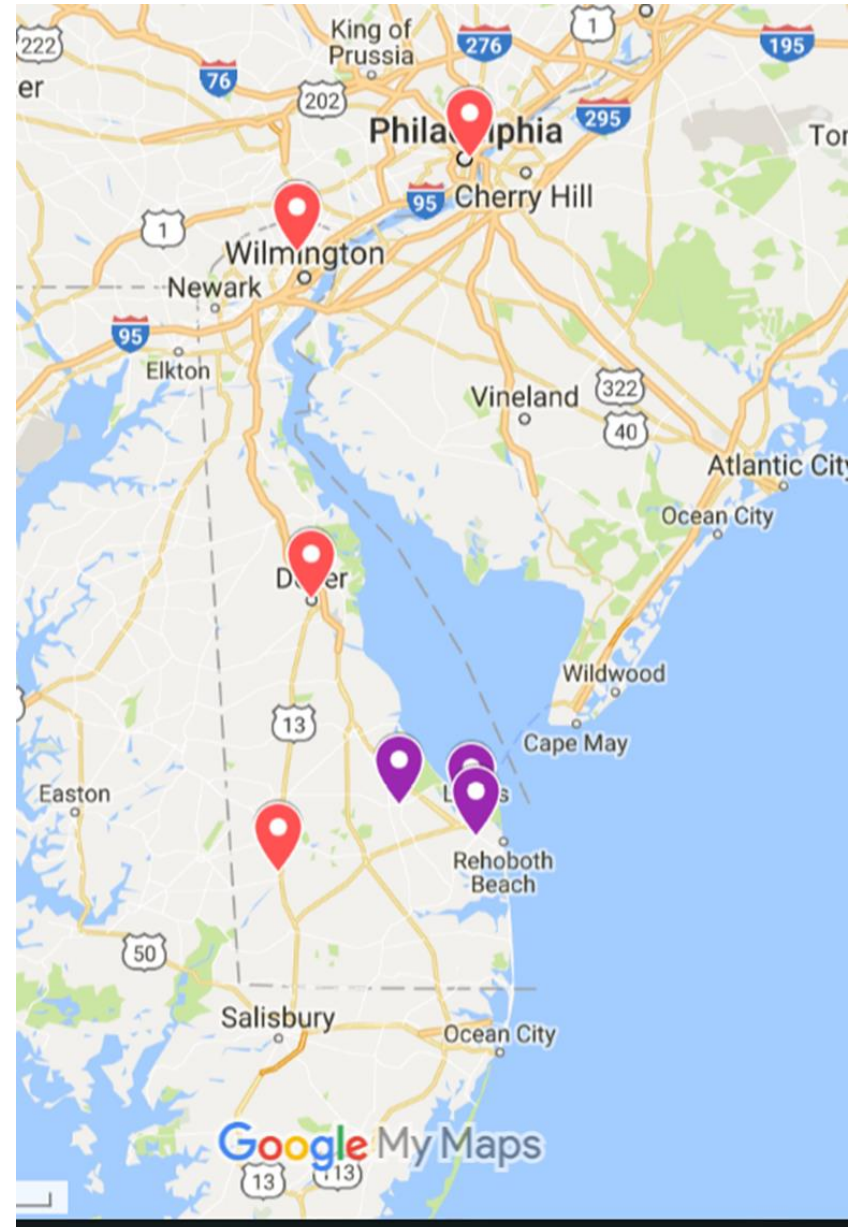
Patient Characteristics of Telemedicine Users

Total Patients [n]	58
Sex [n (%)]	
Female	32 (55%)
Male	26 (45%)
Race/Ethnicity [n (%)]	
White	21 (36%)
Black	13 (23%)
Hispanic/Latino	18 (31%)
Other	6 (10%)
Age [years, mean (range)]	10.8 (1.9-18.4)

Total Patients [n]	58
Obesity Class [n (%)]	
Overweight	1 (2%)
Obesity	20 (34%)
Severe Obesity	37 (64%)
BMI-z [mean, (SD)]	2.6 (0.6)

Telemedicine Expanded

- **Psychology Services**
- **Nemours PCP sites**
 - Philadelphia, PA
- **Non-Nemours PCP sites**
 - Rainbow Pediatrics
 - Beacon Pediatrics
 - Pediatric and Adolescent Center (PAC Milton)
- **Telehome visits to patients' homes**



Visit data

- **Weight Management is #1 user of telemedicine at Nemours/AIDHC in outpatient setting**
- **11/2014-11/2018**
 - ~ 1800 Weight management visits



Successes

- **Improvement in no-show rates**
 - Average: 8-10% compared to in-person of 25-30%
- **New patients into Weight Management Clinic and into Nemours Children's Health System**
 - ~250 new patients
- **Durable treatment option**
 - Reimbursement rate: ~87%

Perceived Barriers and Possible Solutions

- **New technology**
- **Lack of physical exam**
- **Interpreting services**
- **Low SES**
- **Personnel**
- **Licensing**

Future Directions

- **Policy and Advocacy**
- **Weight and Comorbidity Outcomes**
- **Expansion of Services**
- **Press-Ganey surveys**

Conclusion

- **Pediatric Obesity continues to increase at alarming rates in the US and is associated with both medical and psychological sequelae that affect mortality in adulthood**
- **Behavior intervention is the mainstay of treatment**
- **Providing multidisciplinary obesity care via telehealth is both feasible and acceptable to patients**
- **Future work should focus on weight and comorbidity outcomes as well as promoting uniform legislature and coverage of specialty care through telemedicine**

Questions?

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