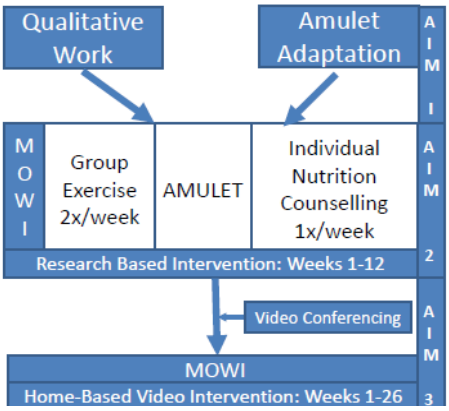
Official Title:	Mobile Health Obesity Wellness Intervention in Rural Older Adults (MOWI): Home-Based Pilot
NCT number:	NCT03104205
Document Type:	Study Protocol and Statistical Analysis Plan and Informed Consent Form
Date of the Document:	July 3, 2018

Overview: The study will: 1) Obtain input on feasibility, usability, and acceptability of using mHealth in behavior change by adapting a device for rural older adults; 2) Develop, refine and tailor MOWI in research settings; 3) Conduct MOWI in subjects' homes. The overall goal is to improve older adult physical function in rural areas and use the results as a basis for an R01 randomized trial testing the MOWI's delivery in the home.

Study Setting/Population: Dartmouth-Hitchcock (D-H) serves 1.5 million persons from a circumscribed area of rural New Hampshire/Vermont. The site of Lebanon, NH, is a typical rural New England town (16.2% aged ≥65 years; 95.4% Caucasian[83]). Of 13,293 primary care patients ≥65years old at D-H, 3,987 are study eligible (~30% obese[84]). The Center for Health & Aging (CHA) has rooms for study assessments. In-home evaluations will use CHA video equipment.

Recruitment: As a Geriatrician working with an interdisciplinary team, I have ready access to potential subjects from a practice panel of ~3000 older adults. In addition the Centers for Health and Aging provide a venue for recruitment, as indicated by successfully recruiting 111 elderly subjects this past year for pilot studies by 3 junior faculty. Patients meeting study criteria will be identified using record review and e-mailed/mailed letters describing the study (after HIPAA waiver). Posters/handouts will be placed strategically at D-H. Colleagues will give information materials to patients requesting permission for contact by the study research assistant. With respect to the qualitative component, the PI will recruit 6 clinicians (from 87 in the provider network) to participate in interviews. Dr. Bartels will use the CHA's extensive aging services network to recruit 4 leaders of aging services organizations for study participation.

FIGURE 2: STUDY OVERVIEW



Selection Criteria: Focus groups, interviews, and usability testing will target English-speaking obese older adults (age≥65years and BMI ≥30kg/m^2[17] or waist circumference ≥88/102cm[85] in females/males). Excluded from eligibility are adults with severe mental or life-threatening illness, dementia, substance use, history of bariatric surgery, suicidal ideation, unable to provide consent/perform measures, or residing in a nursing home.. Older adult participants in Aims 2 & 3 will require the presence of home Wi-Fi high-speed internet, medical clearance, have less than a 5% weight loss in the past 6 months, and be without advanced co-morbidity, exercise restrictions[88] or involvement in other research studies.

Screening/Consent: Subjects expressing interest will be mailed/emailed forms, evaluated by chart review to confirm eligibility, and those meeting criteria invited to an RA-led session to verify final eligibility, review and complete consent forms, and answer queries. Competence for consent will be assured by: no diagnosis of dementia (all Aims) and a Callahan score ≥4 (Aims 2 & 3). Written consent will be obtained before enrollment. The RA will obtain screening/baseline measures, and provide a list of contact details (see Human Subjects).

10. Aim 3 *(Evaluate home-based MOWI)*: **Conduct and assess the feasibility, acceptability, and potential effectiveness of a home MOWI:** MOWI will be delivered via video-conferencing in the subject's home in a 3x per week, 26-week program from the CHA (in contrast to Aim 2) by: an individual dietician-led weekly nutrition session; 2x/week physical therapist-led group exercise session[69]; and Fitbit monitoring of activity. We plan 5 cohorts of 8 subjects n=40. In-person RA-led assessments will occur at 0, 4, 8, 12 and 26 weeks. Only one exercise session will occur during these weeks. A HIPAA-compliant Android tablet with video-conferencing software (*Vidyo)*[126] will be configured by the Telehealth team and can record sessions, allowing 10% to be viewed randomly by the PI for fidelity. Prior to each nutrition session at home, weight will be assessed using a Bluetooth scale.

MOWI Consists of the following: a 12-week, 3x/week program of: weekly nutrition counseling; 2x/week group exercise visits; and Amulet to monitor activity, strength, and gait speed. A dietician and physical therapist will lead the in-person (15-20 min) nutrition and exercise (70-90 min) sessions. The team will provide advice and troubleshooting of each element. Two waves of 8 individuals each will be assessed at 0, 4, 8 and 12 weeks and be given Amulet. Further, Amulet/Fitbit will measure steps, activity type, duration and distance.

A 2x/week, physical therapist-led guideline-based exercise regimen[88] will be held at CHA focusing on progressive resistance, flexibility, balance and aerobic exercise at moderate intensity to improve strength,

quality, and mobility[113]. Adjustable cuff weights and Thera-bands will be given for upper/lower limb exercises. Resistance training will target major muscle groups[88] (30-45min, 3 sets, 8-12 repetitions). After 15 repetitions of full range of motion, loads will increase, followed by flexibility exercises (15-30min) of static stretches (30-60s). Neuromotor training will focus on agility, balance, and coordination, including static, dynamic, vestibular and Tai Chi (15-30min). Subjects will be trained to perform exercises 1-2 days/week and educated in aerobic activity (30min/day, minimum 10min bouts,150min/week[88,114,115]) outside the sessions. Baseline personalized plans will be created aimed at gradual workload increases. Individual weekly dietician counseling sessions[116] at the CHA. will consist of behavioral modification[117] and motivational interviewing[118] based on the 5 A's.[91,119] The initial visit is the basis for an individualized program using a point-of-care 24-hour diet recall[120], reducing recall bias, and avoiding the burden and non-adherence of self-reported, home-based measures. Elements include: caloric restriction (500-750 kCal/d); high protein (1-1.5g/kg /day)[94,121,122]; 800IU vitamin D[123,124] and weekly weigh-in[125]. This approach counters weight loss induced sarcopenia and bone loss[88,89,107,108].

I will conduct a usability evaluation consisting of individual semi-structured interviews, interview and satisfaction questionnaires, repeating the process after the 2nd wave. The RA will record and transcribe all sessions allowing me to discuss these with my team. Outcomes and analyses are detailed below.

STATISTICAL DESIGN AND POWER

Aim 1 (*Qualitative assessment*) will use mixed-methods to adapt Amulet and MOWI for use in rural older obese adults. Aim 2 (*Develop/refine MOWI*) and Aim 3 (*Evaluate home-based MOWI*) will explore feasibility/acceptability, and preliminary effectiveness of the above outcomes. Data will be analyzed as follows:

Aim 3 (*Evaluate home-based MOWI*): *Conduct and assess the feasibility, acceptability, and potential effectiveness of a home-based MOWI:*

- *Feasibility/Acceptability:* Rates of screening, eligibility, enrollment, completion, assessment, entry criteria
- suitability, attrition reasons, satisfaction, acceptability, usability, and feasibility of MOWI will be assessed using mixed-methods at 26 weeks as in Aim 2.
- *Statistical Analysis:* The 1º outcome of Physical Function and 2º outcomes of behavioral activation, health status, and activity will be assessed and analyzed at 0, 4, 8, 12, 26 and 12-weeks post-study as in Aim 2.
- *Sample Size & Power*: We intend on enrolling 40 subjects. The sample size undergoing the intervention by the team is manageable allowing us to detect with 80% power at a 5% type I error rate, an effect of MOWI that improves grip strength in 70% using a binomial test. More efficient approaches such as Wald tests of the time term from a mixed effects model with random intercept (or generalized estimating equations with patient cluster) for patient will detect an effect equal to 0.6 within subject standard deviations (0.8 standard deviations of change from baseline), calculated using the Monte Carlo method. We will estimate correlations between pre/post-measures, or equivalently, the partitioning into between subject and within subject variation, which are also essential for randomized trial power calculations. *We emphasize Aim 3 is not designed to definitively provide evidence for a treatment effect*, but designed to inform a comprehensive, larger study and whether it should be conducted.

Recruitment and Retention Strategies

Participants will be recruited from referrals from Family Medicine/General Internal Medicine providers (Primary Care), providers from the Dartmouth Weight & Wellness Center, and community members attending the Dartmouth Center for Health and Aging (DCHA). I will inform clinicians of Family Medicine and General Internal Medicine and the staff at the Weight & Wellness Center of the proposed study during section meetings. Dr. Bartels has an extensive network of community-care providers and will send e-mails/letters to the CHA's listserv and mailing list requesting participation. Posters will be placed in each examination room, in the patient waiting areas and in common areas of the DCHA. All posters will have been pre-approved by DHMC patient/family advisors and the Committee for the Protection for Human Subjects. Additionally, postings in the DCHA quarterly newsletter, the DHMC weekly D-H Today online bulletin, the weekly Geisel School of Medicine at Dartmouth newsletter, and electronic mailing lists will promote the study. We anticipate advertising in the local newspaper as well. A dedicated phone number and e-mail will be assigned to this study.
Patients will be identified from the PI's clinical practice group at D-H, word of mouth, or other means as indicated below. We will also identify prospective individuals fulfilling basic eligibility criteria after obtaining a HIPAA waiver for electronic record review from the Committee for the Protection of Human Subjects. A pre-assessment eligibility would be performed to limit the burden on patients should they be ineligible after full informed consent for the requisite aims. This will allow the investigators to query our electronic medical record and if necessary send targeted messages and/or letters to individuals that may possibly qualify for this study. If needed, the study staff will send a letter to prospective individuals requesting their involvement either by mail or email (through the electronic medical record). This letter will describe the study and provide contact information for those interested. The CTO will also have details of the study. Any individuals that have expressed interest will be contacted by the team by phone or by email which will be the most preferable method of communication. A pre-screening questionnaire or electronic link to RedCAP (See below) or by phone will be mailed/emailed to participants (depending on patient preference).
As part of Aim 1a, eligible patients will be asked to participate in qualitative focus groups and individual semi-structured interviews with a member of the team. It is anticipated that the focus group will occur 4-6 weeks after interest is expressed. The investigators will perform four separate patient focus groups. Semi-structured interviews will take place for clinicians and community leaders of health and senior centers. At the time of communication, the consent form will be sent to these individuals for review (paper or electronic) and if they agree to the terms of the consent, the individuals will attend these sessions at a mutually convenient time for the study participants and the Research Team. A reminder letter will be sent either via myDH (through the electronic medical record) by the PI, and/or a hard copy letter to the patient's address.
As part of Aim 1b, eligible patients will be asked to attend the DCHA to confirm eligibility and informed consent process by the RA/PI (See Section on *Informed Consent Procedures* for Full details). Those ineligible will be informed by the team and any information will be destroyed. We anticipate that eligibility to study onset will be roughly 4-6 weeks after screening.
As part of Aim 2 and 3 (including the pre-pilot Aim 2), eligible patients will be asked either to attend a baseline visit with the RA or PI at the DCHA to confirm study full eligibility for measurements and full informed consent process by the RA/PI (See Section on *Informed Consent Procedures* for Full Details*)*. Those ineligible will be informed by the team and any information will be destroyed. We anticipate that eligibility to study onset will be roughly 4-6 weeks after screening. The patient's primary care provider will provide medical clearance prior to study enrollment and sign a paper or electronic form allowing the individual to undergo this intervention. They will be kept informed of any abnormal symptoms or problems throughout the study.

The investigators recognize that this intervention may lead to attrition. To reduce the risk of participant drop-out, participants will be reminded of sessions with a phone call, e-mail, and Amulet messaging reminder from the RA. Individuals will be compensated with sandwiches/snacks plus $25 gift card for the focus groups of the qualitative aim (Aim 1a), $25 gift card for the subject semi-structured interviews, a nominal $10/hour payment for the prevalidation phase of Aim 1b (cash, gift-card), a $25 gas card each for Aim 1b, $100 for completing >80% of the visits and assessments for the three-month program (Aim 2) - $25 per assessment, and $200 for completing >80% of the visits and assessments at 6-months (Aim 3). Payment will be made at study conclusion according to institutional policies. They will also receive a fixed schedule of items (pens, notepads, thank you cards) to recognize their participation to date. Participants will have the option of declining such incentives at any time. We will provide a $25 gas card or equivalent for each visit (Aim 4).

No involvement of special vulnerable population such as fetuses, neonates, pregnant woman, children, prisoners, institutionalized individuals or others who may be considered vulnerable will be included in this study. The study will be a single-arm study and there will be no assignment to a study group for this study.

Retention

We recognize that attrition rates in obesity studies range between 25-50%. For Aim 1a (qualitative studies), we will target 4 focus groups of 6-8 individuals (24-32 individuals total), 6-8 individual semi-structured interviews, 6 primary care clinicians, and 4 community leaders for a maximum total of 50 individuals. For Aim 1b, we anticipate recruiting 75 individuals for a target of 60 individuals. Conservative estimates suggest that 14 individuals need to be recruited to allow for 16 individuals for Aim 2 at study conclusion. For Aim 3, our target is 40 individuals. We anticipate recruiting 53 individuals. We believe that these targets are feasible with our local population. We anticipate recruiting individuals in one wave for Aim 1, two waves for Aim 2, and in 4 waves for Aim 3 to reach target enrollment and completion. Should we exceed target enrollment and completion, we will continue gathering measurements on all individuals. With the new arm (MOWI-P), we anticipate recruiting an additional 16 subjects. For Aim 4 (Weight Maintenance), we anticipate recruiting 60% of each of the original sample for Aim 2 (ie: 4 waves @ 8 = 32 x 0.6 = approximately 19 subjects).

PROTECTION OF HUMAN SUBJECTS – AMENDED

This Human Subjects Research meets the definition of a clinical trial. The Dartmouth Committee for the Protection of Human Subjects (CPHS) has approved the study, CPHS#28905 (see Appendix) and includes a partial waiver of HIPAA authorization to collect the minimum information required to identify, contact and recruit eligible patients. This proposal has been discussed with Dr. William Nelson, Geisel School of Medicine at Dartmouth health care ethicist, and Dr. David Kotz, our technology information security expert and Chair of the Department of Computer Science, who will both serve as advisors to guide the development of the responsible conduct for research.

Human Subjects Involvement, Characteristics and Design:

Justification of Use of Human Individuals

The proposed intervention requires human involvement to develop a mobile health Obesity Wellness Intervention (MOWI). MOWI consists of a 3x/week in-person intervention at the Dartmouth Center for Health and Aging, comprising of three components: an individual weekly nutritional counseling session led by a dietician, 2x/week group exercise visits led by a clinical physical therapist, and a patient-self-monitoring mHealth device capable of remote sensing (Amulet). The intervention is based on previous studies demonstrating the importance of intensive behavioral therapy and caloric restriction[16,19,21,80-82] and the emerging evidence of the importance of group meetings[161]. We will also use focus groups and semi-structured interviews to obtain input into the utility, acceptability and perceived value of Telehealth modalities (Aim 1a); adapt Amulet in older adults to assess geriatric functional measures (Aim 1b); develop, refine, and tailor MOWI to evaluate its effectiveness (Aim 2); and conduct and assess the feasibility, acceptability and preliminary effectiveness of a video-delivered home-based program (Aim 3). It is impossible to assess study feasibility, acceptability or effectiveness without human involvement. The MOWI-P arm will consist of an additional 16 participants

Characteristics of the Subject Population

We will recruit older motivated adults with obesity (aged ≥65years) to participate in the three separate aims of this study. Aim 1a will recruit up to 50 individuals, Aim 1b will recruit 100 individuals (pre-validation and validation), Aim 2 aims to recruit and retain 10 individuals, and Aim 3 aims to recruit and retain 40 individuals. No special or vulnerable populations, including older adults with cognitive impairment, will be included in this study. No assignment to study group will occur. For Aim 1b (pre-validation) on younger local personnel/students, we approximate ~30-50 individuals to participate and 10-20 older adults as well. MOWI-P will consist of an additional 16 participants

Sources of Materials

Sources of information

Data from this study includes clinical characteristics abstracted from the medical record (age, race, ethnicity, employment status, ability to communicate in English, marital status, education level, number and names of medications, co-morbidities, smoking status, admissions to the nursing home or hospital, BMI, documented dementia, weight loss of >5% in the past year, recent angina/coronary events, bariatric surgery). Self-reported data from questionnaires will be obtained including Katz[86] and Lawton[87] activities of daily living scales, PAM[137], PROMIS[139], CHAMPS[144], Social Support with Exercise[145] , Social Support and Eating Habits, Readiness to Change, and number of household members. Objective outcome measures will be assessed including grip strength[127], Five Times Sit-to-Stand[106], Six Minute Walk Test[130], gait speed[135], weight, and waist circumference. Field notes from the physical therapist and the dietician (detailing the experience of the intervention, reactions from the participants, aspects that work well or need improving upon, insights etc.), and questions regarding patient satisfaction will be assessed.

All qualitative data from focus groups or semi-structured interviews will be recorded, transcribed and/or videotaped by the RA. Satisfaction questionnaires will be completed by participants. This information will subsequently be imported for analysis and review using *Dedoose* and STATA, R or SAS.

All questionnaire data will be either in paper format, or populated by individuals using the RedCAP (Research Electronic Data Capture) software. Study data will be collected and managed using REDCap electronic data capture tools managed at Dartmouth College through the license from the Clinical and Translational Science Institute (SYNERGY)[146]. REDCap is a secure, web-based application designed to support data capture for research studies, providing 1) an intuitive interface for validated data entry; 2) audit

trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources.

Study Personnel with Access to Identifiable Data

The PI and RA will have access to all data. All data would be considered protected health information (PHI) subject to HIPAA and D-H regulations. Only the PI and the RA will have access to this individual-level data and to the electronic medical record (eDH) which has pertinent PHI and laboratory assessments obtained. Drs. Kotz & Pletcher and their teams will also have access to technology-related data that will be communicated to the RA and study team. This is necessary in the capacity of the RA to serve as a health coach[102] to be aware of such information. All other data communicated to other study personnel will be de-identified and communicated only in aggregate.

The MOWI comprises of a multidisciplinary treatment strategy, including nutritional, behavioral, and physical interventions, augmented by Telehealth modalities (telemedicine, mHealth and remote sensing). The confidentiality of focus group or individual data cannot be guaranteed. We will encourage and ask our study participants not to share the information discussed within the session.

Strategies for Protecting Personal Information

All investigators will have completed the requisite Human Individuals protection training, CITI, or training as required by local institutional standards. All Dartmouth investigators would abide by HIPAA policies, and as such, would have full understanding of privacy rules. Access to medical records would be from private D-H work computers accessed using a unique electronic portal identifier. A password-protected datafile on password-protected computers of the PI will contain linking data with identifiers. All written material will be coded using a unique identifier and not by participant name. All questionnaires or other study-related documents will be kept in the PI's locked office. All consent forms (paper or electronic) will be kept separately in the PI's locked office (or in a secure electronic location). All data will be accessible by the PI and downloaded to a D-H password protected computer. Data from audio recordings will be transcribed by the RA, other study personnel or by an official transcription service (ie: rev.com). A non-disclosure agreement will be signed by the PI.

Data from the Amulet will be transmitted to a Wi-Fi- secure cloud-based repository via HTTP post, decrypted and stored on an Amazon virtual machine running a MySQL database. The data can be downloaded by the RA. Individual data in Aim 1b and 2 will be kept confidential, although sharing of information that is communicated in group exercise sessions cannot be kept confidential to other participants.

Survey data will be performed on RedCAP software and be encrypted per institutional policies. The Department of Bioinformatics through the Center for Translational Science Activities will facilitate this process. Additionally, any video-conferencing will be performed through the Vidyo or Zoom software platforms are encoded to transmit securely between participant and study staff. At the conclusion of each wave, any software and tablets will be erased and data will be expunged per IT policies.

Data from the fitness devices and their applications will be password protected, and only study personnel would have access to the complete data. All data from the EHR will be HIPAA-compliant. No PHI information will be relayed during any of these sessions. The investigators will discuss this with the eligible subjects and ensure they are fully aware of these minimal, but possible risks. The risk of a contact allergy with the fitness device is possible, although we anticipate this risk being quite low, and if indeed this does occur, a communication with the patient's primary care provider will be made. Should the contact allergy be significant, the patient will be treated symptomatically or withdrawn from the study.

Potential Physical and Psychological Risks to Individuals (including possible alternative treatments) and Mitigation of Such Risks.

The MOWI comprises of a multidisciplinary treatment strategy, including nutritional, behavioral, and physical interventions, augmented by Telehealth modalities (telemedicine, mHealth and remote sensing). The confidentiality of focus group or individual data cannot be guaranteed. We will encourage and ask our study participants not to share the information discussed within the session.

Physical activity interventions may lead to mild muscular fatigue or soreness but will be monitored in a setting by trained professionals. Risk of falling is elevated in older adults[178] and will need to be supervised. Physical activity is recommended, even in sedentary individuals who may be at risk for cardiovascular

events[179,180] . As such, primary care clinicians need to provide medical clearance for individuals to participate in this program. Injuries may occur while engaging in the physical therapy program which will be allayed by a graded approach to activity. As with all functional measures there are safety issues. Physicians are on site at the Dartmouth Center for Health and Aging at the time of these sessions all of whom are certified in cardiac life support. If at any time during the study, the patient expresses any unexplained physical symptoms, the RA or clinical staff will share this information with the PI, who in turn will contact the participant's primary care provider to ensure prompt evaluation. Should the primary care provider not be available, the participants will be transported, if deemed medically necessary, to the closest Emergency Department. A member of the study staff will remain with the participant until there is a safe transfer of care. For Aim 3, additional safety measures have been established to ensure the safety of participants while participating in at home exercise classes where an RA or physical therapist will not have direct contact with them at the time a physical symptom may arise. (See attached safety flowchart) Lastly, rarely during focus groups or semi-structured interviews would individuals become uncomfortable; however, they will be reminded that they are participating voluntarily and may leave the group at any time. Our Institution Review Board expects notification of any incidental findings, as well as about any unanticipated problems involving risk to subjects. Any newly identified psychiatric disorder will be referred to the primary care provider for assessment and treatment.

Data from the Amulet and its applications will be password protected, and only study personnel would have access to the complete data. All data will be HIPAA-compliant. Additionally, we deliberately chose Vidyo as this is a software platform that has been used by the Center for Telehealth and this software is HIPAA-compliant. The investigators will discuss this with the eligible subjects and ensure they are fully aware of these minimal, but possible risks. The risk of a contact allergy with Amulet is possible, although we anticipate this risk being quite low, and if indeed this does occur, a communication with the patient's primary care provider will be made. Should the contact allergy be significant, the patient will be treated symptomatically or withdrawn from the study.

Venipuncture will be considered in all participants in Aim 2 – this will be performed at the Dartmouth-Hitchcock laboratory under standard clinical conditions. We expect minimal risk from this procedure. Volume of bloodwork will be <500cc in this population. Bloodwork will be obtained at baseline and again at 12 weeks.

Adequacy of Protection Against Risks

Description of Informed Consent Procedures

Please refer to the above section regarding the HIPAA waiver to allow for identification of subjects in the electronic medical record. Competence to provide informed consent will be assured by a review of personal history/medical record (all Aims for subjects) and the Callahan Cognitive screener score ≥4 prior to informed consent evaluation for Aims 2 & 3 **(**Appendix**)**. No chart review will be performed for clinicians/leaders in Aim 1a or the pre-validation in Aim 1b.

After the study participant expresses interest and is eligible based on inclusion/exclusion criteria (*see Recruitment & Retention Strategies* above), they will be presented with a written consent form (paper or electronic form) and initiation of the informed consent discussion will occur by either the PI or RA or member of the study staff. Participants will be encouraged to ask questions about the study or research process. If the participants need more time to consider enrolling, a follow-up telephone call to continue this consent process will occur according to IRB-approved procedures for telephone consent by the PI/RA with contact telephone numbers if they have additional questions. Participants will be encouraged to ask questions about the study or research process and be given ample time to review the informed consent form. A telephone script will be available which will encourage questions and clarification of the study procedures as needed. All individuals agreeing will be asked to sign an informed consent document (paper or electronic), or if done by telephone, a return postage envelope will be used to return the consent form. The individual who agrees by phone will not commence the study until this form is received. The form will be scanned into the Dartmouth-Hitchcock Electronic Medical Record and the encounter will be documented. Once targeted enrollment for a given iteration occurs, the PI/RA will arrange and notify the patient the time and date of the first session. Primary care provider permission will be necessary prior to commencing this study for Aims 2 and 3.

All consent processes will be performed at the Dartmouth Centers for Health and Aging, the Amulet laboratory on campus, or a mutually convenient location as designated by the participant/PI. The overall purpose of the research will be presented to the participant and the specific component they will be recruited for will be discussed. The reason why the individual was asked to be involved will be provided. The anticipated outcome will be explained to the individuals. We shall emphasize to the prospective subject that their

involvement is entirely voluntary and will not influence nor impact their care at Dartmouth-Hitchcock. Individuals will be encouraged to discuss the study with their family and friends and take their time to make such a decision. We will emphasize that their participation in all aims is based on their willingness to engage in the requisite technology.

The time commitment for the research project will be described and the anticipated discomforts and risks (both physical and nonphysical). The potential benefits to the participant and the potential benefits to others will be provided (see below). A description of their confidentiality will be provided, including how their information will be treated, stored, maintained (and for what duration) and how the materials will be disposed of. They will be provided with the freedom to participate in research and/or withdrawal of the research permission at any time and the institutional processes for doing so. The sources of information that data can be collected will be given, along with the contact information for questions or concerns will be provided along with the PI's name, address, phone number. Any costs or description for compensation for injury will be described. The grantor for this research will be given as well and any potential conflicts of interest that the investigators may have.

A separate consent form will be provided for Aim 4.

For Aim 1a: *Qualitative Assessment* (Focus Groups/Semi-Structured Interviews) Subjects: The Dartmouth CPHS considers this type of research minimal risk. An information page and consent form (paper or electronic) will be provided to each participant. The RA will explain the purpose of this component of the study and answer any questions that any of the participants may have. Each individual will have the opportunity to answer questions in the group (or individually for the semi-structured interview), in a non-pressured manner. Should the participant, following discussion of the study purpose and consent not be willing to participate, the subject shall be thanked for their time but not included in the group. None of their information shall be used and any information to date will be destroyed.

For Aim 1a: *Qualitative Assessment* (Clinician & Community Leader Semi-Structured Interviews): The Dartmouth CPHS considers this type of research minimal risk. An information page and consent form will be provided to each participant (paper or electronic). The RA will explain the purpose of this component of the study and answer any questions that any of the participants may have. Each individual will have the opportunity to answer questions in a non-pressured manner. Should the participant, following discussion of the study purpose and consent not be willing to participate, the subject shall be thanked for their time but not included in the study. None of their information shall be used and any information to date will be destroyed.

For Aim 1b: *Prevalidation of Amulet Information:* As per CPHS discussion of 7/6/2016, an information sheet will be provided (either paper/electronic) to the participants.

For Aims 1b (*Adapt Amulet*), Prevalidation Aim 2, Aim 2 (*Define/refine MOWI)* & Aim 3 (*Home-based MOWI*): The RA will review the respective aim study with the patient, answer any questions, and assess the patient's eligibility. Description of the intervention and the possible risks, benefits and alternatives will be presented. Much of the eligibility criteria will have been screened in advance (see above). The RA will present the information sheet (Aim 1b), consent form (Aim 2+3 - paper or electronic) and initiate the informed consent discussion (as described above). Should the participant, following discussion of the study purpose and consent not be willing to participate, the subject shall be thanked for their time but not included in the group. None of their information shall be used and any information to date will be destroyed.

The completed form will be scanned into the Dartmouth-Hitchcock Electronic Medical Record (Aims 2+3) and the encounter will be documented for study subjects. For community leaders, clinicians and pre-validation subjects, the consent forms (paper or electronic) will be kept in the PI's locked office.

Adequacy of Protection Against Risks

Participants are informed that information obtained through research interviews and assessments are confidential. Talking about life experiences may cause discomfort. If participants feel uncomfortable they are encouraged to take a break and continue again later or are offered to stop the interview or assessment. Participants may also choose not to answer certain questions. The interviewer also may offer to call the

participant's family, a program staff member, or concerned others (such as a close friend) to make sure he or she has someone to talk with about the program.
The team will also encourage continual communication with the primary care provider if any medical concerns are raised by participants. Should any participant endorse any symptoms, we will immediately contact the nursing staff of the patient's primary care physician at Dartmouth-Hitchcock or to the individual's local community provider to communicate this risk. On site, there will be individuals and other members that are certified in Basic Life Support by the American Heart Association as required by Institutional Policies. Urgent care can be provided in the event of an emergency prior to calling 9-1-1 for an ambulance to arrive.
Any other medically-related questions will be referred to the patient's primary care provider during normal business hours (Monday to Friday 8am-5pm) and after-hours on-call coverage is available through the Family Medicine/General Internal Medicine practices or to the local community practice. All study activities will be performed during normal clinic hours (8am to 5pm) and hence access to participant's primary care team is possible. Study-related questions can be communicated to the Principal Investigator at 603-653-9500 or by e-mail at John.A.Batsis@dartmouth.edu. Additionally, the patient's emergency contact will be contacted as indicated in the consent form. Our team intends on collaborating with each participant's primary care provider to determine an appropriate action plan to minimize any risk.

Potential Benefits of Proposed Research

Research participants have an opportunity to engage in a medically supervised Obesity Wellness Intervention using novel technologies and would benefit from the discussions with other participants in similar situations. For the intervention development, participants will participate in this program which has the potential to improve their overall function, aerobic and resistance activity and wellness. Approximately 150minutes weekly of aerobic physical activity is recommended[166,167]. While our program focuses primarily on resistance training, we will encourage individuals to achieve the aerobic objective on their own. Individuals will obtain data that could potentially be used in clinical settings. The monetary appreciation is another benefit of this proposed research that will offset travel costs. The overall risks of this study are quite minimal, yet in line with recommendations from major medical societies. Obesity interventions are recommended even in older adults[168], yet we believe that any benefits received from this intervention far exceed those risks. The components of the obesity intervention would be considered medically necessary for older adults with obesity.

Importance of the Knowledge to be Gained

The information gained in this study will allow the investigators to ascertain the benefits from a technology-based wellness program and anticipate furthering our understanding of the implications of this program on functional and biological biomarkers. Understanding these relationships in a clinical setting will allow further refinement into a wellness program for obese older adults with the goal of limiting the acceleration of sarcopenia and improving function. The program engages and empowers patients in altering their lifestyle, thereby promoting healthy living, proper nutrition, physical activity, and maintenance of function. The risks of the study are minimal to individuals in relation to the potential benefits they may receive.

Additionally, the Amulet is intended on becoming a commercially available device intended on improving physical health and wellness. The device has been granted a Non-Significant Risk exemption (NSR) according to published intent of Amulet[100] and review of the protocol by the Committee for the Protection of Human Subjects at Dartmouth, dated 7/23/2015 based on 21 CFR 812.2(b)(ii) (Appendix).

Confidentiality and Data Integrity:

Confidentiality protections include confidentiality training for all new employees and refresher seminars annually for all employees; coding subjects by number; filing code sheets separately from data; removing or obscuring names from data forms; using an acronym in return addresses on correspondence to subjects; storing all data in locked file cabinets; and password-protected computer databases.

All data collected by Amulet will be recorded to an internal memory card (standard MicroSD card) but can only be accessed by removing it from the Amulet (by unscrewing the back cover) and then read by any device with an SD-card adapter. This approach provides a secure and reliable means of collecting data and transferring it to the researcher's computer when the subject returns the Amulet at the end of the study. There will be automated upload of live data via standard Bluetooth wireless protocols to a computer server in the Kotz lab (or virtual server in the Amazon Cloud). This transfer of data will be conducted over authenticated and confidential channels using standard protocols (https – which is used by all common e-commerce and banking websites). Fitbit data will be collected through the application or through a 3rd party vendor (Fitabase).

Data and Safety Monitoring Plan

Per the instructions for the "Human Subjects" section of PHS-398/SF424 (R+R) the proposed study intervention could have harmful effects but does NOT meet the criteria for an NIH-defined Phase III trial.

To ensure participant safety, data integrity and validity, the Research Assistant will meet with the Principal Investigator monthly, and will be responsible for reviewing the following: number of subjects completing the protocol; subject withdrawal and sources of data loss; any serious or minor adverse consequences and actions taken to remedy the issue; new, timely information that could impact efficacy and/or safety of the program or procedures. The meeting reports will be forwarded to the Committee for the Protection of Human Subjects at the time of annual review and serious events will be reported per institutional regulations.

The current intervention is not an experimental agent and its proposed risk to individuals is likely considered low. We anticipate that there will be a low risk of adverse medical events associated with this intervention. A physician will be available on the premises during all intervention sessions and monitor patient progress and/or adverse events during each session and be responsible for monitoring the data and safety for this proposal. However, we intend on establishing an independent data safety monitoring process that will include an independent data safety monitoring board (DSMB). The committee will consist of experienced researchers in the Department of Medicine and The Dartmouth Institute at the Geisel School of Medicine at Dartmouth. Such members will consist of researchers who are not involved in the development or execution of this proposal. Per institutional policies, no investigators will have any conflict of interests with or financial stakes in the research outcome. This independent board will follow the policy for data and safety monitoring published by NIH and be responsible for reviewing the following information: adverse consequences (whether serious or minor) to any subject and actions taken to remedy the problem; data quality, completeness, timeliness; performance of the study site; reviewing the entire IRB-approved study protocol, manual of procedures with regard to safety, recruitment, intervention, data management, quality control, analysis and informed consent documents with regard to applicability and readability; recruitment and retention; adherence to protocol; maintenance of confidentiality; external factors impacting safety or ethics of the study; and new or evolving information regarding the expected efficacy and/or safety of the MOWI intervention. Additionally, the DSMB will review the study in relation to intervention effects, gender and minority exclusion; propose appropriate analyses and periodically review developing data on safety and endpoints; consider the rationale semi-annually for continuing the study; review and make recommendations on proposed protocol changes during the trial. All recommended changes to the protocol will be adhered to by the PI. The board will identify relevant data parameters and the format of how the information will be regularly reported. Written reports of each meeting will be sent to the program officer and additional reports as needed, in addition to providing timely advice on issues regarding data discrepancies. They will review manuscripts of trial results. In addition, they will recommend subject recruitment be initiated after receipt of a satisfactory protocol and/or postpone recommendations for initiation of subject recruitment until after the receipt of satisfactory revised protocols. Summary reports of the meetings will be sent to the CPHS at the time of annual reviews. The monitoring committee will ensure safe and effective conduct of the intervention and recommend conclusion of the intervention when significant benefits or risks have developed or the intervention is unlikely to be concluded successfully. All monitoring will be timely and effective. Data from the Research Assistant and Biostatistician will be forwarded to the DSMB for review (and to the Program Officer upon request). The DSMB will conduct reviews of the study every 6 months.

All information will be kept confidential during all phases of the intervention, including monitoring, preparation of interim results, review and response to monitoring recommendations. Monitoring will also consider external study factors when interpreting data, including scientific or therapeutic developments that can impact participants. The results of the trial will be forwarded upon publication of its results to all subjects at the conclusion of the intervention. The team will also provide the subject's healthcare providers with appropriate information, as needed, concerning the individual.

Adverse Event Reporting

Serious, unexpected adverse events (SAE) related to study participation are anticipated to be rare. Study personnel will be trained to report all adverse events. In addition, screening for adverse events potentially related to the study intervention will occur during the routine administration of study assessment measures. These interview-based indicators will augment required SAE reports by study personnel, including specific items in the assessment interviews evaluating episodes of muscle or fall-related injuries, unexpected medical events, medical emergency room admissions, medical hospitalizations, or unplanned medical clinic

visits. If an SAE occurs, the PI will report the event to the Dartmouth CPHS using the CPHS Adverse Event Form, to the DSMB, and to the NIA Program Officer within 10 days of the study's knowledge of the SAE (if unanticipated) unless otherwise requested by the DSMB. The PI, in consultation with co-investigators and others, as needed, will review the adverse event report and gather other information as needed to investigate the event and determine the need for subsequent action. Any subsequent action will be documented and reported to the CPHS. In addition, any SAE will also be reported to the NIH program officer and they will be informed of any actions taken by the CPHS as a result of its continuing review. The CPHS will review each reported adverse event to determine whether: the participants in the study should receive additional information related to continuing their participation; the protocol, study plan or consent form should be modified; or the study should be temporarily suspended. If the CPHS determines that some action in response to the adverse event is necessary, the CPHS will promptly inform the PI. All deaths will be reported in an expedited manner, normally within 24 hours of the study's knowledge. The report of death will also be submitted to the NIA Program Administrator and to the CPHS and to the DSMB Chair.

STATISTICAL DESIGN AND POWER

Aim 1 (*Qualitative assessment*) will use mixed-methods to adapt Amulet and MOWI for use in rural older obese adults. Aim 2 (*Develop/refine MOWI*) and Aim 3 (*Evaluate home-based MOWI*) will explore feasibility/acceptability, and preliminary effectiveness of the above outcomes. Data will be analyzed as follows:

Aim 3 (*Evaluate home-based MOWI*): *Conduct and assess the feasibility, acceptability, and potential effectiveness of a home-based MOWI:*

- *Feasibility/Acceptability:* Rates of screening, eligibility, enrollment, completion, assessment, entry criteria
- suitability, attrition reasons, satisfaction, acceptability, usability, and feasibility of MOWI will be assessed using mixed-methods at 26 weeks as in Aim 2.
- *Statistical Analysis:* The 1º outcome of Physical Function and 2º outcomes of behavioral activation, health status, and activity will be assessed and analyzed at 0, 4, 8, 12, 26 and 12-weeks post-study as in Aim 2.
- *Sample Size & Power*: We intend on enrolling 40 subjects. The sample size undergoing the intervention by the team is manageable allowing us to detect with 80% power at a 5% type I error rate, an effect of MOWI that improves grip strength in 70% using a binomial test. More efficient approaches such as Wald tests of the time term from a mixed effects model with random intercept (or generalized estimating equations with patient cluster) for patient will detect an effect equal to 0.6 within subject standard deviations (0.8 standard deviations of change from baseline), calculated using the Monte Carlo method. We will estimate correlations between pre/post-measures, or equivalently, the partitioning into between subject and within subject variation, which are also essential for randomized trial power calculations. *We emphasize Aim 3 is not designed to definitively provide evidence for a treatment effect*, but designed to inform a comprehensive, larger study and whether it should be conducted.

CONSENT TO TAKE PART IN RESEARCH

Dartmouth-Hitchcock Medical Center and Dartmouth College

Study title: **Mobile Obesity Wellness Intervention in Rural Older Adults with Obesity Aim 3 – D_16182_3**

Principal Investigator: John A. Batsis, MD

You are being asked to take part in a research study. Taking part in research is voluntary.

Your decision whether or not to take part will have no effect on the quality of your medical care. Please ask questions if there is anything about this study you do not understand.

Key Points:
a) Weight and Wellness Study in Older Adults
b) Use of Wearable Fitness Device
c) Use of Video-conferencing (Telemedicine) at Home

What is the purpose of this study?

The purpose of the study is to learn if incorporating technology into a wellness program is valid, effective and can improve one's care.

Will you benefit from taking part in this study?

You may or may not personally benefit from being in this research study. We hope that the information we gather in this research will be helpful in advancing our understanding how to help older adults who need to lose weight in the future.

What does this study involve?

Your participation in this study may last six months. During this time, we will provide each person with a wearable device, a scale, weights and a Tablet. Each participant will participate in a 26-week program of weekly nutrition counseling and twice weekly group exercise visits. Each nutrition session will last 15-20 minutes, and each exercise session will last 70-90 minutes. Participants will be expected to participate in these sessions in their own home and be provided the appropriate video-based technology to do so. We will have monthly in-person sessions as well.

To ensure you are eligible to participate in the study, we will review your medical record, and have complete the following:

- Questionnaires on physical function
- Memory test

In the home setting, we will guide you in how to connect your tablet to WiFi and how to connect your tablet to your TV if you so wish. The commercial wearable device we will provide you will track your activity – this feedback will be available to our study staff who can provide feedback and motivation to you as the participant.

Questionnaires, and physical strength and fitness measures will be assessed at baseline, 8, 16 and 24 weeks post-baseline assessments at the study center. An interview will also be conducted at follow-up. Post-study assessments will be performed as well.

We shall ask you for a blood draw before the study begins and again at the end. Any unused blood will be banked. Some of your blood cells or serum may be stored for future research use. Any future research that uses your blood will be reviewed by the Committee for the Protection of Human Subjects at Dartmouth College, who will determine if the research requires your permission or may be properly done without further permission from you.

What are the options if you do not want to take part in this study?

You do not have to take part in this study if you do not wish to nor do you need to take part in this study to receive medical care or treatment.

What are the risks involved with being enrolled in this study?

We cannot be sure how your body may respond to weight loss or the exercises you will be asked to do in this study. The research team will discuss possible problems and the chances that they will happen. Unknown problems may happen. Problems are likely to be small, such as muscle soreness or fatigue, or they may be so serious that they result in death, which would be extremely unlikely, or they may be somewhere in between. All participants will require medical clearance before starting the study. You should report any problems to your doctor or to the director of this study**: John A. Batsis, MD, 603-653-9500**

A risk of providing blood is mild to moderate pain at the site of the needle puncture into your vein. Other risks are redness, minor bleeding, swelling and a bruise at the site of the needle puncture or, rarely, an infection. Some people feel dizzy or faint when blood is taken; however, most people do not experience any problems.

Other important items you should know:

• **Leaving the study:** You may choose to stop taking part in this study at any time. If you decide to stop taking part, it will have no effect on the quality of medical care you receive. Any equipment must be returned to the study director. The investigator reserves the right to stop the study participant from continuing without participant consent.

• **Number of people in this study:** We expect 40 people to enroll in this study here

• **Funding:** The National Institutes on Aging and the Department of Medicine provides funding to Dartmouth College for this research.

• **Product Development:** If the results of this research are used to develop a product sold for a profit, you will not share in the profit.

How will your privacy be protected?

The information collected as data for this study includes:
Data that is available in the Dartmouth-Hitchcock electronic medical record and audiotaped data as outlined above. Study data will be maintained for a period of six (6) years or longer if needed for other purposes. At that time, data will be deleted from computer hardware or shredded on the DHMC campus.

We are careful to protect the identities of the people in this study. We also keep the information collected for this study secure and confidential. All data will be kept in a locked office, and all computer data will be on a password protected encrypted computer as outlined by the Committee of Protection of Human Subjects.

The information collected for this study will be used only for the purposes of research as stated earlier in this form.

Who may use or see your health information?

By signing this form, you allow the research team to use your health information and give it to others involved in the research. The research team includes the study director plus others working on this study at Dartmouth-Hitchcock Medical Center and elsewhere. You also permit any health care provider holding health information needed for this study to give copies of your information to the research team.

The information collected for this study may be used by researchers or officials of the following institutions.

- Dartmouth College
- Mary Hitchcock Memorial Hospital
- Dartmouth-Hitchcock Clinic
- Dartmouth-Hitchcock Medical Center
- Mayo Clinic Rochester
- University of New Hampshire

In order to conduct this study, researchers need to use your health care information. This data is called Protected Health Information ("PHI"). PHI is protected by federal privacy laws (HIPAA). By signing this consent form, you give your permission to have your PHI collected, used and disclosed for purposes of this study. There is no intention to disclose your PHI to others outside of the study. There are protections in place to keep your PHI and research data confidential. However, HIPAA requires notification so you are aware if your PHI is disclosed to others, it may no longer be protected by federal privacy laws.

No publication or public presentation about the research described above will reveal your identity without another authorization from you.

Identifiable data collected for this study will be used for research purposes which are determined to be reasonable and in line with expectations by a review committee.

Once data collected for this research study is no longer identifiable, the data may be used or disclosed for other purposes.

Your permission to use your health information for this study will not end until the study is completed. During this study, you and others who take part in the study may not have access to the study data. You may ask for your study data once the study is over. You have a right to receive a copy of the information in your medical record at any time.

This research is covered by a Certificate of Confidentiality from the National Institutes of Health. The researchers with this Certificate may not disclose or use information, documents, or biospecimens that may identify you in any federal, state, or local civil, criminal, administrative, legislative, or other action, suit, or proceeding, or be used as evidence, for example, if there is a court subpoena, unless you have consented for this use. Information, documents, or biospecimens protected by this Certificate cannot be disclosed to anyone else who is not connected with the research except, if there is a federal, state, or local law that requires disclosure (such as to report child abuse or communicable diseases but not for federal, state, or local civil, criminal, administrative, legislative, or other proceedings, see below); if you have consented to the disclosure, including for your medical treatment; or if it is used for other scientific research, as allowed by federal regulations protecting research subjects.

The Certificate cannot be used to refuse a request for information from personnel of the United States federal or state government agency sponsoring the project that is needed for auditing or program evaluation by NIA which is funding this project or for information that must be disclosed in order to meet the requirements of the federal Food and Drug Administration (FDA). You should understand that a Certificate of Confidentiality does not prevent you from voluntarily releasing information about yourself or your involvement in this research. If you want your research information released to an insurer, medical care provider, or any other person not connected with the research, you must provide consent to allow the researchers to release it.

The Certificate of Confidentiality will not be used to prevent disclosure as required by federal, state, or local law of: child or elder abuse and/or neglect, or harm to self or others.

What if you decide not to give permission to use and share your personal health information?

If you do not allow use of your health information for this study, you may not take part in this study. If you choose to stop taking part in this study, you may cancel permission for the use of your health information. You should let the researcher know if you want to cancel your permission. The study team will assist you in putting your wishes in writing. Information

collected for the study before your permission is cancelled will continue to be used in the research.

What about the costs of this study?
There are no costs charged to the participant.

Will you be paid to take part in this study?
For each assessment, we will provide a $25 gas card for its completion (total $125). A fixed schedule of items (pens, notepads, thank-you cards) will be provided to recognize your participation to date. You have the option of declining these gifts.

The sessions will be done only for research purposes and paid for by the sponsor. Insurance plans will not be billed as part of this project. All medical issues resulting from this study would need to be covered through your regular healthcare insurance. You or your insurance plan will be expected to pay for the costs of this usual medical care. For assistance in determining your coverage, please call the billing specialist in DHMC Patient Financial Services at 603-653-1047 or 800-368-4783.

Your name, address, and social security number will be given to an office at DHMC that arranges for payments and reports payments to the IRS. If you do not provide a social security number, no payment can be made. This DHMC office sometimes checks to make sure that social security numbers and names match.

Whom should you call with questions about this study?
If you have questions about this study or need to report a study related injury, you can call your doctor or the research director for this study: Dr. John A. Batsis, MD, (603) 653-9500 during normal business hours. If Dr. Batsis is not available, all concerns should be addressed by your primary care provider's office who will be available to answer your questions during normal business hours. An emergency contact number is (603) 650-5000, the main hospital number.

If you have questions, concerns, complaints, or suggestions about human research at Dartmouth, you may call the Office of the Committee for the Protection of Human Subjects at Dartmouth College (603) 646-6482 during normal business hours.

CONSENT

I have read the above information about **Mobile Obesity Wellness Intervention in Rural Older Adults with Obesity** and have been given time to ask questions. I agree to take part in this study and I have been given a copy of this signed consent form.

Participant's Signature	Date	PRINTED NAME
Researcher or Designee Signature	Date	PRINTED NAME