ANCILLARY REVIEWS

DO NOT DELETE. Submit the completed checklist below with your protocol.

Which ancillary reviews do I need and when do I need them? Refer to HRP-309 for more information about these ancillary reviews.			
Select yes or no	**Does your study…**	*If yes…*	***Impact on IRB Review***
☐ **Yes** **x No**	Include Gillette resources, staff or locations	*Gillette Scientific review and Gillette Research Administration approval is required. Contact: research@gillettechildrens.com*	**Required prior to IRB submission**
x Yes ☐ **No**	Involve Epic, or Fairview patients, staff, locations, or resources?	*The Fairview ancillary review will be assigned to your study by IRB staff Contact:* ancillaryreview@Fairview.org	**Approval must be received prior to IRB committee/ designated review.** **Consider seeking approval prior to IRB submission.**
☐ **Yes** **x No**	Include evaluation of drugs, devices, biologics, tobacco, or dietary supplements or data subject to FDA inspection?	*The regulatory ancillary review will be assigned to your study by IRB staff Contact: medreg@umn.edu* *See: https://policy.umn.edu/research/indide*	
☐ **Yes** **x No**	Require Scientific Review? Not sure? See guidance in the Investigator Manual (HRP-103).	*Documentation of scientific merit must be provided. Contact: hrpp@umn.edu*	
☐ **Yes** **x No**	Relate to cancer patients, cancer treatments, cancer screening/prevention, or tobacco?	*Complete the CPRC application process. Contact: ccprc@umn.edu*	
☐ **Yes** **x No**	Include the use of radiation? (x-ray imaging, radiopharmaceuticals, external beam or brachytherapy)	*Complete the AURPC Human Use Application and follow instructions on the form for submission to the AURPC committee. Contact: barmstro@umn.edu*	**Approval from these committees must be received prior to IRB approval;** **These groups each have their own**
☐ **Yes** **x No**	Use the Center for Magnetic Resonance Research (CMRR) as a study location?	*Complete the CMRR pre-IRB ancillary review Contact: ande2445@umn.edu*	
☐ **Yes** **x No**	Include the use of recombinant or synthetic nucleic acids, toxins, or infectious agents?	*Complete the IBC application via eprotocol.umn.edu*	

☐ **Yes** **x No**	Include the use of human fetal tissue, human embryos, or embryonic stem cells?	*Contact OBAO for submission instructions and guidance*	**application process.**
x Yes ☐ **No**	Include PHI or are you requesting a HIPAA waiver?	*If yes, HIPCO will conduct a review of this protocol.* *Contact: privacy@umn.edu*	
x Yes ☐ **No**	Use data from the Information Exchange (IE)?	*The Information Exchange ancillary review will be assigned to your study by IRB staff* *Contact: ics@umn.edu*	**Approval must be received prior to IRB approval.** **These groups do not have a separate application process but additional information from the study team may be required.**
☐ **Yes** **x No**	Use the Biorepository and Laboratory Services to collect tissue for research?	*The BLS ancillary review will be assigned to your study by IRB staff.* *Contact: Jenny Pham Pham0435@umn.edu*	
☐ **Yes** **x No**	Have a PI or study team member with a conflict of interest?	*The CoI ancillary review will be assigned to your study by IRB staff* *Contact: becca002@umn.edu*	
☐ **Yes** **x No**	Need to be registered on clinicaltrials.gov?	*If you select "No" in ETHOS, the clinicaltrials.gov ancillary review will be assigned to your study by IRB staff* *Contact: kmmccorm@umn.edu*	
x Yes ☐ **No**	Require registration in OnCore?	*If you select "No" or "I Don't Know" in ETHOS, the OnCore ancillary review will be assigned to your study by IRB staff* *Contact: oncore@umn.edu*	**Does not affect IRB approval.**

PROTOCOL COVER PAGE

Protocol Title	Piloting a Family-Based Intervention of Time-Restricted Eating to Treat Obesity
Principal Investigator/Faculty Advisor	Name: Amy Gross, PhD
	Department: Pediatrics
	Telephone Number: (612) 624-9865
	Email Address: acgross@umn.edu
Student Investigator	Name: N/A
	Current Academic Status (Student, Fellow, Resident):
	Department:
	Telephone Number:
	Institutional Email Address:
Scientific Assessment	I believe Scientific Assessment is not required.
IND/IDE # (if applicable)	N/A
IND/IDE Holder	N/A
Investigational Drug Services # (if applicable)	N/A
Version Number/Date:	Version 6.0, dated 07Sep2022

REVISION HISTORY

Revision #	Version Date	Summary of Changes	Consent Change?
1	14Dec2021	Removes the term Bluetooth from the protocol and replaces it with the more accurate term of Bluetooth. Clarifies that a Registered Dietician from the University of Minnesota's Nutrition Coordinating Center will be contacting the parent to perform an assessment of eating. Clarifies section 5.0 of the protocol for the standard care dyad who will be asked to limit calories and encouraged to follow appropriate portion sizes.	Yes
2	12Jan2022	Adds a prescreening/consent visit to be done via Zoom. Changes the frequency of the REDCap surveys on time logs Adds follow-up questionnaires at months 3 and 6 after intervention.	Yes
3	02Feb2022	Removes the Visual Log of Appetite	No
4	16Feb2022	Removes the SF-36 questionnaire and replaces it with the Peds-QL Adult Quality of Life Inventory Questionnaire. We will administer the PedsQL, which is already listed in the protocol but will be adding the parent report versions. The report the parent is asked to complete will be stratified based on the age of the child and could be: • PedsQL Parent Report for children 8-12 • Peds QL Parent Report for young children 5-7	No

		• Peds QL Parent Report for toddlers ages 2-4	
5	07Sep2022	Updates the protocol eligibility criteria	No

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ABBREVIATIONS/DEFINITIONS

BMI	Body mass index
CPOM	Center for Pediatric Obesity Medicine
DCRU	Delaware Clinical Research Unit
GEE	Generalized estimating equation
NCC	Nutrition Coordinating Center
SD	Standard deviation
SOC	Standard of care
TRE	Time-restricted eating

1.0 Objectives

1.1 Purpose:

This study will provide preliminary data to demonstrate feasibility and acceptability of time-restricted eating (TRE) in the family unit, providing critical preliminary data to support NIH-level funding for a more detailed analysis of TRE in families.

Obesity affects over 40% of adults and over 25% of children in the United States. Obesity – defined in adults as a body mass index (BMI) $\geq$ 30 kg/m^2 and in children as BMI $\geq$ 95th percentile – is associated with several physical and psychological comorbidities, such as hypertension, heart disease, type 2 diabetes mellitus, and reduced quality of life. Heritability of obesity is 40-75%. Thus, if a parent is obese, children in the family have a high likelihood of also becoming obese due to both genetic and environmental factors. As such, treatments that apply to the family unit can address the public health concern of obesity at the child and adult level.

Typically, obesity treatment primarily focuses on intentional caloric restriction. In adults with obesity, behavior-based weight loss programs result in weight reduction of 1-4 kg over one year. In children with obesity, lifestyle modification therapy typically results in weight stabilization, while children without treatment gain weight. Weight stabilization results in reductions in body mass index parameters (e.g., percent BMI or BMI z-score) due to increased height in children. Family-based obesity treatment also focuses on intentional caloric restriction through reduced consumption of energy dense foods, as well as increased consumption of low energy density foods, increased physical activity, and implementation of strategic parenting practices. Parent BMI change is a significant predictor of child outcomes in family-based treatment. Unfortunately, family-based interventions are typically time and resource intensive, thus limiting their receptiveness by many families.

In contrast to intentionally restricting calories, time-restricted eating (TRE) intentionally restricts the eating window while allowing ad libitum intake during the window. TRE's agnostic approach to eating allows individuals to select foods that align with their needs and preferences. Multiple studies in adults, including our own, demonstrate TRE reduces weight. The postulated mechanism is that a reduced eating window reduces the number of eating occasions to reduce daily caloric intake.

2.0 Background

2.1 Significance of Research Question/Purpose:

Rigorous prior research in small-scale human studies show promising effects of TRE**.** In contrast to intentional caloric restriction, TRE presents a simplified

approach to obesity treatment. TRE establishes a consistent daily eating window (~8-12 hours) with *ad libitum* intake, while preserving a daily 12-16 hour fasting period. Our preliminary data in adults (PI: Chow), show that 12 weeks of TRE with ad libitum intake in adults who are overweight results in reduction of weight (-3.7%), fat mass (-4%) and visceral fat (-11.1%).[1] Moreover, our preliminary data show that TRE improves quality of life relative to baseline or unrestricted eating.[2]

TRE's agnostic approach to diet allows participants to eat *ad libitum* during their eating window according to food availability and cultural food preferences. Consequently, TRE presents a practical means of implementing prolonged fasting in adults, reducing eating occasions by 22%[1] and daily caloric intake by ~8-20%.[3,4] TRE can be administered remotely, reducing frequently cited barriers to intentional caloric restriction such as transportation, scheduling or financial barriers.[5,6] TRE requires less staff time, as our preliminary data show that the average visit duration for monitoring intentional caloric restriction in adults was 46.1 (33.7) [mean (SD)] minutes, whereas the duration for TRE was significantly lower ($p<0.01$) at 24.4 (7.7) minutes.[2] In summary, TRE's simple approach of restricting the eating window results in weight reduction and increased quality of life while taking less staff and participant time than traditional obesity treatment approaches, likely increasing acceptability of TRE.

It is well documented that obesity clusters in families. As such, obesity treatment should be made available to both children and adults, simultaneously. Traditionally, family-based therapy has been implemented by a few research groups and is time and resource intensive.[7,8] Even on an individual level, multiple barriers likely impede the implementation and effectiveness of, as well as adherence to intentional caloric restriction. In contrast, TRE's simple approach presents a potentially viable alternative to intentional caloric restriction. By allowing ad libitum intake during the eating window, TRE mitigates the understanding, literacy, dietary, and numeracy barriers often arising from intentional caloric restriction.[5] Furthermore, the contact hours necessary to implement TRE will be significantly less than other interventions. This study will provide preliminary data to demonstrate feasibility and acceptability of TRE in the family unit, providing critical preliminary data to support NIH-level funding for a more detailed analysis of TRE in families.

3.0 Study Endpoints/Events/Outcomes

3.1 Primary Endpoint/Event/Outcome: Evaluate feasibility and acceptability of implementing TRE in families by quantifying recruitment, adherence and intervention burden. We anticipate that we will recruit ~3 families per month for a total of 10 families in each intervention group (N=20), with a retention rate of 70-80% across both groups.

- In the TRE group, there will be close agreement between tooth brushing times (recorded with Bluetooth-enabled toothbrush) and self-reported eating window.
- Family-based TRE will result in less intervention burden than intentional caloric restriction, as documented by less staff time administering the intervention.

3.2 Secondary Endpoint(s)/Event(s)/Outcome(s):

- Compare weight/BMI change between the TRE group and the SOC group. We hypothesize that the weight/BMI outcomes between the two groups will be comparable.
- Assess relationship between child and adult weight/BMI outcomes with TRE. We hypothesize that parent and child weight/BMI change will be positively correlated.

4.0 Study Intervention(s)/Investigational Agent(s)

4.1 Description:

This pilot study will be designed as a 12-week randomized trial comparing the effects of family-based TRE to family-based intentional caloric restriction (standard of care) on weight (Figure 1). Our study is innovative in using mobile technology to monitor participants and to engage the parent-child dyad in our interventions. We propose the novel concept of providing Bluetooth-enabled electronic toothbrushes to all participants to facilitate monitoring of the eating window. We will also use a Bluetooth-enabled sale for weekly weights by the parent-child dyad to facilitate calculation of the weight trajectory. Finally, we will deliver most sessions virtually by Zoom or by phone.

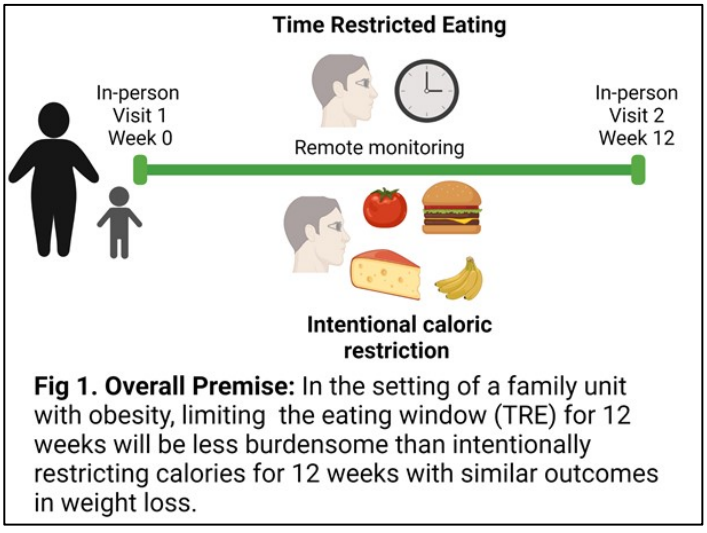

Fig 1. Overall Premise: In the setting of a family unit with obesity, limiting the eating window (TRE) for 12 weeks will be less burdensome than intentionally restricting calories for 12 weeks with similar outcomes in weight loss.

We will enroll 10 family units (i.e., parent/child dyad) per intervention, for an anticipated total of 40 participants and 20 families in the overall study. Participating families will include children who are 3-9 years old with obesity (BMI $\geq$ 95th percentile) and a parent with obesity (BMI $\geq$ 30 kg/m^2).

Consent will be discussed and obtained by a study investigator or the study coordinator via Zoom after explaining the entire study in detail, asking the parent(s)/guardian(s) to explain the purpose, risk and benefits, and other details of the study, and giving them an opportunity to ask questions. A copy of the consent form and assent form will be mailed to the family so that they can review this before the video meeting. At least one parent signature will be required for parental permission. However, the study team will encourage both parents/guardians to be present at the initial visit to learn about the study and ask questions. We will ask that the parents return the signed/dated consent form and assent form for counter signature by the individual who conducted the video consent process. As children under the age of 8 will be enrolled, we will take a verbal consent as an agreement to participate and will not enroll the child if the child gives verbal dissent.

In the TRE group, study staff will instruct the family unit on limiting the eating window to 10-12 hours per day, during which they can eat ad libitum. Notably, in the TRE group, participants (children and adults) will be instructed to brush their teeth with a Bluetooth-enabled toothbrush in the morning and specifically within ½ hour after their evening meal. This will serve as a cue to stop evening eating, and information from the Bluetooth-enabled toothbrush will be accessed by study staff to approximate the eating window. The adult from each family unit will receive a periodic REDCap-administered emails to indicate the timing of the first meal of the day and the last meal of the day for the parent and child, which will also serve as an estimate of the eating window.

The standard of care control group will receive dietary instruction that is based on a 1200-1500 calorie diet, as is typical of family-based interventions. Families will be encouraged to follow appropriate portion sizes; increase vegetable, fruit and lean protein consumption; as well as decrease consumption of energy-dense but low-quality items (e.g., sugar sweetened beverages). Families in this group will also receive a Bluetooth-enabled toothbrush and periodic REDCap surveys but will not be instructed on when to brush teeth or to shorten their eating window.

In both intervention groups, the child and adult participant will weigh themselves on a consistently weekly basis, using a Bluetooth-enabled scale. This is a common aspect of behavioral weight loss interventions (i.e., self-monitoring) and will serve as ongoing data collection (see outcomes below). Additionally, treatment will be

primarily delivered to the adult participant, as prior research indicates adult-only sessions are as effective as joint sessions for younger children.[7,9,10] That is, parents and children will attend two in-person sessions: baseline and 12 weeks. Only parents will attend virtual sessions. Sessions occur on a weekly basis for the first 4 weeks and every other week for the final 8 weeks (see Schedule of Events).

4.2 Drug/Device Handling: Not applicable.

4.3 Biosafety: Not applicable.

4.4 Stem Cells: Not applicable.

4.5 Fetal Tissue: Not applicable.

5.0 Procedures Involved

5.1 Study Design: This is a pilot study in which we will explore whether time-restricted eating is acceptable and feasible for a family and whether utilizing TRE is as useful in weight loss as standard of care (calorie control) in families. 20 dyads (a dyad will consist of a parent and a child) will be enrolled. Half of the dyads will be randomized to receive standard of care and the other half of the dyads will be asked to follow a time limited eating program. Here is what will happen for each group:

Standard care: This dyad will be asked to limit calories and will be encouraged to follow appropriate portion sizes, increase their vegetable, fruit and lean protein consumption. Families in this group will also be advised to decrease their consumption of energy-dense but low-quality items such as sugar sweetened beverages. Families in this group will:

- receive Bluetooth-enabled toothbrushes but will not be instructed on when to brush their teeth
- will be asked to fill out periodic REDCap surveys
- will be asked to weigh themselves on a consistent weekly basis utilizing a Bluetooth-enabled scale.
- Treatment will be delivered to the adult participant and the child at baseline and 12-week visits. Parents will be asked to attend Zoom or telephone sessions weekly for the first 4 weeks and every other week for the final 8 weeks of the study.

TRE: This dyad will be asked to limit their eating window to 10-12 hours per day, during which they can eat ad libitum. Families in this group will be asked to:

- brush their teeth twice daily with the Bluetooth-enabled toothbrush: in the morning and then again in the evening within ½ hour of completion of their evening meal. This will serve as a cue to stop evening eating.
- will be asked to fill out periodic REDCap surveys.

- will be asked to weigh themselves on a consistent weekly basis utilizing a Bluetooth-enabled scale.
- Treatment will be delivered to the adult participant and the child at baseline and 12-week visits. Parents will be asked to attend Zoom or telephone sessions weekly for the first 4 weeks and every other week for the final 8 weeks of the study.

Schedule of Events

	Prescreening/Consent	Baseline / Week 0	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Follow-Up Month 1	Follow-Up Month 3	Follow-Up Month 6
Consent	V																
Dietary treatment session		P	V	V	V	V		V		V		V		P			
Demographics		P															
Height and weight		P												P			
Weight via Bluetooth-scale		X	X	X	X	X	X	X	X	X	X	X	X	X			
Questionnaires • Child Eating Behavior Questionnaire • Adult Eating Behavior Questionnaire • Child Feeding Questionnaire • Peds-QL • Peds-QL Parent Report Versions (aged 2-4, 5-7 or 8-12) • Peds-QL Adult Quality of Life Inventory Questionnaire		P/V												P/V			
24-hour recall		V												V			
Satisfaction survey														X	X	X	X
Daily time log[1]		← to be done via REDCap for 5 consecutive days three times during treatment (e.g., weeks 1, 6 and 12)→															
Use of Bluetooth-toothbrush		← to be done twice daily at home by participants→															

Note: P= in person, V= via virtual visit, X=completion time

[1] All families will receive automated, email-based REDCap survey for the parent to document the time that they and their child started eating in the morning and their last eating occasion of the day. This will serve as a measure of the length of the eating window.

5.2 Study Duration:

- It is anticipated that it will take six months to recruit the 20 parent/child dyads (40 individuals total) to participate in the study.
- Each dyad will be enrolled in the study for 12-14 weeks for screening through treatment. Follow up surveys will be sent at 1, 3, and 6 months following the end of treatment.

5.3 Use of radiation*:* Not applicable.

5.4 Use of Center for Magnetic Resonance Research*:* Not applicable.

6.0 Data and Specimen Banking: Not applicable.

7.0 Sharing of Results with Participants

7.1 Participants will have access to their scale and toothbrush data results. We will offer to send participants copies of the published data, if they would like to have results of the entire study.

8.0 Study Population

8.1 Inclusion Criteria:

- BMI $\geq$ 30 kg/m2 for the parent
- BMI > 95th percentile for the child
- Age 3-9 years old for the child
- Age $\geq$ 18 years old for the parent

8.2 Exclusion Criteria

- Concurrent participation in another weight loss study
- Taking any medications for weight loss
- Pregnancy or anticipation of pregnancy in next 6 months (for the parent)
- 3+ on Eating Disorder Survey (see attached)
- Must be on a stable dose of any weight-altering medications

8.3 Prescreening/Consent: Individuals who appear to meet the study criteria based on a pre-screening telephone call will be asked to participate in a virtual (video) visit. At that visit, consent will be discussed and obtained, height and weight will be self-reported by parent for both parent and child, so that estimated BMI can be calculated, and inclusion/exclusion criteria will be reviewed. Individuals who meet the BMI requirement and the inclusion/exclusion criteria will enroll in the study.

Following consent and prior to the Baseline/Week 0 session, parents will be

contacted by the University of Minnesota Nutrition Coordinating Center (NCC) staff and will be asked to provide three 24-hour dietary recalls for themselves and for their child (for a total of six). NCC staff will be blinded to participant intervention assignment. Using this 24-hour dietary recall data, we will calculate the daily average caloric intake and healthy eating index, as well as the eating window.

Baseline/Week 0: Individuals will be asked to come to the Delaware Clinical Research Unit (DCRU). At that visit, height and weight will be measured so that BMI can be calculated. Individuals who no longer meet inclusion/exclusion criteria will be excluded (e.g., outside BMI range based on in-person measurement compared to self-reported). Participants who meet the inclusion/exclusion criteria will be randomized to their intervention group. Participants will be provided with a Bluetooth-enabled scale and instructed to weigh themselves once per week. Participants will also be provided with Bluetooth-enabled toothbrushes. Participants randomized to the TRE treatment will be asked to brush their teeth twice daily and to brush their teeth within 30 minutes after the evening meal to note that they have ceased eating until the next day. Participants randomized to SOC will have a dietary session with a dietician to discuss food portions and food selections that encourage reduced caloric intake. They will be given portioned dishes as part of this treatment. Participants randomized to TRE will meet with the dietician to discuss the length and timing of the eating window. All parents will be asked to complete demographic information and questionnaires. Parents will be told that they will receive periodic emails (see schedule of events) asking them to log into REDCap and complete a survey about what time the family started and stopped eating meals for the day.

Weeks 1, Week 2, Week 3, Week 4, Week 6, Week 8, Week 10: Parents will have a dietary session with the dietician to discuss their respective intervention. That is, parents in TRE will discuss implementation of the eating window and parents in SOC will discuss food portions and food selections that encourage reduced caloric intake. Parents will be reminded that they should utilize the Bluetooth-enabled scale to weigh themselves as well as their child once per week. Parents will be reminded to fill out the REDCap survey daily and will be reminded to utilize the Bluetooth-toothbrush.

Week 12: Participants will return to the Delaware Clinical Research Unit. They will receive a session with the study dietician. The height and weight of the parent and the child will be measured and BMI calculated. The parent will be asked to fill out questionnaires about eating as well as a satisfaction survey.

Parents will be contacted by a Registered Dietician from the University of Minnesota Nutrition Coordinating Center (NCC) staff and will be asked to provide three 24-hour dietary recalls for themselves and for their child (for a total of six).

Follow-up: The parent will receive a satisfaction survey to be completed electronically at 1, 3, and 6 months following treatment .

9.0 Vulnerable Populations

9.1 Vulnerable Populations:

Population / Group	Identify whether any of the following populations will be targeted, included (not necessarily targeted) or excluded from participation in the study.
Children	Targeted Population
Pregnant women/fetuses/neonates	Excluded from Participation
Prisoners	Excluded from Participation
Adults lacking capacity to consent and/or adults with diminished capacity to consent, including, but not limited to, those with acute medical conditions, psychiatric disorders, neurologic disorders, developmental disorders, and behavioral disorders	Excluded from Participation
Non-English speakers	Excluded from Participation
Those unable to read (illiterate)	Included/Allowed to Participate
Employees of the researcher	Excluded from Participation
Students of the researcher	Excluded from Participation
Undervalued or disenfranchised social group	Included/Allowed to Participate

Active members of the military (service members), DoD personnel (including civilian employees)	Excluded from Participation
Individual or group that is approached for participation in research during a stressful situation such as emergency room setting, childbirth (labor), etc.	Excluded from Participation
Individual or group that is disadvantaged in the distribution of social goods and services such as income, housing, or healthcare.	Included/Allowed to Participate
Individual or group with a serious health condition for which there are no satisfactory standard treatments.	Included/Allowed to Participate
Individual or group with a fear of negative consequences for not participating in the research (e.g. institutionalization, deportation, disclosure of stigmatizing behavior).	Included/Allowed to Participate
Any other circumstance/dynamic that could increase vulnerability to coercion or exploitation that might influence consent to research or decision to continue in research.	Included/Allowed to Participate

9.2 Additional Safeguards:

Children will be part of the targeted enrollment for this study. As the children enrolled will be between the ages of 3 and 9, we will only ask for the child to assent if they are aged 8-9; children aged 3-7 will be exempt from the assent process. The parent who also enrolls (to complete the dyad) will consent for study participation and will also sign the parental consent indicating that their child can participate in the study.

10.0 Local Number of Participants

10.1 Local Number of Participants to be Consented: A total of 20 parent/child dyads (40 total individuals) will be asked to participate in the study. 10 parent/child

dyads will be randomized to standard care and 10 parent/child dyads will be randomized to time-restricted eating.

11.0 Local Recruitment Methods

11.1 Identification of Potential Participants: Recruitment will be achieved by a number of methods that have been effective in the Center for Pediatric Obesity Medicine (CPOM) as well as in the Department of Medicine in the past. These include mailing letters to potentially eligible participants based on an initial screening of eligibility in the electronic health record, as well as clinical recruitment efforts by members of the investigation team and other physicians within CPOM and the Medical School. Notably, within MHealth Fairview Clinics, there are over 14,000 children aged 3-9 with obesity who are potentially eligible participants.

Retention of patients with obesity can be particularly challenging; thus, we have established robust methods over the years that allow successful retention of youth and families. Our history of successfully conducting clinical trials of obesity treatments provides evidence that we can realistically retain the required number of participants.[17] We will maximize our ability to do this by expressing our gratitude for their time and effort, providing the highest level of customer service possible, establishing rapport and trust with the families, and facilitating regular communication among the investigators. Additionally, we will monitor the recruitment and retention rates monthly and will adjust our retention and recruitment strategies if indicated.

11.2 Recruitment Materials: Letters and flyers will be developed for this project and sent to the IRB for approval before implementation.

11.3 Payment: Families will be appropriately compensated for their time. Each family will receive $35 per in-person visit and $15 for each virtual session. The total compensation will be $175/family. They will also be allowed to keep the Bluetooth-enabled scale and the Bluetooth-enabled toothbrushes at the end of the study. Payments to the parent/child dyad will be made via Greenphire ClinCard.

12.0 Withdrawal of Participants

12.1 Withdrawal Circumstances: Individuals are free to withdraw from study participation at any time, they should just inform the study team.

12.2 Termination Procedures: Data that had been collected before the dyad elected to withdraw from the study will be kept in the participant file. No additional information will be collected from the dyad after they have indicated that they no longer want to participate in the study.

12.3

13.0 Risks to Participants

13.1 Foreseeable Risks: Risks for this study are minimal and include discomfort with recalling and reviewing meals, tiring of filling out daily REDCap inquiries, and potential frustrations (for the TRE group) with trying to brush their teeth in the evening within 30 minutes of finishing their evening meal. There could be discomfort or dissatisfaction with limiting food intake to the eating window hours and/or with limiting caloric intake per standard of care recommendations. There is also a risk of breach of confidentiality.

13.2 Reproduction Risks: Not applicable.

13.3 Risks to Others: Not applicable.

14.0 Potential Benefits to Participants

14.1 Potential Benefits: Due to the interventions and self-monitoring, it is possible that participating in this study will lead to weight loss, which is desirable since we are enrolling participants with obesity. Families may also have increased awareness about the food that is being consumed and how portion control or limiting the times during the day that food is ingested can be helpful in weight loss. It is hoped that the dietician intervention might help parents find strategies to encourage healthy eating within the home.

15.0 Statistical Considerations

Analysis Plan: We will summarize feasibility and adherence measures (recruitment and retention rate, proportion of days with documented eating window, eating window length) using sample proportions, means (standard deviations), and medians (interquartile ranges). Proportion of families completing the study (retention rate) will be compared between intervention groups using Fisher's exact tests. Agreement between toothbrush reported eating window and survey reported eating window will be evaluated using mixed effects models[16] (to account for repeated measures for each family) and Bland-Altman Plots.[17]

The primary outcome analysis will use a linear GEE model, with independence working correlation for family units, to compare change in BMI during the 12-week period (pre-post) between participants assigned to the TRE intervention compared to the standard of care. This model will allow for estimating the TRE effect for children and adults while accounting for the correlation between parent and child measures. If we do not detect a difference in TRE effect for children and adults (p-value≥0.1) the treatment assignment by child indicator interaction will be removed from the model. A similar approach will be used to compare changes in measures of diet quality (average caloric intake and HEI), eating and feeding behaviors, appetite, and quality of life measures between groups. Generalized linear mixed effects models will be used to evaluate

differences in weight trajectory between intervention groups. We will evaluate the correlation between parent and child change in BMI during the study using Pearson's correlation coefficient, or Spearman's correlation coefficient (if data visualizations indicate a non-linear trend). Total intervention time (sum of session time across the study) will be compared between groups using t-tests (or Wilcoxon rank sum tests if measures are highly skewed).

We will check data distributions before conducting statistical tests and will transform the data if the normality assumption is not met. Logistic regression models will be used in place of linear regression models for binary data, as appropriate. Analyses will be performed in R or SAS (Version 9.4, SAS Institute Inc., Cary, NC)

Sample Size*:* Since the primary purpose of this pilot study is to collect preliminary data (specifically feasibility and variability measures) to inform study design for a fully powered clinical trial, this pilot study is powered to detect large differences in BMI change between groups. With n=20 per group (10 child-parent pairs), correlation between child-parent pairs ranging from 0.1 to 0.8, and an alpha= 0.05 significance level, we will have 80% power to detect a difference in BMI change (pre-post) between treatment groups of 0.96 to 1.25 standard deviations (Cohen's d of 0.96 to 1.25, a large effect size).

16.0 Health Information and Privacy Compliance

16.1 Select which of the following is applicable to your research:

☐ My research does not require access to individual health information and therefore assert HIPAA does not apply.

X I am requesting that all research participants sign a HIPCO approved HIPAA Disclosure Authorization to participate in the research (either the standalone form or the combined consent and HIPAA Authorization).

☐ I am requesting the IRB to approve a Waiver or an alteration of research participant authorization to participate in the research.

Appropriate Use for Research:

☐ An external IRB (e.g. Advarra) is reviewing and we are requesting use of the authorization language embedded in the template consent form in lieu of the U of M stand-alone HIPAA Authorization. Note: External IRB must be serving as the privacy board for this option.

16.2 Identify the source of Private Health Information you will be using for your research (Check all that apply)

X I will use the Informatics Consulting Services (ICS) available through CTSI (also referred to as the University's Information Exchange (IE) or data shelter) to pull records for me

X I will collect information directly from research participants.

☐ I will use University services to access and retrieve records from the Bone Marrow Transplant (BMPT) database, also known as the HSCT (Hematopoietic Stem Cell Transplant) database.

☐ I will pull records directly from EPIC.

☐ I will retrieve record directly from axiUm / MiPACS

☐ I will receive data from the Center for Medicare/Medicaid Services

☐ I will receive a limited data set from another institution

☐ Other. Describe:

16.3 Explain how you will ensure that only records of patients who have agreed to have their information used for research will be reviewed.

16.4 Approximate number of records required for review:

We will ask that individuals who might meet study criteria, and who have not opted out of being contacted about research opportunities, be pulled into the data shelter. We will work with FV and the IE to have recruitment letters sent to potential participants. The MHealth system currently has ~ 14,000 children who are diagnosed with obesity who may be eligible for study participation.

16.5 Please describe how you will communicate with research participants during the course of this research. Check all applicable boxes

☐ This research involves record review only. There will be no communication with research participants.

☐ Communication with research participants will take place in the course of treatment, through MyChart, or other similar forms of communication used with patients receiving treatment.

x Communication with research participants will take place outside of treatment settings. If this box is selected, please describe the type of communication and how it will be received by participants.

16.6 Explain how the research team has legitimate access to patients/potential participants:

Individuals who would be pulled for a recruitment letter would be patients within the MHealth FV system who have not opted out of being informed about research studies.

16.7 Location(s) of storage, sharing and analysis of research data, including any links to research data (check all that apply).

x In the data shelter of the Information Exchange (IE)

x Store ☐ Analyze ☐ Share

☐ In the Bone Marrow Transplant (BMT) database, also known as the HSCT (Hematopoietic Stem Cell Transplant) Database

☐ Store ☐ Analyze ☐ Share

x In REDCap (recap.ahc.umn.edu)

x Store x Analyze x Share

☐ In Qualtrics (qualtrics.umn.edu)

☐ Store ☐ Analyze ☐ Share

x In OnCore (oncore.umn.edu)

x Store ☐ Analyze ☐ Share

x In the University's Box Secure Storage (box.umn.edu)

x Store ☐ Analyze ☐ Share

☐ In an AHC-IS supported server. Provide folder path, location of server and IT Support Contact:

☐ Store ☐ Analyze ☐ Share

x In an AHC-IS supported desktop or laptop.

Provide UMN device numbers of all devices:

x Store ☐ Analyze ☐ Share

☐ Other. Describe:

Indicate if data will be collected, downloaded, accessed, shared or stored using a server, desktop, laptop, external drive or mobile device (including a tablet computer such as an iPad or a smartform (iPhone or Android devices) that you have not already identified in the preceding questions

☐I will use a server not previously listed to collect/download research data

☐I will use a desktop or laptop not previously listed

☐I will use an external hard drive or USB drive ("flash" or "thumb" drives) not previously listed

☐I will use a mobile device such as a tablet or smartphone not previously listed

16.8 Consultants. Vendors. Third Parties. Individuals participating in the study will download apps for the Bluetooth scale and the Bluetooth toothbrushes that will track their weights and toothbrushing times. The app for the scale will allow the user to share their data and participants will be asked to email the study team with their results (this can be sent in a csv format to the study team). The app for the toothbrush does not allow for sharing so individuals can screenshot their data and send to the study team or simply show the study team their phone to review the data at their visits. Data that is transmitted to the study team from the participant (such as the csv file for the scale data) will be stored in Box. It is our understanding from meeting with the HIPCO office that participants are free to send data to us and only after it is received by us, does it need to be protected.

16.9 Links to identifiable data: Csv files that the participants send to us that contain their Bluetooth scale information will be stored in Box as it is HIPAA compliant.

16.10 Sharing of Data with Research Team Members. Data will be kept in REDCap and Box and only those individuals who are working on the study will have access to these items.

16.11 Storage of Documents: Paper documents will be kept in individual participant binders and will be kept in an office that is locked when not in use. Electronic records may be kept in Box and REDCap, which utilize two level authentication.

16.12 Disposal of Documents: We anticipate keeping data for at least six years. When data is ready to be destroyed, a company that specializes in the shredding of confidential documents will be utilized to destroy any paper files.

17.0 Confidentiality

17.1 Data Security: Absolute confidentiality will be maintained. All data will be stored in locked offices and will not be released without consent of the participant. Data that is collected will be entered into REDCap which is only accessible by the study

team. Data to be used in scientific presentations or publications will not contain participant identifiers.

18.0 Provisions to Monitor the Data to Ensure the Safety of Participants

18.1 Data Integrity Monitoring. The biostatisticians will issue queries on data that is analyzed where data is missing or does not seem to be correct and the study team will review the study file and make corrections.

18.2 Data Safety Monitoring. Case report forms will be reviewed for accurate completion by individuals within the Center for Pediatric Obesity Medicine.

19.0 Provisions to Protect the Privacy Interests of Participants

19.1 Protecting Privacy: see HIPCO ancillary review.

19.2 Access to Participants*:* Please refer to the recruitment section.

20.0 Compensation for Research-Related Injury

20.1 Compensation for Research-Related Injury:
Treatment for injuries that result from participating in the research activity will be available. Those treatments include first aid, emergency treatment and follow-up care as needed. Care for injuries will be billed in the ordinary manner, to the subject or their insurance company. Subjects will be encouraged to contact the study team if they think that they have suffered a research related injury.

21.0 Consent Process

21.1 Consent Process (when consent will be obtained):
Consent will be obtained by the study team after explaining the entire study in detail, asking the participants to explain the purpose, risk and benefits, and other details of the study, and giving the participants an opportunity to ask questions. A copy of the signed consent form will be given to the participants.

21.2 Waiver or Alteration of Consent Process (when consent will not be obtained):Not applicable.

21.3 Waiver of Written/Signed Documentation of Consent (when written/signed consent will not be obtained): Not applicable

21.4 Non-English Speaking Participants: Not applicable.

21.5 Participants Who Are Not Yet Adults (infants, children, teenagers under 18 years of age): Children aged 3-9 will be allowed to enroll in this study. For children aged 3-7, the parent will sign a parental consent form to indicate that the child may enroll in the study and no assent will be collected. Participants who are aged 8-9 will be asked to sign an assent form and their parent will be asked to sign a parental consent form. We are planning on having only one parent signature in the parental consent form.

21.6 Cognitively Impaired Adults, or adults with fluctuating or diminished capacity to consent: Not applicable.

21.7 Adults Unable to Consent: Not applicable.

21.8 Assent: Assent will be utilized for participants who are aged 8-9. No assent will be utilized for participants aged 3-7.

22.0 Setting

22.1 Research Sites:

- Delaware Clinical Research Unit
- University of Minnesota Nutrition Coordinating Center (NCC)

22.2 International Research: Not applicable.

23.0 Multi-Site Research: Not applicable.

24.0 Coordinating Center Research: Not applicable.

25.0 Resources Available: Not applicable.

26.0 References

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