Tasmanian Health Organisation – North West

Study Protocol

The Assessment and management of Obesity and Self-maintenance (AMOS) Clinic: Implementation and Evaluation of the AMOS Model of Care

Version 7

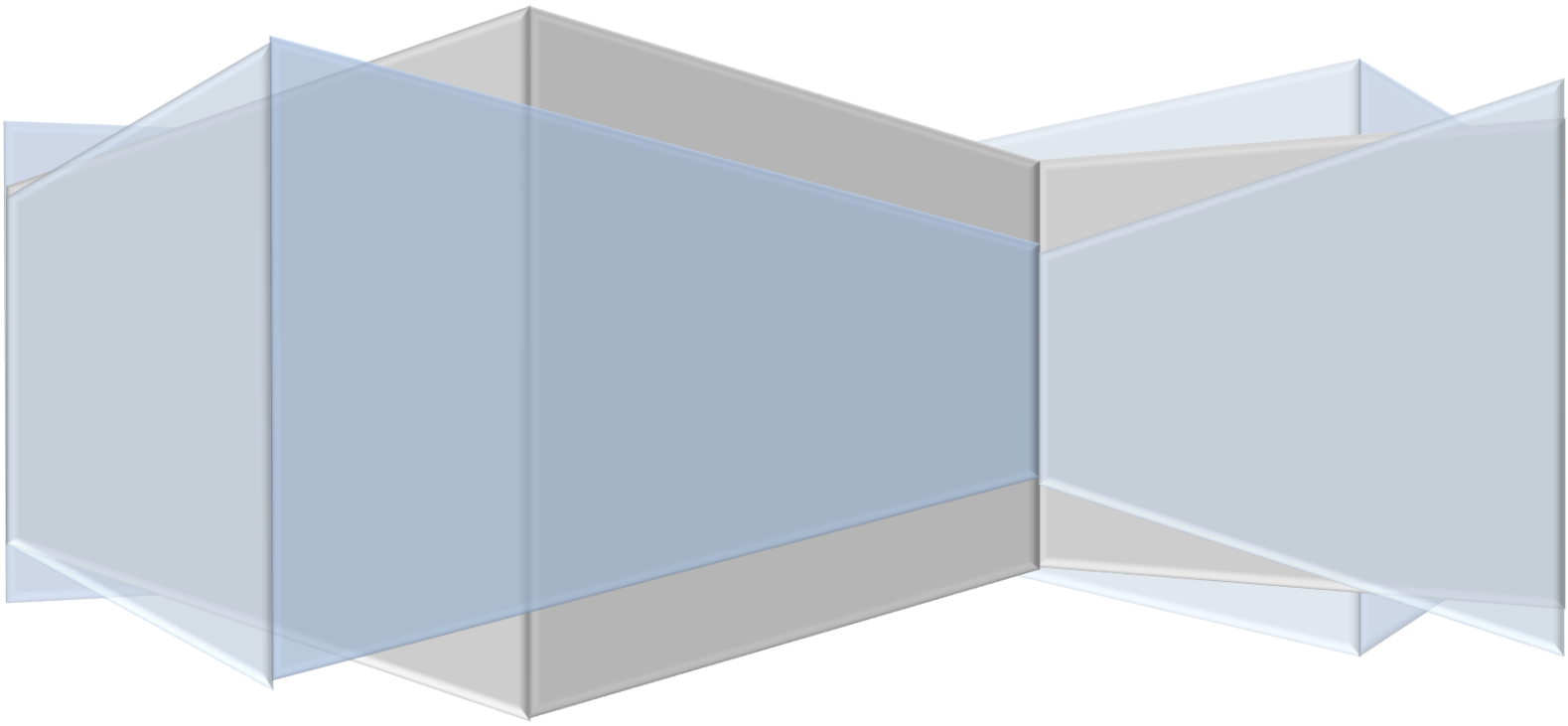


Table of Contents

Title **2**
Summary **2**
Researchers/Investigators **2**
Rationale and Background **3**
Study Goals and Objectives **5**
Aim 5
Objectives 5
Outcomes **5**
Study Design **7**
Rationale for Study Design **8**
Methodology **8**
Randomisation 8
Study Intervention 9
Clarification of Intervention 9
Usual Care Contextualised to the Rural Setting 11
Management of Cross Contamination 12
Orlistat and other Weight Medications 12
Orlistat as the Pharmaceutical Intervention & Bariatric Surgery 13
Flow Chart 14
Study Duration/Timelines **15**
Study Population **15**
Participants Inclusion/Exclusion Criteria **15**
Lay Description of Participation 15
Nature of Existing Relationships and Voluntary Consent 16
Impact of Research on Participant/Researcher Relationship 16
Male to Female Ratio 16
Consideration for Vulnerable Groups 16
Data Management and Statistical Analysis **16**
Data Management 16
Statistical Analysis 17
Justification of Effect Size 18
Expected Outcomes of the Study **21**
Informed Consent **21**
Advertisement of Study 21
Exposure of Person to Disadvantage or Risk 22
Seeking Consent 22
Confidentiality and Privacy 22
Safety Considerations **23**
Expected Benefits to the Wider Community 23
Expected Benefits to Participants 23
Risk of Harm 23
Mechanisms to Monitor the Project 24
Data and Safety Monitoring 24
Resources **24**
Other Personnel Relevant to Research Project 24
Training 25
Project Funding 25
Project Management **26**
Prior Reviews **31**
Dissemination of Results and Publication **31**
References **32**

Study Protocol

Title

The Assessment and Management of Obesity and Self-Maintenance (AMOS) Clinic: Implementation and Evaluation of the AMOS Model of Care

Summary

The aim of this project is to assess the effectiveness of an integrated model of obesity care for adult patients with diabetes who also have obesity. The research design is a randomised controlled clinical trial. The project will recruit 212 patients with diabetes and randomise them to active intervention or usual care. The active intervention group will receive an integrated, multidisciplinary model of care for obesity management.

Researchers/Investigators

Principal Investigators

Giuliana Murfet (PhD candidate [Deakin] MSc MNg[NP] Grad Dip DiabEd CDE BN)
Expertise: Giuliana Murfet is a nurse practitioner (NP) specialising in diabetes; has worked as an NP for 4 years and as a Credentialled Diabetes Educator for over 20 years. As a nurse practitioner she is involved in diagnosis and medical management of both acute and chronic conditions. She has extensive experience in literature reviews for policy development on a state-wide and national level in the area of diabetes, its management and medicine management. In particular through her role as member of the Medical Educational and Scientific Advisory Council and as Board member of the Australian Diabetes Educators Association for the past 6 years. She has performed research and published in improving health outcomes in diabetes in pregnancy through service modelling.
Responsibilities: Responsible for overseeing the study operations across the site. Co-ordinate training and meetings with stakeholders, manage project team and stakeholders, manage change and timelines and report back to any funding body. Along with her fellow PI will ensure that the AIs at the sites implement HREC regulations.
Role: Will advise on patient reported outcome measures and interpret outcomes of final data analysis.

Associate Researchers

~~**Dr Kelly Shaw**~~
~~***Expertise:*** Dr Kelly Shaw is a public health physician, epidemiologist and health services research academic. She has expertise in the measurement, analysis, interpretation and application of a range of patient reported measures, including health status and quality of life, and the design and analysis of longitudinal intervention studies.~~
~~***Responsibilities:***~~
~~Dr Shaw will be responsible for guiding the statistical analysis plan for data obtained in this study and primary data analysis.~~
~~***Role:*** Providing epidemiological support to the project.~~

Dr Michelle Kilpatrick (BA Hons (Psych) BMus Hons(Perf) PhD)

Expertise: Dr Michelle Kilpatrick is a Post Postdoctoral Research Fellow working at the Menzies Institute for Medical Research, University of Tasmania. She is currently working on an NHMRC-funded partnership grant investigating obesity surgery in Tasmania. She is an epidemiologist with a background in psychology, and experience in biostatistics, including tutoring biostatistics at Masters level. She has expertise in the measurement, analysis, interpretation and application of a range of patient reported measures, including health status, behavioural aspects and quality of life, and the design and analysis of longitudinal intervention studies.

Responsibilities:

Dr Kilpatrick will be responsible for guiding the statistical analysis plan for data obtained in this study and primary data analysis.

Role: Providing epidemiological and statistical analysis support to the project.

Heidi Behrens

Expertise: Heidi is a research assistant and has worked with a number of projects as a Junior Research Fellow since 2005. She has been involved in numerous research projects with UTas and undertaking a systematic review. She has expertise in the measurement, analysis, interpretation and application of a range of patient reported measures, including health status and quality of life.

Responsibilities: Heidi will be responsible for providing advice and instruction of evaluation of the project and planning data collection, development of operational business processes for the clinic and data collection, ethics submissions, communication strategies, data entry.

Role: Data entry and analysis

Rationale and Background

Obesity is associated with significant comorbidities for affected individuals, particularly type 2 diabetes, cardiovascular disease, osteoarthritis, sleep apnoea, cancers of the prostate, breast and colon (Leslie et al., 2007; National Cancer Institute 2013). For patients with type 2 diabetes and obesity, the risks of diabetes complications, adverse cardiovascular and musculoskeletal outcomes are increased (AIHW, 2011).

A number of patients attending Diabetes Clinics within Tasmania with excessive BMIs > 40 suffer from significant insulin resistance that is not responsive to any form of oral and/or injectable treatment (Diabetes Centre, 2014). The current BMI of patients attending the Adult Diabetes Clinics in the THO-North West is high; maximum BMI is > 70 and mean 44.5 (Diabetes Centre, 2014). Thus, this population is at particularly high risk of development of additional comorbidities as the mean BMI falls within the Obesity III classification (NHMRC, 2013; AIHW, 2011). Good clinical management underpins what is termed “tertiary prevention”, that is, the prevention of complications arising from established conditions (such as type 2 diabetes); the system of national health financing now in place provides significant financial incentive for increased “efficient” acute activity (Population Health, 2013). In addition, hospitalisation rates in Tasmania are increasing for diabetes and arthritis/musculoskeletal conditions (Population Health, 2013). The north west of Tasmanian holds a higher prevalence of diabetes in the 30 – 39 year old age group (Diabetes Australia, 2014) that identifies a longer duration of potential diabetes and diabetes during maternal child bearing years; pre-pregnancy overweightness and obesity closely associated to adverse obstetric outcomes (Nankervis et al., 2013).

The NHMRC Clinical Practice Guidelines for the Management of Overweight and Obesity in Adults, Adolescents and Children in Australia (2013) ("the Guidelines") make recommendations regarding the management of individuals who have a body mass index (BMI) greater than 25.0 kg/m2 and are at

risk or currently have an obesity related comorbidity. According to these guidelines weight management in adults with overweight and obesity involves multicomponent approaches that incorporate lifestyle management (nutrition, physical activity and psychological interventions), medication management and bariatric surgery in the subgroup of patients in whom these procedures are indicated (NHMRC, 2013).

The development of the national guidelines was underpinned by a comprehensive systematic review of the literature (conducted by AI Shaw). This literature review identified important evidence gaps in the management of patients with diabetes mellitus who also have obesity (NHMRC, 2013). A number of these evidence gaps are the focus of this project.

The multidisciplinary management of patients with obesity and type 2 diabetes is not straightforward. Although national diabetes guidelines recommend the use of laparoscopic banding procedures for patients with obesity who also have type 2 diabetes, the studies upon which this recommendation is based were conducted in patients with type 2 diabetes who had been diagnosed within 2 years of the laparoscopic procedure being performed (NHMRC, 2013). Evidence of effectiveness of surgery from randomised controlled trials in patients with type 2 diabetes of more than 2 years duration is not available.

Health problems related to excess weight impose substantial economic burdens on individuals, families and communities (Tanamas et al., 2013; Colagiuri, 2010). Data from the AusDiab study indicate that the total direct cost for overweight and obesity in 2005 was $21 billion ($6.5 billion for overweight and $14.5 billion for obesity) (Tanamas et al., 2013; Colagiuri 2010). The same study estimated indirect costs of $35.6 billion per year, resulting in an overall total annual cost of $56.6 billion. A 1% absolute reduction in mean A1C levels has been associated with a 37% decrease in the risk of microvascular complications and a 21% reduction in the risk of any diabetes-related complication or death (UKPDS, 1998). Further, the 'legacy effect' providing long lasting effect; for all-cause mortality, the hazard ratio was 1 for years 0 to 10, but the risk reduction increased to 21% at year 15 and to 24.7% at year 20 (Livingstone & Fisher, 2007). Reduction in systolic blood pressure by 10mmHg also supporting reduction in end points related to diabetes and risk of death (Livingstone & Fisher, 2007; UKPDS, 1998).

The multidisciplinary management of patients with type 2 diabetes and obesity in rural and remote areas is not straightforward. Although national guidelines recommend multidisciplinary care, the availability of dietitian, psychologist and exercise physiologist supports in rural areas is limited. Further, the effectiveness of multidisciplinary management in rural areas has not been assessed. This is an important evidence gap as the built environment within which lifestyle modification must occur in rural areas is different to the environment within urban areas.

Finally, the systematic review of the literature performed for the development of the national guidelines reveals a lack of evidence for chronic disease models of obesity care rather than models of care that focus on weight loss as the main goal of care (NHMRC, 2013). Chronic disease models of care are of particular relevance to patients with obesity and type 2 diabetes as the likelihood of sustained weight loss in this patient group, even with surgical intervention, has been shown to be low (NHMRC 2013; National Institute for Health and Care Excellence, 2013). It is therefore essential that the secondary complications of obesity (sleep apnoea, hypercholesterolaemia, hypertension, malignancy, infertility, non-alcoholic steatohepatitis, osteoarthritis) (ADIPS 2013; National Cancer Institute 2013; NHMRC, 2013) are identified early and managed effectively in these patients as sustained weight loss is unlikely in spite of weight reduction therapies (NHMRC 2013; National Institute for Health and Care Excellence, 2013).

Study Goals and Objectives

AIM

The aim of this study is to assess the feasibility, acceptability and effectiveness of a rural, multidisciplinary team-based approach to care for adult patients with diabetes mellitus and obesity.

OBJECTIVES OF THIS PROJECT

- To determine if a multidisciplinary multi-intervention clinic for obesity tailored to the individual can reduce absolute cardiovascular and morbidity risk
- To evaluate management and treatment factors as potential predictors of outcome
- To determine whether an interdisciplinary multi-intervention obesity clinic for people with diabetes improves metabolic profile
- To provide process and impact outcomes to substantiate and drive clinical and policy change supportive of a multidisciplinary systematic approach for patients living with obesity

OUTCOMES	
Primary Outcome:	change in HbA1c (measured as a continuous variable) in the intervention group compared with the control group
Timepoint:	at 6, 12, 18 and 24 months post baseline; also 6 and 12 months post intervention
Primary Outcome:	change in body weight (measured as a continuous variable) in the intervention group compared with the control group
Timepoint:	at 12 and 24 months post baseline; also 6 and 12 months post intervention
Secondary Outcome:	a decline in Edmonton Obesity status
Timepoint:	at 12 and 24 months post baseline, and 12 months post intervention
Secondary Outcome:	change in absolute cardiovascular risk
Timepoint:	at 12 and 24 months post baseline, and 12 months post intervention
Secondary Outcome:	proportion of participants achieving individualised HbA1c targets according to the Australian Diabetes Society guidelines
Timepoint:	at 12 and 24 months post baseline; also 12 months post intervention
Secondary Outcome:	impact on psychometric scores as assessed using the Assessment of Quality of Life (SF-36), Patient Health Questionnaire (PHQ-9) [Depression] and Generalised Anxiety Disorder Assessment (GAD-7) [Anxiety], Assessment of Quality of Life (AQoL), Work Productivity and Activity Impairment (WPAI)
Timepoint:	at 6, 12, 18 and 24 months post baseline; also 6 and 12 months post intervention

Outcome measures and collection time points							
Measure	**Base line**	**6 mth**	**12 mth**	**18 mth**	**24 mth**	**6 mth POST**	**12mth POST**
Demographic and clinical measures:							
Demographic data, duration of diabetes	X						
• Demographic data, duration of diabetes at baseline only – to ensure similar characteristics of both the intervention and control groups.							
Biometric measures; weight, BMI, girth, BP	X	X	X	X	X	X	X
• To review changes in metabolic parameters • Time points to allow for intensification of treatment as deemed required • Based on evidenced based guidelines/ peer-reviewed literature for timely treatment							
Co-morbidities, medications	X		X		X		X
• To review changes (improvement/deterioration) in other co-morbidities as a result of treatment for obesity • Review interval increased as changes in medication and disease profiles require review time, further based on timelines for review and assessment in peer-reviewed literature.							
Edmonton obesity staging	X		X		X		X
• The Edmonton obesity staging system independently predicted increased mortality even after adjustment for contemporary methods of classifying adiposity (Padwal et al., 2011). • The Edmonton obesity staging system may offer improved clinical utility in assessing obesity-related risk and prioritizing treatment. • The project is targeting gradual weight loss that is linked to sustained weight loss – thus timing for assessment are linked to overall weight loss and potential co-morbidity reduction as estimated in peer reviewed literature							
Sleepiness Scale	X		X		X		X
• Sleep apnoea is independently linked to insulin resistance • Time points related to practical timeline for referral, review, assessment and treatment of any diagnosed sleep disturbance							
McCaffery Pain assessment scale/ Physical function	X	X	X	X	X		X
• Pain is a common symptoms of patients attending the service with obesity and little is generally done for chronic pain in Tasmania – as a result the patient is not able to undertake the physical activity recommendations provided to them • Time points for assessment are related to timelines of psychometric scales as these results are closely related and can vary at differing points. Further, as identified in other peer literature							
Metabolic markers							
Absolute CVD risk	X		X		X		X
HbA1c, Lipids, eGFR LFTs	X	X	X	X	X	X	X
Leptin, ketone, ACR vitamin D, B12, TFTs	X		X		X		X
• The metabolic markers listed above were chosen as they are generally those reported on in other studies, they provide indication of metabolic profile and the need to intensify treatment and/or provide treatment for a deficiency that is related to reduction of metabolism • Time intervals chosen are related to evidence based screening timelines supported by peer-reviewed literature • NB: Ketone and leptin will not be screened in the post intervention data							

Measure	Base line	6 mth	12 mth	18 mth	24 mth	6 mth POST	12mth POST
Psychometric measures							
PHQ-9 [Depression] and GAD-7 [Anxiety]	X	X	X	X	X	X	X
SF-36 Quality of Life scaling	X	X	X	X	X	X	X
Assessment of Quality of Life (AQOL)	X	X	X	X	X	X	X
Work Productivity and Activity Impairment	X	X	X	X	X	X	X

TSRAC QUESTION 8 (Response)

- Initially the decision was made to use the K10 as a brief measure of psychological distress. This was intended to act as a "triage" for psychological support grouping. Initially the discussions agreed that this was the best option in terms of being conservative in the amount of time being requested of participants. However, the K10 is more a population measure (with norms) rather than used to compare specific research populations.
- The DASS scale is not being utilised within this research study
- The PHQ-9 (depression) and GAD-7 (Anxiety) have been chosen as they are validated tools widely used in other research that has focused on the issues of diabetes or obesity, such as the MILES study.
- The PHQ and GAD are based on the DSM-IV diagnostic criteria.
- The SF-36 is a generic measure of quality of life. There are a number of other options, however many of them are diabetes specific (or focus on another specific health condition). Given the AMOS project is potentially going to be rolled out to those without diabetes, a more generic measure is more appropriate. It is widely used, acceptable reliability and validity, and norms are available for a range of clinical and nonclinical populations.
- Time points for assessment and review have been chosen due to fluctuating nature of these measurements and as used in other peer reviewed literature

Health professional referral measures							
Referral to other health professionals	X		X		X		
Psychology review	X		X		X		
Physiotherapy review*	X		X		X		
Dietitian review #	X		X		X		
Group training (Stanford – GTMOL)	X		X		X		

- Referral points to AHPs and group program were chosen as outcome measures as a variable that has altered care or treatment
- Time points for this collection was selected due to presumed referral in line with study protocol.

Study Design TSRAC v2 Q1

- Parallel randomised waitlist control trial conducted in the Diabetes Centre of the THO-North West; individuals wait listed for the obesity clinic (*the experimental intervention*) becomes the control group.
- Participants who fit the inclusion criteria will be recruited from pre-existing clinics and listed in order of BMI – subsequently randomly assigned to the two arms of the study via use of an Excel Random Number Generator.
- Recruitment will start initially with the first 106 identified through the excel program for the two groups and will continue until 106 participants have been recruited into both arms.

Rationale for Study Design TSRAC QUESTION 1 (Response)

- According to the NHMRC levels of evidence, a RCT is level 2 evidence and a systematic review of RCTs is level 1 evidence. Program evaluation is not a research method. Rather, program evaluation is conducted using a range of different research methods that are adapted to the task of evaluation depending on the program and the circumstances of its implementation. As this study is an intervention study that examines the effectiveness of an obesity model of care in patients with type 2 diabetes, the higher level of evidence is a RCT and is the study design that the research team wishes to use.
- Initially, all patients will be provided with quality evidenced based care at all times for diabetes and obesity; this form of care for both groups will not alter.
- The potential difficulty for team members to provide services differently depending on whether a client is in the control or intervention group has been addressed by separating participants from the control and intervention group into different clinics. The control group will be seen in the usual diabetes clinic with no particular focus on obesity management and/or the many factors that impact on obesity.
- At differing times a patient in the control group may have an assessment taken ie DASS due to an issue isolated in the course of the clinic however; this is not common but will be accounted for post-hoc in our data analysis.
- The intervention group will have onsite on the day of the clinic a more extensive multidisciplinary team that will be involved in assessment and treatment; unlike the control group clinic.
- Services and treatment will differ due to these assessments and measurement of other markers eg psychometric and pain scales that will prompt differing care and treatment plans.

Methodology

TSRAC QUESTION 2 and 3 (Response)

Randomisation

- All patients referred to the Diabetes Centre are listed in the services clinical software program DiaBASE.
- The list of potential participants was drawn from this program (that is inclusive of all patients as at 10/9/2014)
- Once those that met the exclusion criteria were removed this list of potential participants (359) has been ranked from highest to lowest – at this stage they have been allocated a study number of 1 to 359, 1 being the participant with the highest BMI and 359 with the lowest.
- Numbers have been assigned for the two arms of the study from the computer random number generated via excel.
- According to numbers allocated to the potential participant list these are then assigned to the two arms of the study (intervention and control).
- This will occur once ethic approval has been gained and prior to allocation to clinics
- Once case identified and consent gained participants will be recruited from pre-existing clinics
- Outcome measures will be collected at baseline and at appropriate intervals at 6, 12, 18 months and post intervention at 12 and 24 months.

Study Intervention

- Outcome measures including quantitative and qualitative data **not** usually collected as part of a diabetes clinic will be collected to support the development of individualised plans of care:
    - Absolute cardiovascular disease risk

- Patient Health Questionnaire (PHQ-9) [Depression] and Generalised Anxiety Disorder Assessment (GAD-7) [Anxiety] and SF-36 Quality of Life scaling, Assessment and Quality of Life (AQoL), Work Productivity and Activity Impairment (WPAI)
- McCaffery Pain assessment scale and Physical function status
- Edmonton obesity staging
- Sleepiness Scale
- Metabolic clinical markers (HbA1c, lipids, leptin, ketone, vitamin D, B12, TFTs, LFTs, ACR, eGFR)
- Physical measurements (eg BMI, girth, blood pressure)

- Assessment is undertaken initially on the same day by the physiotherapist in terms of pain management and ability to increase physical activity – these assessments are provided to the endocrinologist and Dietitian at which time a treatment plan is developed in partnership with the client by the multidisciplinary team including:
  - Referral to other health professionals and/or assessments (eg Snore Aust, pain clinic)
  - According to scores from psychometric, physical functioning and/or pain scales participants will be divided into groups A, B or C and referred on for either a once off individual consultation, a series of individual consultations or a group program with relevant AHP.
    - Regular psychology review for CBT and other relevant therapies (according to PHQ-9 and GAD-7)
    - Resistance and hydrotherapy training
    - Medical nutritional therapy
- Following 3 months of lifestyle modification and intensive therapy if weight loss <5% Olistat will be introduced
- At 6 months participants will be referred to self-management program for ongoing behaviour modification
- For relevant cases at 12 months if weight loss not <5% and pathology demonstrates ketosis referral for surgical review
- Bariatric surgical assessment and patient counselling will be provided to determine:
  - whether surgery is indicated;
  - the patient's desire for, and likely tolerance to surgery; and
  - if so, what surgery type is most appropriate for the patient (Nguyen, 2013).

Following the completion of the up to 24 month program **(the intervention)** participants (both intervention and control) will be invited to continue to be part of the research project by way of providing follow-up data to determine sustainability of the intervention and project. ~~Given~~ Participants are existing patients of the service and will continue to be review as part of routine care at the Diabetes Centre, at their 24 month collection point (intervention and control) participants will be invited to continue with a collection of indicated markers at 6 and 12 months post intervention. If at their last visit **(24 months)** the participant indicates that they are happy for this to occur this verbal consent will be recorded on the spreadsheet used to collect project data – ie consent given: yes and date. If consent is provided by the participant, ongoing data will be collected following intervention period at 6 and 12 months post intervention.

Intervention Clarified/Differences in two arms of Study TSRAC QUESTION 12 (Response)

- Intervention of interest **– individualised** multidisciplinary multi-intervention assessment and treatment
- The impact of a model of care that assesses, triages and treats **all** factors impacting on metabolic processes from point of entry

Differences in two arms	
Control Group	**Intervention Group**
1. Patient attends Diabetes Clinic 2. Pre-assessment includes physical measurements (BMI, BP) and HbA1c by CDE. Plus; Psychological Distress PHQ-9 and GAD-7, QoL SF-36v2, Assessment of Quality of Life (AQoL) and Work Productivity and Activity Impairment (WPAI). The above data will be collected by a research assistant and not the clinicians to prevent impact of 'treatment as usual'. 3. Patient reviewed by endocrinologist and management is diabetes and endocrine focused 4. Screening may include HbA1c, lipids, vitamin B12 and folates, TFTs, LFTs, ACR, eGFR 5. Referral to diabetes educator as needed for ongoing education if HbA1c above target 6. Referral to psychologist as required if patient raises psychosocial problems during consultations with either CDE or endocrinologist 7. Referral to dietitian if HbA1c > 9% in type 2 diabetes 8. Adhoc referral for bariatric assessment if BMI >40 and failed attempts at weight loss	1. Patient attends AMOS Clinic 2. (a) Pre-assessment includes physical measurements (BMI, BP, girth) and HbA1c by CDE. (b) Universal screening - completion of scales to support planned assessment and care: • Psychometric (Psychological Distress PHQ-9 and GAD-7, QoL SF-36v2 and AQoL, WPAI) • Epworth Sleepiness Scale • Absolute cardiovascular risk • Edmonton Obesity Staging (c) Review with physiotherapist for: • Assessment for physical functioning performed • Completion of McCaffery Pain Assessment scale 3. (a) According to psychometric scales patient is triaged into psychologist for 1:1 or group session (b) Patient booked into physiotherapist for 1:1 or group sessions (c) According to dietitian assessment patient seen 1:1 or booked into group program (program facilitated by psychologist and dietitian with focus on identification of barriers) 4. Patient reviewed by endocrinologist and management is diabetes/endocrine and obesity focused 5. Screening for metabolic pathology request provided as per control group with addition of leptin and ketones (to identify weight loss and ketosis) and vitamin D In addition, assessment and review by dietitian to support development of treatment plan. 6. Treatment Plan agreed: • Weight Loss goals determined • Referral as relevant to: o Other health professional/specialist (sleep apnoea or pain management assessment if applicable) o Community Based Weight /Pain management programs (Stanford - GTMOL, OPAL) • Resistant or balance training • Medicines alteration and/or titration • Behaviours Modification and Self-Maintenance awareness 7. Initiation of Orlistat if BMI > 35 and < 2% weight loss after 3 months 8. Referral for bariatric assessment if deemed suitable and after 12 months failed treatment.

Usual care contextualised for the rural setting of the North West Coast of Tasmania
TSRACv2 QUESTION 2 (Response)

Remodelled of services to incorporate local resources, evidence base, critical mass and to take into account the urban setting has been ongoing in the north west these past 12 years; through this efficiencies have been created and reductions in wait times in a number of services. Whilst there are many factors that impact on obesity and/or diabetes and evidence supports management of these elements with specific care guidelines – overall care is provided based on available existing clinical resources. This is standard practice across all diabetes centres within Australia regardless of whether they are in metropolitan or regional areas.

Within the diabetes clinic the major focus is the management of metabolic disarray and diabetes complications. Whilst a patient may also present with pain due to another health issue, this is addressed through recommendations to the GP who has access to Commonwealth funded GP Management Plans. Unfortunately, action items like this are rarely followed through – for example, GPMP Medicare item numbers are generally used for podiatry. Hence, issues such as chronic pain are not managed and the cycle of chronic conditions continues.

Socio-economic status (derived from SEIFA 2006) indicates that 99% of patients attending the service in the north west reside in areas that are among the four lowest deciles for socio-economic deprivation in Australia (ABS 2014; Pendley et al., 2002). This was ascertained by matching of postcodes against the Index of Relative Socio-economic Advantage and Disadvantaged (IRSAD) - an area-level measure of socio-economic advantage to disadvantage that includes data on income, education level, unemployment, housing expenditure and assets. Thus, whilst the offer of referral to a private physiotherapist can and is made; the patient group that does present itself to this rural setting generally does not have the finances to self-fund visits to private physiotherapist or other allied health; again, this is generally never follow-up. To alter this in the TAU group would require increased resources and would alter present “usual care”.

Again although weight management is an important issue in the care of people with type 2 diabetes it is not the focus of the clinic; basic advice is provided in diet and physical activity by diabetes educators. Limited state funded dietetic services are utilised in the care of paediatrics with diabetes and generally adult individuals with type 1 and some with type 2 with pre-existing co-morbidities. Individuals with weight issues who are referred to state funded dietetic services for individualisation of advice are presented with a letter indicating that they ‘are not likely to be seen so will not be placed on a wait list’ and a list of private dietitians is provided. The same issue prevails as listed above in relation to financial capacity of the individuals. Thus, the majority of people with type 2 diabetes without co-morbidities or co-morbidities that are controlled, will not have personalised calculations of energy requirements needed and specific advice on the particular caloric decreased required to provide weight loss. In addition, the reasons behind eating behaviour and weight gain are more often from a psychology basis and/or related to funding of differing food types. Another limited health professional resource in the north west.

Methodology *(continue)*

Management of Cross Contamination TSRAC QUESTION 3 (Response)

- Randomisation will be achieved by method listed above
- Cross contamination is managed by several means:
    - The clinics are run on alternate days – thus patients are unlikely to come across each other – they may within the community as they would with any other RCT
    - The interventions which include multidisciplinary assessment and care, the use of orlistat and potentially bariatric surgery if identified as a suitable candidate requires assessment and referral – the control group patients will not have the assessments performed routinely and/or be in the setting to have these referrals created
    - The intervention group utilises a different credentialled diabetes educator than the ones used in the traditional (usual care) diabetes clinic
    - The endocrinologist involved in this study will mainly be involved in the AMOS clinic – during other clinics he will be seeing patients with type 1 diabetes of lower BMI who do not meet the criteria and due to different disease process their needs will differ
    - An alternate endocrinologist not involved in AMOS will see the control group within the traditional (usual care) diabetes clinic

Timing of Assessment Scales TSRAC QUESTION 4 (Response)

- Psychometric and pain measurements will be taken at the same intervals; baseline, 6,12,18,24 months
- Both will be taken on the same day – however, by a different health professional. The only reason for this is that pain assessment falls into a normal assessment for physiotherapists

Orlistat and Other Weight Loss Medication TSRAC QUESTION 10 (Response)

- The use of Orlistat is drawn from recommendations draw from the NICE and NHMRC guidelines for management of obesity.
- Orlistat is currently the only medication registered for use in treating overweight (with comorbidities) and obesity that has been evaluated for long-term safety. Although it is listed on the Repatriation Pharmaceutical Benefits Scheme, it is not listed on the Pharmaceutical Benefits Scheme (PBS). Data suggest that it is more cost-effective in individuals who have numerous comorbidities (type 2 diabetes, hypertension, hypercholesterolaemia)
- Orlistat should be prescribed only as part of an overall plan for managing obesity in adults who hold a BMI of 30.0kg/m^2 or more (NHMRC 2013).
- The decision to use drug treatment in non- Repatriation clients for longer than 3 months and to a maximum of 6 months (usually for weight maintenance) should be made after discussing potential benefits and limitations with the patient.
- The co-prescribing of orlistat with other drugs aimed at weight reduction is not recommended (NHMRC 2013).
- Other medications found to support weight loss include;

    "sibutramine (Horvath et al. 2008), rimonabant (Curioni & André 2006; Nissen et al. 2008; van Gaal et al. 2008), taranabant (Proietto et al. 2010), metformin (Knowler et al. 2009) and

lorcaserin (Smith et al. 2010). However, many of these medications have been associated with adverse effects and have been withdrawn (e.g. sibutramine) or were never approved (e.g. rimonabant, taranabant) in Australia. The evidence on the effects of weight loss medications on health outcomes other than weight loss is limited." (NHMRC 2013)

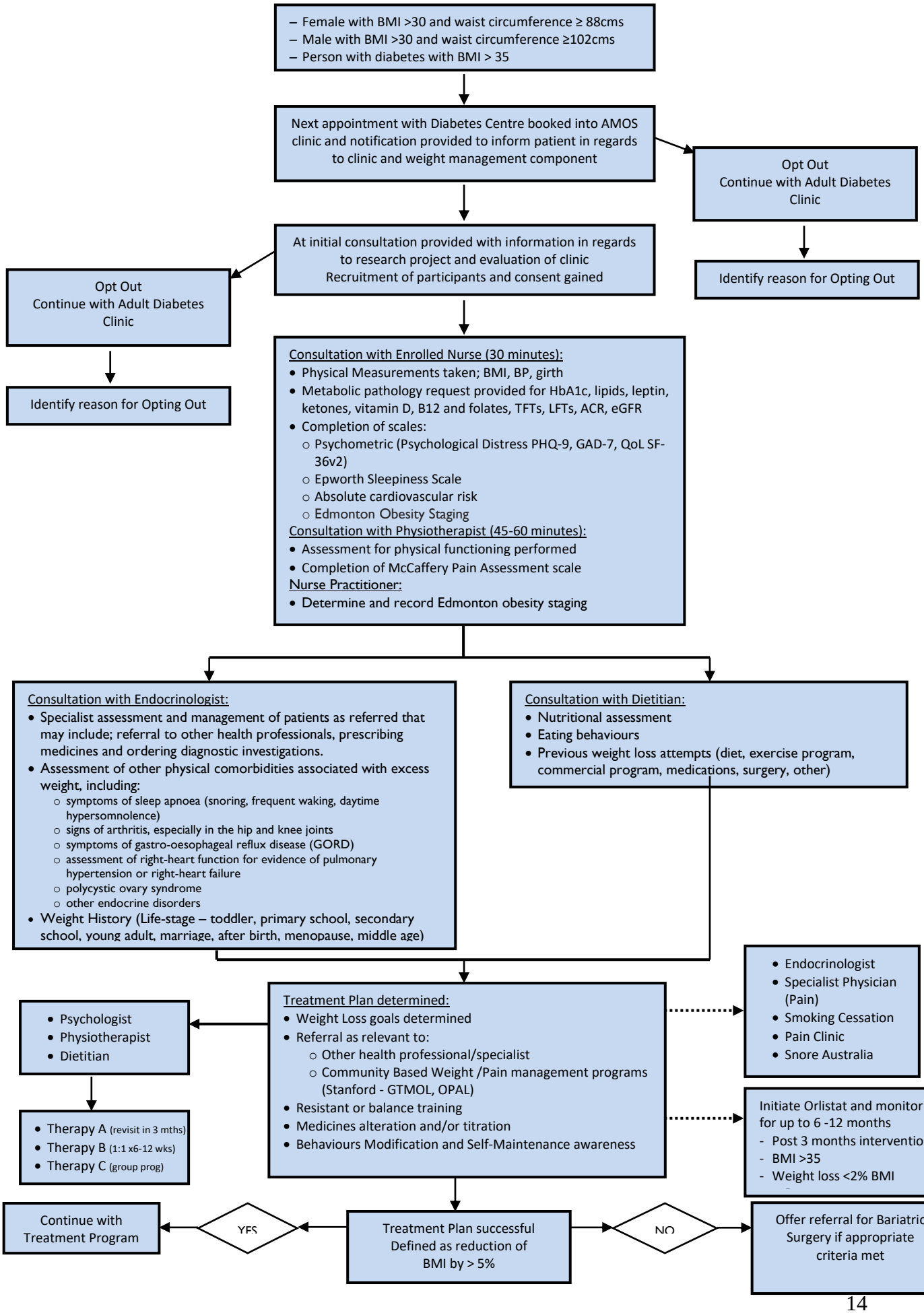
- Phentermine is registered for use as a short-term (e.g. 3-month) adjunct to dietary management of obesity, under medical supervision. The use of Phentermine is not likely to be utilised within this clinic as it is associated with a range of side effects (e.g. hypertension, tachycardia, insomnia) that is problematic with the patient cohort and their existing co-morbidities and its long-term safety has not been tested (NHMRC 2013). Further, it is not listed on the PBS.
- All patients will be screened for medications that they are taking (including complementary drugs) and this will be reviewed against those that have been prescribed as part of a normal medical assessment.

Orlistat as the Pharmaceutical Intervention and Bariatric Surgery

TSRAC QUESTION 11 (Response)

- Orlistat is being used for the reasons mentioned above; evidence supports its use in obesity management as it reduces the absorption of energy-dense fat by inhibiting pancreatic and gastric lipases.
- In conjunction with lifestyle intervention, orlistat is associated with slight reductions in systolic and diastolic blood pressure (Padwal et al. 2003), modest weight loss in adults with comorbidities, including metabolic syndrome (Svendsen et al. 2009), hypertension (Siebenhofer et al. 2009) and type 2 diabetes (Jacob et al. 2009; Norris et al. 2005) and slight improvement in glycaemic control (Jacob et al. 2009; Norris et al. 2005) in adults with type 2 diabetes with no adverse effects on lipid profile (Eliasson et al. 2007; Norris et al. 2005). (NHMRC 2013).
- Orlistat is not PBS listed and will not be offered to the control group.
- Referral for lapbanding will only be offered to the 'control' group by the research team if the patient has a BMI of >40, has presented for therapies planned for behaviour change and has had failed attempts at weight loss following this.
- "The Australian Clinical Practice Guidelines for the Management of Overweight and Obesity in Adults" (NHMRC, 2013) provide an evidence-based, stepped approach to obesity management. The first level of management is lifestyle intervention, comprising exercise, nutrition and psychological intervention. The second level of management is medication management. The third level of management is surgery. The guidelines consider that higher levels of management are indicated when lower levels of management have been insufficient to achieve desired clinical outcomes. This is the management approach the hospital research team will adopt in their patient management strategies.
- However, the control group in this study will receive 'usual care'. The research team is aware this means patients in the intervention or control groups may receive lifestyle, medication and / or surgical management through alternative clinical pathways (e.g. through primary care, private hospital or other sources of clinical support). This is usual in obesity clinical trials with a 'usual care' control arm (see the Australian Clinical Guidelines discussion on this). Consistent with other obesity studies, we will account for any differences post-hoc in our data analysis.

AMOS Research Project Participant Flow Chart



Study Duration/Timelines:

Stage 1: Recruitment of participants to study and informed consent (0 – 3 months)
Stage 2: Data collection, referral to therapies (3 – 12 months)
Stage 3: Ongoing recruitment and informed consent (6 – 9 month)
Stage 4: Initial data analysis (15 months)
Stage 5: Data Analysis and Interpretation (24-26 month)
Stage 6: Presentation and publication (15 and 26 month)

Study Population

Participants

Inclusion Criteria

- Person with BMI >30 with waist circumference ≥ 88cms in women and ≥102cms in men
- Those aged < 75 years of age
- Patient has diabetes mellitus
- Already in the care of the North West diabetes service
- Able to provide informed consent
- Not pregnant or breastfeeding

Exclusion Criteria

- Person with diabetes with a BMI > 30 with waist circumference < 88cms in women and <102cms in men
- Person with diabetes with a BMI ≤ 30
- Those aged ≥ 75 years of age
- Any pregnant or breastfeeding person with diabetes
- Any person with diabetes < 18 years of age
- Any person with a cognitive impairment, an intellectual disability or uncontrolled psychotic illness

Lay Description of Participation

This study looks at the effects of care that is tailored to obesity. Patients invited to the study will be told about what they will need to do if they decide to be involved. They will be asked to provide written consent before being placed at random to the treatment group or normal care. Participants in the control group will receive routine care as part of the normal Adult Diabetes Clinic. Participants in the intervention group will complete a number of hand written assessments about sleep, pain, stress and/or how they have been feeling. Some measurements of body shape will be taken as well as some blood tests each 6 months. Some of these are routine tests for normal care and others are specific to the study. All participants will attend the service each 3 months – that is 4 times per year – these visits may last 30 to 90 minutes. At these times they may see other health professionals such as a physiotherapist, psychologist or dietitian – this will be on an individual basis at first and then may be in a group format. The group programs will involve learning about ways to stop the cycle of obesity and/or some physical activity. If no weight loss is achieved a dose of Orlistat will be suggested for a 3 month period. The participants will be contacted by the research assistant to arrange a time for their follow-up visits and to see how they are doing overall. If suitable and willing the participants may be referred to see a surgeon to discuss other options.

Nature of Existing Relationships between Potential Participants/Research team and Voluntary Consent

A majority of the participants will have had a past and/or current relationship with a number of the health professionals involved in the research study group. Potential participants will be clearly informed that their relationship with any of the investigations or staff involved in their medical care will not be influenced by their choice to participant or not to participate.

Potential participants will be assured that the decision to participate is voluntary and will have no influence on their relationship with medical or allied health professional staff, the research team or the THO-North West.

Impact of the research on the Relationship between Participants and the Researcher

Some potential participants will be in a doctor/allied health – patient relationship with one or more of the researchers. However, these researchers will not be involved in the mentioning of the study to the potential participants – they will be referred to the research assistant/case manager for a fuller explanation of the study and to gain informed consent. They will be assured that participation or not is entirely their decision and will not affect their relationship with any member of the health team in any way.

Male to Female Ratios

It is expected that recruitment of male to female ratios will generally be fairly similar. There may be a higher intake of females as they are more likely to access health care services than males. The male population has a slightly higher rate of obesity than females. Diabetes is of similar proportion across both genders.

Considerations for Vulnerable Groups

THO North West provides routine clinical services to people from backgrounds whose language is other than English, people in existing dependent / unequal relationships and Aboriginal and / or Torres Strait Islander (ATSI) peoples.

The hospital has liaison officers for people from Culturally and Linguistically Diverse (CALD) backgrounds, including ATSI peoples. Staff providing the clinical services being delivered in this project have received training in cultural competence. Staff have access to translation and interpreter services which will be used to assist in communicating with participants if required.

Data Management and Statistical Analysis

Data Management

- Data will be collected as part of the normal process of the clinic in the DiaBASE program (clinical software program)
- The DiaBASE can only be accessed by relevant clinicians for entry of information only
- Once data is required for analysis a report will be exported from DiaBASE onto Excel
- Data will be reviewed for accuracy and completeness by the Co-Principal Investigator with role of project management on a quarterly basis.
- Gaps in data will be addressed through the Co-PI and the Research Assistant (Case Manager)
- Staff of the THO are bound by rules of confidentiality in relation to patient information

Statistical Analysis

Sample Size TSRAC Q5

- The sample size of 212 participants (randomising 106 participants to each group) was calculated by performing power calculations assuming significant differences between intervention and control groups in one or more of the following measures:
    - HbA1c
    - Absolute cardiovascular risk
    - Psychometric measures (PHQ-9, depression and SF-36 Quality of Life)
    - Decline in Edmonton Obesity status (Padwal, 2011)
- Rationale - the power is in general a function of the possible distributions under the alternative hypothesis. As the power increases, the chances of a Type II error occurring decrease. We conducted power calculations to calculate the minimum sample size required using a target variance for an estimate to be derived from the sample eventually obtained.
- We assumed a Cohens d of 0.5 and a power of 0.95 based on estimates in the peer-reviewed literature.
- We assumed significance criteria of 0.05, the probability of the data implying an effect at least as large as the observed effect when the null hypothesis is true must be less than 0.05, for the null hypothesis of no effect to be rejected.
- Further, this assumed:
    - A follow-up period of at least 6 months for each participant.
    - Not all participants will be cared for simultaneously – there will be multiple intakes e.g. as people exit the program enrol new participants and controls.

Analysis TSRAC Q12

- Data will be exported from DiaBASE (Clinical software program) and entered into Excel (Microsoft) for data cleaning, then imported into Stata 12 and SPSS for analysis.
- Analysis will be performed using SPSS and Stata.
- Descriptive statistics will first be calculated to investigate the proportions of categorical variables and the distribution of continuous variables.
- Pearson's chi-square test or Fisher's exact tests will be utilized for investigation of associations between categorical variables, while independent t-tests will be used to investigate differences in continuous data between the control and intervention groups.
- For dichotomous outcomes logistic regression will be performed.
- For continuous outcome data analysis of covariance will be performed to test the effects of predictor variables.
- Adjusted relative risks (aRR) of metabolic and psychometric outcomes will be calculated for the control vs. intervention groups (with 95% confidence intervals) using a Poisson regression model with robust error variance.
- The regression models will include adjustment for age, pre-existing diabetes, socio-economic status and Asian or indigenous ethnicity.

TSRAC v2 Q8

Please provide additional justification on for the effect size with references.

The main body of evidence in support of the effect size was the National Health and Medical Research Council (2013) *Clinical practice guidelines for the management of overweight and obesity in adults, adolescents and children in Australia - Systematic Review.* Melbourne: National Health and Medical Research Council. This systematic review was written by Dr Kelly Shaw who is also now part of the research team.

There is substantial heterogeneity in the literature regarding the effects of obesity management on patients with type 2 diabetes. Further there is a proximal link between biomarkers for CVD and cancer (the intermediate endpoints in our study) that, although well proven, does not describe well but the timeframe between biomarker changes and outcomes is poorly described.

We have therefore chosen to estimate a moderate effect size (Cohens d 0.5) and accept that in doing so, some outcomes measures may not demonstrate significant between group differences.

Although many trials conducted in patients with obesity and type 2 diabetes generally demonstrate minimal weight loss with weight regain occurring within short timeframes, there are varying lead times between when weight is lost and when differential cardiovascular outcomes (in particular) are observed.

References used: Impacts of weight loss interventions in type 2 diabetes

Glycaemic control

Results from the following studies demonstrate a high degree of variability in the impact of weight reduction interventions on glycaemic measures. Cohens d of 0.5 for effect size was selected to balance differences observed across meta-analyses.

Norris et al. (2005a) conducted a meta-analysis of 22 RCTs involving 4,659 participants over up to 5 years that assessed the impact of non-pharmacological weight loss interventions on type 2 diabetes. Estimates were pooled for any intervention versus usual care, very low calorie diet (VLCD) versus low calorie diet (LCD) and physical activity versus no or less intensive physical activity. Weight losses of up to 12 kg were achieved with lifestyle interventions. Weight losses of approximately 3 kg (95% CI, -0.5 to 6.4) were achieved with diet versus usual care. The corresponding decrease in HbA1c was approximately 0.7% across these studies. More intense physical activity was associated with greater weight reduction but not with greater reductions in HbA1c.

Nield et al. (2007) assessed 36 articles reporting 18 RCTs of dietary interventions in 1,467 participants with type 2 diabetes. Low fat, low carbohydrate, low calorie and very low calorie diets were assessed over follow-up of up to 18 months. Diet and exercise were associated with a 1% reduction in HbA1c at 12 months in studies where participants were newly diagnosed with type 2 diabetes mellitus. In these primary studies, a decrease in weight of 2.5 kg to 5 kg was associated with an approximate 0.5% to 1% reduction in HbA1c.

Thomas et al. (2006) conducted a meta-analysis of 14 RCTs that compared exercise with no exercise in 377 people with type 2 diabetes followed for up to 12 months. Exercise significantly improved HbA1c (-0.6%; 95% CI, -0.9 to -0.3) but not body weight (WMD 0.0 kg; 95% CI, -3.8 to 3.8 kg). There were no significant changes in lipids or blood pressure with the exception of a small reduction in serum triglycerides (WMD -0.25 mg/dL; 95% CI, -0.48 to -0.02).

Huisman et al. (2009) conducted a systematic review and meta-analysis of 34 RCTs involving 5,469 participants with type 2 diabetes mellitus who participated in lifestyle interventions for weight loss. The overall effect sizes for weight loss in the short term (< 6 months) were low (0.18) and even lower

in the longer term (> 6 months; (0.06)). The overall effect sizes for HbA1c outcomes were higher (0.35) and remained stable in the longer term (0.34).

The Look AHEAD study (Belalcazar et al., 2010; Pi Sunyer et al., 2007; Wing et al., 2010b) investigated changes in CVD risk factors with intensive lifestyle interventions in people with excess body weight and type 2 diabetes.

Blood pressure

Inconsistent treatment effects are observed in blood pressure (systolic versus diastolic). A pooled weight loss of 5.3 kg (95% CI, -5.0 to -5.6) corresponding to changes in SBP and DBP of -2.3 mmHg (95% CI, -3.0 to -1.6) and -0.4 mmHg (95% CI, -0.9 to 0.1) respectively was reported in the NHMRC Clinical Practice Guidelines.

Norris et al. (2005b) conducted a meta-analysis of 22 RCTs involving 3,379 participants (296 participants who received fluoxetine, 2,036 participants who received orlistat and 1,047 participants who received sibutramine) that assessed the efficacy of pharmacotherapy for weight loss in adults with type 2 diabetes over approximately 12 months. Sibutramine was associated with a weight reduction of 5.1 kg (95% CI, -3.2 to -7) at 12 months and changes in BP as follows: SBP (WMD -0.8; 95% CI, -1.7 to -0.02) and DBP (WMD 1.4; 95% CI, 0.1 to 2.8).

Lipids

Similarly, fractionated lipids effect sizes are an approximate weight loss of 5 kg (results heterogeneous when pooled) correspond with changes in total cholesterol and triglycerides of -0.25 mmol/L (95% CI, -0.5 to -0.02) and -0.45 mmol/L (95% CI, -0.7 to -0.2) respectively.

Norris et al. (2005b) conducted a meta-analysis of 22 RCTs involving 3,379 participants (296 participants who received fluoxetine, 2,036 participants who received orlistat and 1,047 participants who received sibutramine) that assessed the efficacy of pharmacotherapy for weight loss in adults with type 2 diabetes over approximately 12 months. Orlistat was associated with reductions in weight of 2 kg (95% CI, -1.3 to -2.8) at 12 months of follow-up and changes in lipids as follows: total cholesterol (WMD -0.4; 95% CI, -0.5 to -0.3), LDL (WMD -0.3; 95% CI, -0.4 to -0.2), HDL (WMD -0.02; 95% CI, -0.04 to -0.01), triglycerides (WMD -0.2; 95% CI, -0.4 to -0.1). Sibutramine was associated with a weight reduction of 5.1 kg (95% CI, -3.2 to -7) at 12 months and changes in lipids as follows: total cholesterol (WMD -0.1; 95% CI, -0.4 to 0.2), LDL (WMD -0.1; 95% CI, -0.3 to 0.2), HDL (WMD 0.07; 95% CI, 0.03 to 0.11), triglycerides (WMD -0.3; 95% CI, -0.5 to -0.1). Fluoxetine was associated with reductions in weight of 5.1 kg (95% CI, -3.3 to -6.9) and changes in lipids as follows: total cholesterol (WMD 0.5; 95% CI, -0.3 to 1.3), HDL (WMD 0.03; 95% CI, -0.05 to 0.11), triglycerides (WMD -0.5; 95% CI, -1.2 to 0.2).

Eliasson et al. (2007) conducted a RCT of topiramate versus placebo over 12 months in 38 participants with type 2 diabetes mellitus and a mean BMI of 33 kg/m2. In topiramate-treated patients, there were significant reductions in body weight (-7.2 ± 4.3 kg). Triglycerides decreased by 0.11 (SD 1.0) mmol/L and LDL by 0.1 (SD 0.4) mmol/L. HDL increased by 0.1 (SD 0.2) mmol/L and total cholesterol increased by 0.01 (SD 0.4) mmol/L. In comparison, participants in the placebo group experienced no significant reduction in body weight (0.01 ± 2.5 kg) or significant changes in lipids.

Impacts on morbidity and mortality outcomes

James et al. (2010) conducted a randomised controlled trial including 10,744 older adult participants (aged 55 years or above) that assessed sibutramine and lifestyle management or lifestyle management alone. All participants had a history of CVD, type 2 diabetes with at least one other cardiovascular risk factor, or both. Mean weight loss during the lead-in period was 2.6 kg; after

randomisation, the participants in the sibutramine group achieved and maintained further weight reduction (mean 1.7 kg at 12 months).

The risk of a primary outcome event (nonfatal myocardial infarction, non-fatal stroke, resuscitation after cardiac arrest or cardiovascular death) was 11.4% in the sibutramine group as compared with 10.0% in the placebo group (hazard ratio (HR) 1.16; 95% CI, 1.03 to 1.31). The rates of non-fatal myocardial infarction and non-fatal stroke were 4.1% and 2.6% in the sibutramine group and 3.2% and 1.9% in the placebo group, respectively (HR for non-fatal myocardial infarction 1.28; 95% CI, 1.04 to 1.57; HR for non-fatal stroke 1.36; 95% CI, 1.04 to 1.77; P = 0.03).

Uusitupa et al. (2009) conducted a randomised controlled trial including 522 participants with impaired glucose tolerance that assessed intensive diet and exercise counselling with a control intervention of general health behaviour information. In addition, the authors presented follow-up data for a population-based cohort who had received no form of lifestyle advice or intervention (termed “natural controls” by the authors). People lost an average of 4.5 kg (SD 5) in the intervention group and 1 kg (SD 3.7) in the control group after 12 months. After a median follow up time of 10.2 years there were 57 (out of 257) new CVD events (hospital admission for acute coronary events, coronary heart disease, stroke or hypertensive disease) in the intervention group and 54 (out of 248) in the control (health behaviour information) group. There were no statistically significant differences in CVD morbidity between intervention and control groups (22.9 versus 22.0 per 1,000 person years (HR = 1.04, 95% CI, 0.72 to 1.51)). When compared with the population-based cohort (the “natural controls”), adjusted hazard ratios for CVD morbidity were not statistically different (0.89 (95% CI, 0.62 to 1.27) and 0.87 (0.89 (95% CI, 0.60 to 1.27) in intervention and control groups respectively).

A RCT conducted by James et al. (2010) with 10,744 older adult participants (aged 55 years or above) assessed all-cause and CVD mortality for sibutramine and lifestyle management or lifestyle management alone. All participants had a history of CVD, type 2 diabetes with at least one other cardiovascular risk factor, or both. Mean weight loss during the lead-in period was 2.6 kg; after randomisation, the participants in the sibutramine group achieved and maintained further weight reduction (mean 1.7 kg at 12 months). The risk of cardiovascular death or death from any cause was not increased over up to 7 years of follow-up.

Expected Outcomes of the Study

- It is anticipated that a clinical pathway will include the development of clinical decision algorithms about when a patient should be referred for surgical assessment and which patients are unlikely to benefit for surgery (and thus should be managed solely according to a chronic disease case management approach).
- Reduction of absolute cardiovascular disease
- Reduction in metabolic parameters; HbA1C%, Total Body Weight reduction, Lipid panel
- Decline in Edmonton Obesity Staging
- Improvement in physical function status
- Improvement in mental health status
- Improvement in Quality of Life Status – health status as perceived by the patient
- Demonstration of effective model; clinical and behavioural management strategies for patients living with diabetes and obesity for the potential implementation for other THO's.
- Identification of particular strategies, interventions or approaches to be researched on a future randomised trial basis.

Informed Consent

Advertisement of the Study

The randomly selected potential participants will have extra text included on their next follow-up appointment with the diabetes centre. This will read:

'You have been identified as a potential participant for a research study that the Diabetes Centre is about to undertake. The study involves looking at ways to better treat problems with excess weight. At your next visit we will discuss the study in more detail. If you are not interested in being involved please let us know at this visit.'

The research assistant will discuss the study with participants by telephone. The following script will be used:

"Hello, I am <research assistant> from the Diabetes Centre of the North West Regional Hospital. We are conducting a research study that looks at targeting the issue of weight and obesity. Is this a convenient time to tell you a little more about what the study involves?

Our study aims to look at the effects of care that is tailored specifically to obesity. The study involves complete several hand written assessments about sleep, pain, stress and/or how they have been feeling. If you need assistance with this we will provide this. Also some measurements of your body as well as some blood tests each 6 months. Some of these are routine tests for normal care and others are specific to the study. You will visit the clinic each 3 months – that is 4 times per year – these visits may last 30 to 90 minutes. At these times you will see other health professionals such as a physiotherapist, psychologist or dietitian – this will be on an individual basis at first and then may be in a group format. The group programs will involve learning about ways to stop the cycle of obesity and/or some physical activity. You can discuss these options with the staff member at the time – you will not be forced to go into any specific treatment. If no weight loss is achieved a dose of Orlistat will be suggested for a 3 month period. If after 12 months weight loss is still low and you are interested, you may be referred to a surgeon to discuss other options."

Given participants are existing patients of the service and will continue to be review as part of routine care at the Diabetes Centre, at their 24 month collection point (intervention and control) they will be invited to continue with a collection of indicated markers at 6 and 12 months post intervention. If at this last visit they indicate that they are happy for this to occur this verbal consent will be added to the spreadsheet used to collect the project data – ie consent given: yes and date.

Would knowledge of recruitment, participation or exclusion Expose the Person to Disadvantage or Risk

No

Seeking Consent

- Potential participants are identified through records of patients with BMI >30 via DiaBASE program (clinical software program) in order of last review
- Participants will be screened for eligibility by the Research Assistant after this list is generated
- We will use a random number generator to assign patients to groups
- After an initial notification that the individual has been identified as a potential participant for the study on their next appointment letter the Research Assistant will invite the potential participant to be involved in the study
- The research assistant will have had previous training in seeking informed consent
- Informed Consent will be gained by the Research Assistant/ Case Manager in written form
- Participant information will be forward to research team immediately and patient booked into next available AMOS Clinic
- As outlined previously, participation is voluntary. Prior to entry into the study potential participants will be informed of their ability to withdraw at any time, without giving a reason should they wish – the intervention and resources being tested in the study will no longer be made available to withdrawn participants. Withdrawn participants will re-enter the normal Adult Diabetes Clinic.
- There will be no payments made to participants involved in the study

Confidentiality and Privacy

Participant names, their details and data will be kept on a password protected database and will only be linked to a study identification number for this research. Patient information will initially be entered into DiaBASE (a clinical software program that is password protected) on computers that are also password protected. On transportation of data from DiaBASE to excel format only THCI numbers will be included initially – to track any missing data initially – this will then be removed at the study identification number allocated.

At this point there is no patient identifiers. All data will be entered into a computer that is password protected, stored in a locked office of the investigator and maintained for a minimum of 3 years after completion of the study.

Safety Considerations

Expected Benefits to the Wider Community

- The development of an evidenced based tiered model for individualised interdisciplinary care to support obesity management and reduce comorbidity risk.
- Improved patient outcomes which in turn reduce health costs to the community
- Improve best practice in the management of obesity
- Will provide information to support change in service delivery and policy development
- Assessment of process and impact outcomes to substantiate and drive clinical and policy change supportive of a multidisciplinary systematic approach for patients living with obesity.
- The development of a model of care that supports the self and medical management of obesity; taking into account the experience and the context for the person as well as their physical measurements and indicators.
- The development of a framework for improved obesity management for rural Tasmanians with diabetes and obesity.

Expected Benefits to Participants

- Participants may directly benefit from participation in the study as a result of improvements in metabolic markers
- The early identification and management of secondary complications of obesity.
- A reduction in absolute cardiovascular risk.
- An improvement in glycated haemoglobin - or diabetes control.
- A potential reduction in body weight.

Risk of Harm

Low Risk – It is possible that participants may find some of the physical activities challenging and/or psychological sessions distressing. However, the study protocol directs those with higher levels of stress for therapies to reduce anxieties and distress. These are measured throughout the study at 6 month intervals.

Some participants will be referred for bariatric surgery. This surgery is associated with complications and adverse events. These are not a result of the study per se as the surgery is not experimental and is an established clinical treatment recommended in current national guidelines.

Other Risks

There are no foreseeable risks to the research team or the organisation.

Commercial Benefits of the Research for Investigators and Sponsors

There is no anticipated commercial benefit arising from the research for the investigators and/or sponsor

Risk of Harm as a Result of Dissemination

All data will be aggregated and de-identified and thus there is no foreseeable risk of harm when results are disseminated.

Mechanisms to monitor the Project

- The research will be conducted under the supervision of a steering committee comprised of members of the clinical team caring for the patients, experts in population health and with academic oversight.
- The clinic itself will operate under the supervision of the usual clinical governance of the North West Tasmanian Health Organisation (THO). All providers are staff members of THO North West, are credentialled to provide the clinical services outlined in the model and are subject to the safety and quality monitoring and reporting requirements of the North-West Regional Hospital, an accredited Australian public hospital.
- Regular monthly to 2 monthly meetings of the study investigators to monitor the conduct and progress of the study, and to manage change, problems and timelines.
- Meetings will review; participant recruitment rate, follow-up of participants according to key outcome timelines, reasons for attrition, data collection/entry and related issues, need for early termination of study.
- Co-Principal Investigator/Project Manager will meet with Case Manager to identify any problems with follow-up and/or implementation of therapy plans.
- Study co-ordinator/Project manager will meet with recruiting staff to ensure training has be adequate and well supported for screening, recruiting and consenting of participants.

Data and Safety Monitoring

The likelihood of a serious adverse event occurring in this study is low and consequently there are no stopping rules. Given the short timeframe of this study 2.5 years it is unlikely that the issue of overwhelming benefit or futility will arise. Thus a Data and Safety Monitoring Board will not be established. Reports on Risk Assessment and Management will be provided to the Safety and Quality Committee of the THO on a 6 monthly basis.

Resources

Others Personnel Relevant to the Research Project

- Siobhan Harpur: Director Populations Health Operations- involved in the supporting of analysis of data to provide input in policy direction
- Tess Kasper (RN BN Diabetes Educator) /Ruth Young (RN BN CDE): Research Assistant/Case Manager - ensuring participants receive care and therapies that have been planned, data collection and entry, and reviewing of data for completeness
- Noel McRoberts: Manager of physiotherapy, provision of staffing for the study. May access the information to review factors that may relate to the role of the physiotherapist
- Surgeon TBA: Will provide assessment and review of patients deemed suitable for bariatric surgical procedures
- Richard Hanlon: Manager of Pathology – involved in the provision of advice in pathology screening, will not access data
- Kathryn Thomas: Manager of the Diabetes Centre – involved in support clinics with staffing, will not access data – but may use final findings to change service delivery

Training

Prior to the commencement of the project, the steering committee comprised of members of the clinical team caring for the patients and experts in population health will be trained to ensure they are able to commence their role in the study protocol. Training will be provided by the Co-PI and will include familiarisation of the background and aims of the study, the study material (audit sheets/scales) and processes. All will be encouraged to review the National Health and Medical Research Council (2013) *Clinical practice guidelines for the management of overweight and obesity in adults, adolescents and children in Australia*. Melbourne: National Health and Medical Research Council. The training will also include sample cases to rehearse the sequence of events.

It will be delivered in person and by phone to those not involved in handling of the material by the Co-PI and evaluated on an individual basis or through the steering committee meetings.

Project Funding

Grant Submission

- Have submitted for Clifford Craig Foundation grant - Applications are encouraged for any basic, translational medical research in areas such as diabetes and the management of obesity

Managing a funding shortfall

- The host organisation / investigators have access to resources to cover the shortfall
- The investigators will continue to apply for funds

In Kind Support

- In the interim THO-North West CEO has approved funding of Orlistat
- Other position numbers are being reviewed to increase psychology position
- Dr Kelly Shaw has indicated that she will be able to support data analysis if funding not achieved
- Meeting space offered at THO sites
- In addition, services within the Diabetes Centre can be altered temporarily to enable this research - thus by using in-house staffing

Disclosure of Payments

- There are no payments to be made to participants within this study

Project Management

Principal Investigator / Lead Health Officer

- Implement and manage the project as outlined in the proposal
- Manage project team and relevant stakeholders
- Involved in planning and development of operational business processes for the clinic and data collection
- Provides health service expert clinical leadership to guide care delivery systems in AMOS clinic.
- Specialist assessment and management of patients as referred that may include; referral to other health professionals, prescribing medicines and ordering diagnostic investigations.
- Assessment (utilising referral to appropriate health professionals if required) should also include other physical comorbidities associated with excess weight, including:
    - symptoms of sleep apnoea (snoring, frequent waking, daytime hypersomnolence)
    - signs of arthritis, especially in the hip and knee joints
    - symptoms of gastro-oesophageal reflux disease (GORD)
    - assessment of right-heart function for evidence of pulmonary hypertension or right-heart failure
- Ensure informed consent of participants and ethics approval sought and documented
- Monitor the project's budget as presented by the funded proposal
- Managing change, alterations and timelines
- Co-ordinate and/or provide relevant training (eg data collection)
- The research will be conducted under the supervision of a steering committee comprised of members of the clinical team caring for the patients, experts in population health and with academic oversight.
- Communications to the project team on project
- Report on progress of project to THO-North West Quality and Safety Committee at each 6 month interval and at completion of project.
- Present and/or contribute to presentations of the project to relevant workshops or seminars organised by vTAHSP.
- Perform audits of data for accuracy and completion
- Analysis and interpretation of data
- Involved in publications and presentation of data/results at relevant venues. Share project evaluation with the Tasmanian Health Council and state-wide Diabetes Leaders Group on conclusion of the project to promote replication and sustainability

Lead Academic – Research Fellow

- Involved in providing advice and instruction of evaluation of the project and planning data collection.
- Involved in the planning and development of operational business processes for the clinic and data collection
- Supports completion and submission of ethics application for research project within project timelines
- Communications to the project team on the project and data collection
- Supports in drafting the report on progress of project to THO-North West Quality and Safety Committee at each 6 month interval and at completion of project (04/15, 10/15, 4/16, 10/16).

- Present and/or contribute to presentations of the project to relevant workshops or seminars organised by vTAHSP.
- Analysis and interpretation of data (10/2016, 4/2017, 10/2017, 6/2018) to evaluate the model and for the purpose of reports.
- Supports drafting of reports and publications and presentation of data/results at relevant venues
- Share project evaluation with the Tasmanian Health Council and state-wide Diabetes Leaders Group on conclusion of the project to promote replication and sustainability

Diabetes Specialist Dietitian

- Complete a full Nutrition Assessment for each new client
    - Review clinical data (including medical and social history)
    - Review blood tests and other biochemical data
    - Review anthropometry (including weight, height, weight history and BMI)
    - Assess dietary intake (including usual intake, food allergies and intolerances, and food preferences and avoidances)
    - Based on the Nutrition Assessment, determine if the client needs further intensive 1:1 education from the Dietitian
- Complete an individualised Nutrition Care Plan for referred clients
    - Determine 'Nutrition Diagnosis'
    - Determine Nutrition Intervention Goals
- Provide individualised nutrition education to referred clients
    - Optimise nutritional intake for weight loss
    - Help clients establish realistic goals (short term and long term)
    - Increase awareness of healthy lifestyle choices
    - Provide relevant information and learning opportunities in a manner considerate of the individual's environment to support outcomes and quality of life
- Assist with the planning for the AMOS Clinic and data collection
- Assist with the collection of data relevant to the project
- Assist with any relevant publications and / or presentations

Credentialed Diabetes Educator/Case Manager

- Facilitates case coordination and information-sharing with health professionals involved.
- Ensure case records maintained, whether through organization or simply by making sure that case workers keep everything in order.
- Act as advocates between service recipients and the agencies; ensuring the participants receives the services they need and that they understand plan.
- Supports the Treatment Planning process
- Monitors progress of participants; ensuring data is up to date at collection points
- Assists with the evaluation and outcomes of the clinic
- Provides diabetes education as required and relevant

Enrolled Nurse

- Takes clinical measurements at appropriate intervals; 0, 3, 6, 9, 12, 18, 24 months
- Provide pathology request for HbA1c, lipids, leptin, ketone, vitamin D, B12, TFTs, LFTs, ACR, eGFR Enters data into excel for de-identified clients ; including clinical measurements, scores achieved from differing scales used: TSRAC QUESTION 7 (Response)
    - Pre and Post treatment physical function status (validated tool - McCaffery Pain assessment scale and Physical function status) at 0, 6, 12, 18, 24 months
    - Pre and Post mental health status (Patient Health Questionnaire (PHQ-9) [Depression], Generalised Anxiety Disorder Assessment (GAD-7) [Anxiety]), Assessment of Quality of Life (AQoL) and Work Productivity and Activity Impairment (WPAI) at 0, 6, 12, 18, 24 months
    - Quality of Life Status – health status as perceived by the patient (validated tool - SF-36 Quality of Life scaling)
    - Absolute Cardiovascular Disease Risk at 0, 6, 12, 18, 24 months
    - Edmonton Obesity Staging System at 0, 12, 24 months

Administration

- Sends out clinic appointments; 60 minutes for new recruit for assessment
- Initial consultation with endocrinologist 45 minutes
- Initial consultation with dietitian 60 minutes
- Arrives patient into clinic
- Identifies and communicates potential issues with room bookings and/or clinic templates.

Diabetes Psychologist

- Assist with the planning and development of business processes for the AMOS Clinic and data collection
- Complete a full Psychological Assessment for each new client
    - Review clinical data (including medical and social history)
    - Based on the Nutrition Assessment, determine if the client needs further intensive 1:1 education from the Psychologist
- Involved in the development of the individualised Treatment Plan including the determination of Personal Goals
        - A = PHQ-9 and GAD-7 ->20 (high distress); 6+ sessions (to be reviewed)
        - B = PHQ-9 and GAD-7 -5 - 19 (mild/moderate); <6 sessions
        - C = PHQ-9 and GAD-7 -<5 (no distress); 1 session for assessment and health behaviour change strategies.
- Full DDS (diabetes distress scale) can be administered for those for whom the screener indicates high diabetes distress.
- Involved in the Evaluation and Research activities of the clinic/project:
    - Background searches for evidence on predictors of weight loss associated with depression and anxiety in the obese person's ± diabetes
    - Support for ongoing trials/research via data sharing , clinical and professional involvement

- Involved in supporting analysis and interpretation of data

- Assist with the collection of data relevant to the project
- Assist with any relevant publications and / or presentations

Physiotherapy

- Involved in planning and development of business processes for access criteria, consent, therapies and data collection
    - Space for assessment and individual or group management
    - Evidence based Assessment protocol including Pain Assessment tool
    - Formulation of Template for Exercise Programme with progression/review capacity
    - Care/Treatment Plan – incorporate data as available for team review
    - Outline group strength/resistance training programme(s) – evidence based
    - Determine validated Outcome Measures – eg. 6 minute walk test; stair climbing test
- Involved in relevant agreed data collection for purposes of reporting and investigating including:
    - Completion of McCaffery Pain assessment scale
    - Completion of a full physical functioning and balance assessment (6 minute walk test (6MWT), Timed Up and Go (TUG), 30-second Chair Stand test (30s-CST)
    - Investigate iPM Clinics structure
    - Utilise ABC – Activity Barcoding Data Collection
    - Providing any relevant information to support progression of 3 monthly progress report as required by vTAHSP.
- Involved in providing Education and Support to the clinic:
    - Collate and share data with the Team for education/research/clinical or funding purposes
    - Utilise data collected to develop presentations for relevant community and professional groups
    - Assist in presenting and/or contribute to presentations of the project to relevant workshops or seminars organised by vTAHSP.
- Involved in the Evaluation and Research activities of the clinic/project:
    - Background searches for evidence on predictors of weight loss associated with physical activity in the obese/diabetic person
    - Support for ongoing trials/research via data sharing , clinical and professional involvement
    - Involved in supporting analysis and interpretation of data

Population Health

- Involved in planning and development of operational business processes for inclusion of self-management programs
- Supports project reporting requirements with advice as relevant (04/15, 10/15, 4/16, 10/16).
- Analysis and interpretation of data (12/2016, 6/2017, 6/2018) to evaluate the model and for the purpose of reports.
- Review of data collection by Population Health - although challenging to draw conclusively from a trial that will last for 12 months and inevitably have a relatively small population, it will be able to "point" to further actions and strategies (0, 12, 24 months).
- Prepares a report for Population Health for further action and/or strategy development
- Present and/or contribute to presentations of the project to relevant workshops or seminars organised by vTAHSP.
- Share project evaluation with the state-wide Diabetes Leaders Group on conclusion of the project to promote replication and sustainability

Pathology Manager

- Involved in planning and development of operational business processes for the clinic and data collection
- Provides advice on relevant pathology screening for obesity management and testing schedules
- Supports project reporting requirements with advice as relevant (04/15, 10/15, 4/16, 10/16, 6/2017, 6/2018).
- Present and/or contribute to presentations of the project to relevant workshops or seminars organised by vTAHSP.

Diabetes Centre Manager

- Allocating time for the multidisciplinary team to discuss and review the clinic.
- Invites other relevant stakeholders to the group when need/s is identified
- Supports teams members to work collaboratively and encourages openness
- Identifies and manages risk
- Provides relevant education and training opportunities [as identified and/or through PDA]
- Information management and/or supports staff through IT to define priorities, identify solutions and allocating relevant resources
- Reviews and/or supports the review of clinic performance and effectiveness through clinical audits

Prior Reviews

Peer Review

The research proposal has been peer reviewed by the virtual Tasmanian Academic Health Science Precinct and Rural Clinical School of University of Tasmania. In addition, it has been peer reviewed by the Medical Advisory Committee of the THO-North West and the model approved as a new service.

Dissemination of Results and Publication

Commercialisation or Intellectual Property Implications of the funding/support arrangements

None to declare. The ownership of any intellectual property that arises from the study will belong to the Tasmanian Health Organisation – North West and study investigators. The THO will also comply with the principles outlined in the National Principles of Intellectual Property Management for Publically Funded Research and the funding agreement.

Restrictions on the publication of results from this research

- There are no known restrictions

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