

Awareness, Action and Achievement: A Report on MetSyn – A Community-Based, Exploratory Pilot Project for Women Who Have Metabolic Syndrome

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Executive Summary

From June, 2010, through November, 2011, an exploratory Pilot Project-- **MetSyn**- aimed at reducing the likelihood that women with a diagnosis of metabolic syndrome would develop diabetes was conducted in Saskatoon, Saskatchewan. MetSyn was established by the Women's Mid-Life Health Centre of Saskatchewan and Dr. Vicki Holmes.

Metabolic Syndrome is an internationally recognized clinical diagnosis, which indicates an individual has a cluster of factors for Type 2 diabetes (and cardiovascular disease). A diagnosis of metabolic syndrome is made when at least three of the following conditions exist: raised blood pressure, increased triglycerides, decreased HDL-C (good cholesterol), raised fasting blood sugar and in Canada an increased waist circumference of 80 cm or more.

94 women with metabolic syndrome completed a low demand (18 hrs. over 12 months) program. Half of the women had access to automated phone calls that prompted them on physical activity and nutrition changes. Measures of clinical and lifestyle change documented over 12 months within this group as well as an assessment of the Building Awareness Phase of MetSyn was the focus of an evaluation which was conducted by Dr. Judith Martin PhD., University of Saskatchewan and Dr. Bonnie Jeffery PhD., University of Regina. Their report: **Awareness, Action and Achievement: A Report on MetSyn--A Community-Based, Exploratory Pilot Project for Women who have Metabolic Syndrome** is intended to be useful to a broad range of women as well as clinicians, community groups and those who develop wellness programs.

Outcomes of MetSyn

- For participants with access to the automated calls (N=49), there were positive average group changes in **three** metabolic syndrome factors: waist circumference, systolic blood pressure and fasting blood glucose
- For participants who did not have access to the automated calls (N=45), there were positive average group changes in **four** metabolic syndrome factors: waist circumference, systolic blood pressure, triglycerides and HDL cholesterol
- Positive average group changes on **four** lifestyle measures: nutrition (number of positive nutrition habits; 'stage of change') and physical activity (amount of physical activity during leisure time; 'stage of change')

Additional empirical outcomes of MetSyn:

- 17% of participants (15 out of 88 for which all data was complete) no longer fulfilled the criteria for metabolic syndrome at 12 months
- An additional 17% (15 out of 88 participants) who continued to have metabolic syndrome at 12 months, had reduced the number of metabolic syndrome factors (risk factors) which they had when they started MetSyn
- In total, 34% of participants (30 out of 88) had a reduction in the number of metabolic syndrome factors (risk factors) they had at entry to MetSyn

Assessment of the Building Awareness Phase of MetSyn:

- Saskatoon women with metabolic syndrome demonstrated high interest in trying to prevent diabetes and showed initiative in respect to entering MetSyn
- Saskatoon family physicians were responsive to the clinical needs of those women who entered MetSyn
- Public education and media activity played a critical role in the high demand for entry to MetSyn
- Aboriginal women demonstrated interest in MetSyn, however it appears to be important that Aboriginal women in Saskatoon obtain resources to design their own culturally-appropriate initiatives for dealing with metabolic syndrome

Report Recommendation

That the Women's Mid-Life Health Centre invite all 179 women who registered for MetSyn to a presentation of this report.

The report concludes with some 'thinking points', about the need for more strategies aimed at the primary prevention of diabetes as well as the need for a 'flowering' of flexible secondary prevention programs which utilize a diagnosis of metabolic syndrome to encourage women to actively pursue the prevention of diabetes.

Introduction

This report has five parts:

- **Part One—Overview and Context**, provides an overview of the MetSyn Pilot Project, the definition and prevalence of metabolic syndrome, as well as the prevalence of diabetes and its potential impact on quality of life
- **Part Two—Community Roots**, reports on how MetSyn got started
- **Part Three—MetSyn in Three Phases**, describes the phases of MetSyn: Building Awareness, the 12 month Program and the Evaluation of the 12 month program
- **Part Four—MetSyn Outcomes—A Summary**
- **Part Five—Going Forward**, makes one recommendation and identifies a number of ‘thinking points’ which emerged out of doing this report

Part One – Overview and context of the Metabolic Syndrome Pilot Project (MetSyn)

MetSyn began in May of 2011 with activities that involved family physicians, community groups, women’s organizations and the Saskatoon media in coming to understand metabolic syndrome and why a diagnosis of such should spur them to action. By late October, 2011, 179 women, many of whom had initiated their diagnosis of metabolic syndrome as a consequence of the MetSyn building awareness activities, voluntarily joined a free, pilot project that required them to attend six, three-hour group educational sessions over 12 months. Over this period the women submitted blood analysis results and had waist, height, weight and blood pressure measurements taken at entry (baseline), 6 months and 12 months. The women were divided into two groups: one group of which simply went through the program. The other group of women went through the same program, however, this group also received automated phone calls (IVR: interactive voice response) in their homes every two weeks, that asked about their progress on the nutrition and physical

“Women’s mid-life health study-Project aims to help prevent Type 2 diabetes and heart disease”

Saskatoon Sun, headline, October, 10, 2010.

activity goals they themselves had set. The automated call also reminded them that they could call the project director for a referral to the nutrition consultant and/or the physical activity consultant who were assigned to MetSyn by Saskatoon District Health. The automated call also indicated to them, if they had 'said' that they were not meeting their goals, that the Project Director would call them within two business days. At some of the group sessions, questionnaires prepared by the independent evaluators were administered by the project director.

This report is based on a descriptive review of the Building Awareness phase of MetSyn as well as information from the above-noted questionnaires, select post-project taped interviews, and additional questionnaires prepared and distributed by project staff, plus the participants' measurements and blood analysis results. The evaluation research component of this pilot project was approved by the University of Saskatchewan Ethics Board and by the Saskatoon Health Region (SHR).

The Objectives of MetSyn

- a) To build/enhance awareness and encourage action with respect to metabolic syndrome
- b) To find out if automated phone calls made a difference in reducing the measurements of metabolic syndrome factors participants had when they entered MetSyn
- c) To find out if specific indicators of nutrition and physical activity, as reported by participants when they entered MetSyn, had changed when they reported on these indicators at completion of the Pilot Project

What is Metabolic Syndrome?ⁱ

In 2009 an expert panel of specialists issued a joint scientific statement which said:

A cluster of factors for cardiovascular disease and Type 2 diabetes, which occur together more often than by chance alone, have become known as metabolic syndrome. The risk factors include raised blood pressure, dyslipidemia (raised triglycerides and lowered high-density lipoprotein cholesterol),

29.5% of women, 18 years & over who live within the Saskatoon Health Region are overweight. (BMI: 25-29.99). But another 15.9% of women of this age group are obese (BMI: 30 plus). In all 45.4% of women over 18 in the Saskatoon Health Region are considered to be at risk for serious illnesses in which weight is seen as a factor. Can. Community Health Survey, 2009/10.

“As a sociologist, I think it is high-time the medical profession developed new language to denote a BMI over 30, ‘obese’ is not just a medical term, it has been used as a demeaning pejorative in English speaking countries for decades.” Judith Martin, PhD.

and raised fasting glucose and central density...Three abnormal findings out of 5 would qualify a person for metabolic syndrome. (Alberti et al., pg.1640, 2009).

The five factors as listed above were measured for each woman who was interested in joining MetSyn. Eligibility for the Pilot Project was based on the measurement 'cut points' as presented in Table 1.

"I had never heard of metabolic syndrome so I didn't even know about it." Participant

Table 1: Criteria for Clinical Diagnosis of the Metabolic Syndrome

Measure	Categorical Cut Points
Elevated waist circumference*	Population- and country-specific definitions**
Elevated triglycerides (drug treatment for elevated triglycerides is an alternate indicator†)	>150 mg/dL (1.7 mmol/L)
Reduced HDL-C (drug treatment for reduced HDL-C is an alternate indicator†)	<40 mg.dL (1.0 mmol/L) in males; <50 mg/dL (1.3 mmol/L) in females
Elevated blood pressure (antihypertensive drug treatment in a patient with a history of hypertension is an alternate indicator)	Systolic \geq 130 and/or diastolic >85 mm Hg
Elevated fasting glucose (drug treatment of elevated glucose is an alternate indicator‡)	>100 mg/dL (\geq 5.6 mmol/l or treated Type 2 diabetes)

HDL-C indicates high-density lipoprotein cholesterol. *It is recommended that the IDF cut point be used for non-Europeans and either the IDF or AHA/NHLBI cut points used for people of European origin until more data are available. †The most commonly used drugs for elevated triglycerides and reduced HDL-C are fibrates and nicotinic acid. A patient taking 1 of these drugs can be presumed to have high triglycerides and low HDL-C. High dose ω -3 fatty acid presumes high triglycerides. ‡Most patients with Type 2 diabetes mellitus will have the metabolic syndrome by the proposed criteria (Alberti et al., pg. 1642, 2009).

** For the purposes of this Pilot Project, the waist circumference threshold for abdominal obesity was set at \geq 80cm

Prevalence of Metabolic Syndrome

A 2011 research paper, published in *The Canadian Medical Association Journal*, which drew upon a representative sample of the Canadian population found that 19.1% of Canadians (18 + years) had metabolic Syndrome (Riediger & Clara, 2011). According to a 2002 study

published in *the Journal of the American Medical Association*, 23.7 % of the US population had metabolic syndrome (Ford et al. 2002).

The focus of MetSyn was on preventing diabetes

Although metabolic syndrome is also a precursor of cardiovascular disease (CVD), for a variety of reasons including the prevalence of diabetes in Saskatchewan and the currently growing public concern about this situation, many of the awareness strategies of MetSyn were aimed at ‘preventing diabetes’.

Prevalence of Diabetes

Diabetes is a now world-wide issue. In 2007, the UN reported that 6% of the world’s people, (aged 20 to 79) had diabetes (United Nations General Assembly, 2007). According to a leading researcher in this area, 12.3% of Americans had diabetes in 2010 (Grundy, pg. 631, 2008).

Table 2 tells the tale of the growth of the numbers of Canadians who suffer with this disease. This data needs to be considered in respect to which populations are excluded from these numbers (see note below table) as well as the fact that our population is aging.

About one fourth of Europeans, according to Grundy (2008), have metabolic syndrome and in Germany, we see that 31.6% of adult men have this condition, which is not as high as that of women in the UK, which takes in 47.5 % of adult women.

“We found that those at increased risk (for metabolic syndrome) were those in households with lower education and income levels”. (Riedger & Clara, pg. E1129, 2011).

Table 2: Yearly incidence of diabetes mellitus(%) by sex in Canada from 2005-2010

Year	2005	2007	2008	2009	2010
All	4.9	5.8	5.9	6	6.4
Males	5.4	6.4	6.3	6.6	7.4
Females	4.4	5.2	5.4	5.3	5.4

Source: Statistics Canada, CANSIM, table [105-0501](#) and Catalogue no. [82-221-X](#). Last modified: 2011-06-21. Note: This table represents Canadians aged twelve and over. Excluded from the sampling frame are individuals living on Indian Reserves and on Crown Lands, institutional residents, full-time members of the Canadian Forces, and residents of certain remote regions.

In Saskatchewan we see a steady growth in the prevalence of diabetes (4.2% in 2000; 7% in 2010) and it is estimated to increase to 10.8% by 2020 (Canadian Diabetes Association, 2010). The increase in the number of Aboriginal people with diabetes is well documented: “By

1990 almost 10% of the province's First Nations adults had diabetes; by 2006, the proportion was over 20%, while it remained at about 6% in the general population" (Dyck et al., pg.2, 2010).

This Pilot Project involved women **from Saskatoon and neighbouring areas**. According to a 2011 report from the Saskatoon Health Region, more than 16,500 people or about 5% of those living in the Saskatoon Health Region had diabetes in 2006-07. In 2006-07, 7.1% of those living in low-income neighbourhoods suffered with diabetes while in middle-income and affluent neighbourhoods the respective figures were 5% and 4.2%. This report from the Saskatoon Health Region also showed that 12% of individuals with Registered Indian Status had diabetes, which is 2.5 times higher than the 4.9% of diabetics who were considered not to have Indian status.

Diabetes is managed very well by many individuals. Clearly, putting resources into patient and family education about how to manage this illness is critically important. However, all management programs aside, diabetes remains a serious, painful and life-threatening illness for many. The greatest cost of diabetes is the suffering endured by its victims and their families, including limited quality and length of life.

The Canadian Diabetes Association reports that:ⁱⁱ

- A person with diabetes is 11 times more likely to be admitted to hospital for a heart attack than someone without it
- Hospitalizations for stroke are approximately 3 times higher in people with diabetes compared to those without diabetes
- The risk of end-stage renal disease is 13 times higher in people with diabetes compared to those without the disease. The numbers of people starting **dialysis** increased by 84% in people with diabetes compared to less than 10% in people without this disease over a five-year period
- Seventy percent of people with Type 1 diabetes and 40% of people with Type 2 diabetes have diabetic retinopathy, a leading cause of **blindness**. It is estimated that 20% of all people with diabetes will become blind
- People with diabetes have 20 times the risk of **amputation** compared to people without the disease

(Canadian Diabetes Association, pg. 2, 2006)

As manager of the renal program for Southern Saskatchewan for many years, Myrna Byeⁱⁱⁱ has seen a lot of suffering:

Over the last 4 and one-half decades remarkable advances in treatment of

Currently, one in four Canadians lives with diabetes, undiagnosed diabetes, or prediabetes; this will rise to one in three by 2020 if current trends continue. (Canadian Diabetes Association ,pg. 5, 2010)

“Until my brother was diagnosed with diabetes, I kind of had a notion that diabetes was not so bad. You took your pills or injected insulin. It was only in seeing my brother suffer so much with eye problems, kidney issues and ketosis acidosis, that I took in the terrible suffering many have with this disease.” Dr. Judith Martin, sociologist.

Chronic Kidney disease have lightened the burden on these patients. This fact, however, does not reduce the unimaginable changes that some patients have to make to undergo treatment. I have shared experiences with patients and their families where statements such as, “If I had known this would take up so much time”, “Why does my arm look like this?” “Why isn’t Mom (or Dad) any better?” “What do you mean three treatments a week is not enough?” or, “Why do I have so many infections?” (Myrna Bye, telephone/email interview , April,2012)

Part Two –The Community Roots of MetSyn- How a Community-based Group in Saskatoon, Saskatchewan, came to establish MetSyn

The pages that follow describe how a community-based women’s organization, the Women’s Mid-Life Health Centre of Saskatchewan^{iv} (WMLHC), made it a priority to find out if a low demand, computer-assisted, nutrition and exercise program could help women with metabolic syndrome make change towards better health.

The desire of this organization to set up a special program for women who were heading towards diabetes, developed initially out of the regular reports that their medical director, Dr. Vicki Holmes, presented at board meetings. Over and over Holmes described the growing number of women in her practice who were very likely to become diabetic. She frequently also expressed her frustration with this situation, as there seemed to be very little she could do except suggest better nutrition and more exercise. Most of Holmes’s time was spent in her private practice while working one day a week at the WMLHC where she saw women who had been referred to the WMLHC by their family physicians. Holmes inspired her board of directors by talking about her experience and tying it to the larger reality in Canada.

For example in 2006 Holmes reported to the WMLHC board that:

- ✓ 66 per cent of the women whose girth we have measured have a waist measurement of over 80 cm. These women were not aware of their risk factors which could lead to diabetes
- ✓ Based on the information we collect about women, if 2.7 million women in Canada are reaching menopause, and 38% have a BMI over 25, then over one million Canadian mid-life women are already at some risk of developing Metabolic Syndrome

The Metabolic Syndrome Pilot Project was, in many ways, a new endeavour for Dr. Holmes as well as for the staff and board of the WMLHC^v. Their approach was exploratory and innovative. The intention was not to establish their organization as a clinical research centre. Rather, the project was designed to ‘try something new’ that might assist some local women who were very likely on their way to developing Type 2 diabetes. In terms of health promotion strategies the WMLHC ‘s concept is a classic example of the secondary prevention of disease : the patient is clearly at risk but there is a practical intervention (diet and physical exercise) which has been shown to prevent or delay the onset of the disease (diabetes in this case) for some years.^{vi} The ‘something new’ that board members and Dr. Holmes wanted to pilot as a tool for helping patients who had metabolic syndrome was the utilization of automated phone calls, interactive voice response (IVR) within a lifestyle change program^{vii}. TelAsk, a company in Ottawa that designs IVR systems, was known in the medical community for their work with the University of Ottawa Health Institute. Conversations with TelAsk officials and a review of some of their work led Dr. Holmes and the WMLHC Board of Directors to pursue a program for women with metabolic syndrome that would involve an automated call system run by TelAsk.^{viii}

It is likely that many family physicians share Dr. Holmes’s frustration with having limited practical tools for assisting patients who have metabolic syndrome. One of the reasons the Pilot Project involved experimenting with the impact of automated phone calls was the hope that this technology (which can be inexpensive)^{ix} could become an option that physicians could offer to their patients who needed to tackle their nutrition and exercise issues.

Part of the learning process for me was going from having an idea that I thought might be useful, to understanding that once we worked with TelAsk and developed the automated process for this type of program, it could possibly be cost effective for physicians to utilize or for it to be incorporated into a variety of programs aimed at reducing metabolic syndrome. (Dr. Vicki Holmes, taped interview, December, 2011)

It was difficult for the WMLHC to acquire funding for MetSyn.

As a board member and chair of the Women’s Mid-Life Health Centre Board I know that it took a lot of effort to get funding for this pilot. Our Centre was a small agency with a huge demand for information, public educational events and our Thursday Clinic which was usually behind a year in seeing referrals. Some board members were worried about diabetes and most of us knew someone who had diabetes. We

just pushed ahead. But that was the WMLHC! We pioneered a women's menopause clinic in Saskatoon, when most people did not say that word in public. We wanted to try something new to help women avoid diabetes. (Terri Parent, email interview, December, 2011)

In early 2007, Dr. Vicki Holmes learned that St. Paul's Hospital in Vancouver had received funding from the pharmaceutical firm, AstraZeneca, to pilot a program for individuals who had been diagnosed with metabolic syndrome. Dr. Holmes then began conversations with AstraZeneca as to whether the WMLHC could apply for funding to set up a pilot project which would utilize automated phone calls to women in Saskatoon who had metabolic syndrome. The response to this request was positive. Shortly after this good news, a committee made up of Dr. Holmes, the Chronic Disease Management Committee, Saskatoon Health Region and some members of the board of the WMLHC (including a faculty member, College of Medicine, University of Saskatchewan), began developing MetSyn, an innovative, exploratory pilot project for women who had metabolic syndrome.^x

In addition to AstraZeneca, MetSyn also received major funding from The Les and Irene Dubé Family Foundation. Potash Corporation of Saskatchewan, Affinity Credit Union, Blue Cross Saskatchewan, RBC Dominion Securities, Saskatchewan Indian Gaming Authority and Dr. Ivan Jen, also provided financial support to this Pilot Project.

Part Three- MetSyn in Three Phases

The metabolic syndrome Pilot Project (MetSyn) is best described in three phases:

- Building Awareness
- The 12 month program
- Evaluation of the 12 month program

Phase One: Building Awareness (May, 2010-October, 2010)

The need for family physicians to become aware of MetSyn and a desire to reach out directly to women led to this phase of MetSyn involving considerable time and energy. A review of The Building Awareness Phase was included in the researchers' evaluation model. This resulted in an assessment of this phase of MetSyn which was based on a document review, interviews with staff and an analysis of data collected from participants. The assessment findings/comments

on this phase of MetSyn are presented in concert with the description of activities undertaken during this pre-program period.

The document review shows that this phase involved:

- ❖ Education and engagement of family physicians in diagnosing and referring female Metabolic Syndrome patients into the Pilot Project occurred from May through October, 2010. Dr. Holmes and Project Director, Wendy Verity, set up several meetings with local doctors to talk about Metabolic Syndrome, MetSyn and why and how family physicians could be involved.
 - ✓ There was a city-wide meeting of 40 family physicians; a lunch-hour session at some family medicine clinics (8 physicians attended) and an event was held at the Saskatoon Club, which was attended by 6 physicians. At these meetings, physicians were provided with forms that they could fill out in order to determine if their patients had metabolic syndrome.
 - ✓ Appendix C includes a copy of a letter that was sent to family physicians in Saskatoon. This letter includes specifics as to diagnosis (measurements/blood work) and referral details for patients who wanted to join MetSyn.

- ❖ The staff and the WMLHC board were also committed to reaching out directly to women in the community. The idea was to inform women about metabolic syndrome, even if they could not join the Pilot. This led to community meetings and a media strategy which had good take-up:
 - ✓ The WMLHC organized a public education event on metabolic syndrome which attracted a large crowd.
 - ✓ Media activity--an ad was placed in the Star Phoenix *Wellness* magazine, news stories on MetSyn ran in the Saskatoon Star Phoenix and the Saskatoon Sun and a local station ran announcements on MetSyn. Articles about MetSyn appeared in *HotFlashes*, the WMLHC newsletter.

- ✓ Posters and pamphlets were displayed at hospitals, clinics and community centres.

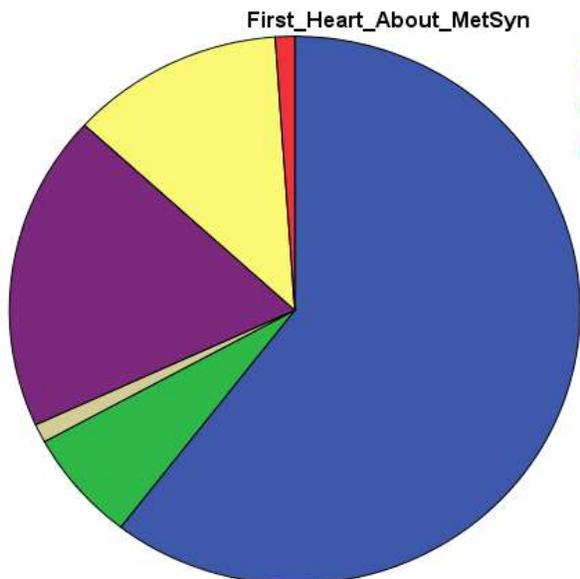
- ✓ Hiring an Engagement Facilitator to encourage Aboriginal women to sign-up for MetSyn. In spring 2010, the WMLHC obtained additional private funding in order to hire a professional woman of Aboriginal ancestry to be in charge of outreach to Aboriginal women. This outreach process included: personal emails to First Nations and Métis organizations; personal contacts with many Aboriginal women; creation of a display (used at a Wellness Day at the Saskatoon Friendship Centre) as well as the creation of a brochure/poster, a presentation for Aboriginal women and an article/AD.

In keeping with the belief that many women are, themselves, active agents in seeking out ways to improve their health, MetSyn was designed so that women could initiate the referral process. In this instance a woman could, perhaps after reading a story in the newspaper, contact MetSyn, obtain details and receive a referral form. She could then take that form to a family physician and ask for the required blood tests. If the test results indicated metabolic syndrome, either she or the physician (**if such was the wish of the woman**) would forward the completed referral form to MetSyn, where eligibility would be confirmed, and followed-up by an invitation to join MetSyn.

As shown in Chart A the media and public education activities of the Building Awareness phase of MetSyn turned out to be more effective in informing women about MetSyn than was the work done with family physicians.

Chart B indicates that many women are, on their own, open to investigating new ways to deal with their health concerns.

Chart A: Responses to question: "Where/how did you first hear about the MetSyn Project?"



60% ■ Newspaper/newsletter/radio/magazine.

7% ■ Poster/pamphlet.

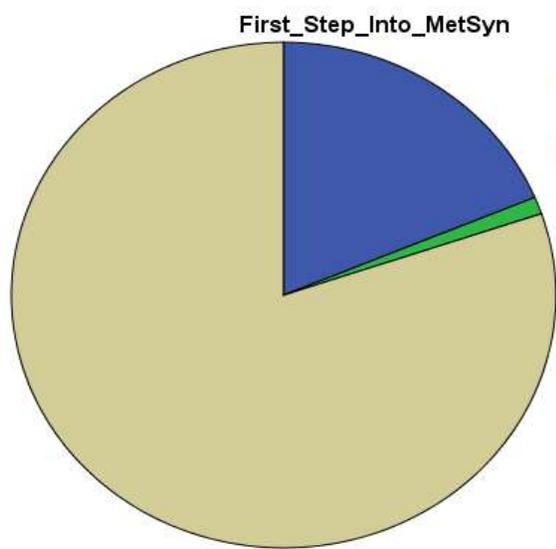
1% ■ At WMLHC presentation or forum.

19% ■ My doctor/nurse/staff from doctor's office told me/called me/sent me information on the project.

12% ■ A friend, family member or other individual told me about it.

1% ■ Other

Chart B: Responses to question: "What was the first step in you being referred to the MetSyn Project?"



19% ■ I had an appt. with my family physician and the doc/nurse/staff member suggested that this might be for me.

1% ■ I was contacted by my doctor's office

80% ■ I heard about the program so I called my doctor or Metsyn

Although most of the women who completed the 12 month program self- initiated their first steps into MetSyn, the information in Tables 3 and 4 points to the merit of the work the MetSyn staff did with the local family physicians. We see in Table 3, that entry into the Pilot Project was ‘easy’, and in Table 6, we see that for the majority of participants, getting their blood work done was also ‘easy.’ Most of the MetSyn participants were busy (thus the attraction of a low demand program); the majority were employed and getting their blood work done and results submitted in a timely fashion was essential.

“My doctor actually called to get me into the program as he was excited about it.”
Participant

“My doctor discouraged me from joining but I insisted; I wanted to be part of it.”
Participant

Table 3: Ease of entering MetSyn

Response	N	%
Easy	82	100
No response	12	
Total	94	100

Table 4: Ease of getting blood work done

Response	N	%
Challenging	5	5.3
Neutral	10	10.6
Easy	70	74.5
No response	9	9.6
Total	94	100

“I think all the work we did with the physicians and their office staff paid off, when the women asked for appointments to get their blood work done.” Wendy Verity, Project Director, taped interview, December, .2011.

- *The blood work the participants had done consisted of the standard blood tests which are routinely undertaken for patients who may have or have metabolic syndrome.*

Entry to MetSyn closed earlier than was expected. The intake of 179 was the absolute limit that the staff could manage. This points to the effectiveness of MetSyn's **Building Awareness** activities and perhaps to the appeal of awareness programs which are attached to an action component.

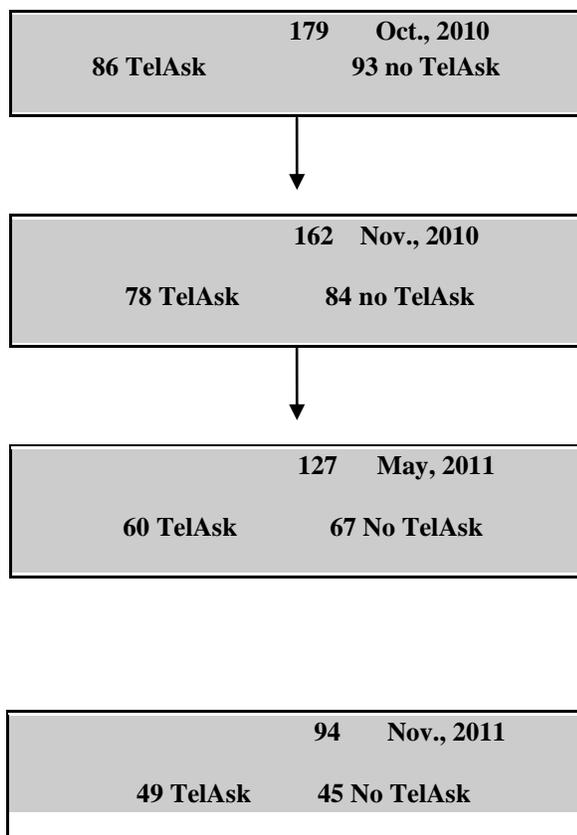
What surprised me, initially, was how many people wanted and demanded to get into this program, how many we had to turn away. You know, it just speaks to the importance of this whole thing. And the first night, when it was a horribly cold, stormy, awful night and 150^{xi} people came out. That was impressive. (Dr. Vicki Holmes, taped Interview, December, 2011)

Phase Two: The 12 month program (October, 2010 to November, 2011)

Program Session #1. Overview of the Program

On October 27, 2011, 153 women gathered in downtown Saskatoon for the first of the six MetSyn educational sessions^{xii}. The focus of this session, which featured many comments/questions from the women, included a clinical presentation on metabolic syndrome, the nature and role of the automated phone calls, and a description of the five sessions to follow over the next twelve months. The nutrition and physical activity consultants, whom the Saskatoon Health Region had assigned to MetSyn were introduced. MetSyn staff (Dr. Holmes and Wendy Verity) led a discussion about confidentiality protocols, consent forms and issues related to data collection (blood work results, measurements, questionnaires). A sociodemographic questionnaire was also completed by the women. On the basis of responses to this questionnaire, the evaluators assigned participants into the TelAsk and noTelAsk groups randomly by age and household income. Participants received this information at Session #2, which included training for those who were assigned to the TelAsk group.

Chart C includes the number of participants by TelAsk /noTelAsk group, who had completed and submitted all their required data (blood test results and measurements) at four intervals: at entry October, 2010; at November, 2010; at May, 2011 (6th month mark); and at the 12 month mark in November, 2011.

Chart C : Participation Flow Chart-12 Month MetSyn Program

“Having weight, hip and waist measurements taken across a year gave me incentive.” Participant

“The goal setting was helpful - having to write it down and give them a time frame. Good nutritional information too.” Participant

How the Automated Calls Worked

A key objective of MetSyn was to find out if computer-assisted phone calls made a difference in the outcomes achieved by participants who completed the Pilot Project. A business, (TelAsk), based in Ottawa, was contracted by MetSyn to design and implement these calls, monitor responses from the participants and send emails to the project director regarding the follow-up required by those participants who received the automated calls. The content of the calls, the algorithm (a computerized sequence of questions), was constructed by the Medical Director and the Project Director with technical assistance from TelAsk staff.

“I like the women only and the telephone calls.” Participant

“The call should have asked if “coming toward meeting goals” rather than just yes or no.” Participant

Appendix D includes a flow-chart of the sequence of automated questions and the various pathways this sequence could take as determined by whether the participant pressed #1 (yes) or #2 (no). Depending on these responses, the automated voice could indicate that the participant would receive a follow-up call from the program director within two business days^{xiii} or she could be invited to call MetSyn for a referral to the nutrition and/or the physical activity consultant. The program design stipulated that the MetSyn staff would not initiate any contact with those who were assigned to the noTelAsk group. However, women in the noTelAsk group were welcome to contact MetSyn with questions for support or to obtain a referral to the nutrition and/or the physical activity consultants.

Program Session #2. Measurements & Setting Personal Nutrition/Physical Activity Goals

Session two of the 12-month program (mid-November), could be seen as the ‘real commitment’ session. 162 women were in attendance. During this session the participants were split into four groups. Weight, height, waist and blood pressure were measured and individualized nutrition and physical activity goals were set.

Program Sessions #s 3,4,5,6. Showing up, Learning, and Sharing

The women met again as a group in January, May, August and November, 2012.

Phase Three: Evaluation of the 12 month Program (December, 2011 – June, 2012)

Before the 12-month program began the WMLHC contracted two researchers, from the University of Saskatchewan and the University of Regina to evaluate MetSyn^{xv}.

The researchers, both experienced in community-based research, worked collaboratively with staff in developing the evaluation approach to MetSyn. As is the case of Pilot Projects which include an evaluation component, there was a creative dynamic between the roles of the researchers and the project staff, given the need to support both the ‘service’ goals and the ‘evaluation’ goals of MetSyn. MetSyn staff and the evaluators were in agreement that it was important for the participants not to feel that the evaluation in any way took precedence over the program, since it was the program and

“The follow up (to the TelAsk call) was great if I was struggling.” Participant

“They got information about exercise and nutrition and goal setting and tools and skills to make those changes.” Jetta Johnson, registered dietitian/nutrition consultant, SHR, taped interview, December, 2011.

“I tried to make it as practical as possible, and also really tried to get the point across that chronic disease is multi-factorial and it’s very time-consuming. So, you know that kind of sets people at ease as well.” Blanche Johnston, physical activity consultant, SHR, taped interview, December, 2011.

“I needed more individual follow-up and more group sessions.” Participant

the opportunity to change their nutrition and physical activity habits which had drawn them (the participants) into MetSyn. The evaluators agreed to limit the amount of information they would aim to collect from the women given that project staff would be collecting clinical measurements as well as administering their own surveys on nutrition and physical activity. Likewise, when 7 weeks into the project it was clear that the original schedule that had been established for the automated calls was not serving the needs of the participants, the researchers supported a change in the TelAsk call schedule.

As part of the evaluation process, a social science literature search on evaluation research of life style change programs for patients with metabolic syndrome was conducted in late 2010 and late 2011. Very few articles were identified by this search. While broadened search parameters did yield numerous articles on interventions in care and/or lifestyle change aimed at patients with diabetes Type 2, overall there appeared to be a paucity of research (peer-reviewed) on practical intervention programs aimed at individuals with metabolic syndrome.^{xvi}

This evaluation focuses on the 94 women who completed the 12-month program.

As Chart C illustrates there was a high attrition rate in this pilot. This rate of attrition is not exceptional in this kind of program.^{xvii} MetSyn had an attrition rate of 47%. 84 out of the original 179 women did not complete the program. This rate takes account of all the women who had qualified, signed up for MetSyn and attended first session of the 12-month program. As it turned out, 17 of the women who attended the first program session in October did not attend the mid-November meeting at which time measurements of weight, height, waist circumference and blood pressure were confirmed and individualized goals for change in nutrition and physical activity habits were set by each woman. After attending the first program session in October, participants were aware that the November session was critical to being in the program. Thus, 162 women could be said to have fully committed to the program. If we consider attrition with this group of women in mind, then the attrition rate could be said to be 41%.

The matter of *who and why* in respect to attrition rates in this type of programming is certainly of interest. In March 2011, in keeping with their collaborative approach, the evaluators met with the medical director and the project director of MetSyn and proposed that it would be worthwhile to look at some of the participants who left the program before completion. Given the limited resources of MetSyn

“The last session I had a couple people come up and say even though they hadn’t made changes, they felt it was beneficial. Because it got them thinking ‘I can get back on track’, I will get back on track.” Jetta Johnson, registered dietation/ nutrition consultant, SHR, taped interview, December, 2011.

“Sometimes I would answer the call and TelAsk was already leaving a message as if the call had not been answered.” Participant

*A lifestyle program for those with metabolic syndrome, which met weekly for 4 months, found significant change in metabolic factor measurements and had a remarkably **low attrition rate**, was run by Tahna Pettman and colleagues. (Pettman, et al,2009)*

and the interest shown by a University of Regina student who was about to begin her final requirement for her Masters degree in Social Work, it was agreed that Jennifer Suchorab would undertake qualitative research on a sample of women who had attended the second (October) program session and had left MetSyn by the 6th month mark.^{xviii} The outcome of Ms. Suchorab's research was a paper, "It's Not My Time: Understanding MetSyn Pilot Project Attrition From A Women-Centered Perspective." (Suchorab, 2012).

Table 5 provides sociodemographic data on the 94 women.

Table 5: Number and Percentage of Participants at completion of MetSyn by age, marital status, employment status, educational attainment, household income, occupation and ancestry.

Variable/Category		Participants	
Age (N=94)		N	%
	49 years or less	15	16
	50-59 years	53	56.4
	60+ years	26	27.7
	Total	94	100
Marital Status (N=93)			
	Married/Common law	72	77.4
	Single	21	22.6
	Total	93	100
Employment Status (N=94)			
	Employed	61	64.9
	Own business	5	5.3
	Not employed	28	29.8
	Total	94	100
Educational Attainment (N=88)			
	Some highschool/highschool	8	9.1
	Some university/college/tech school	16	18.2
	College/Tech diploma	46	52.3
	University and/or post-graduate degree	18	20.5
	Total	88	100
Household Income (N=84)			
	Less than \$50,000	22	26.2
	\$50,000 to less than \$100,000	46	54.8
	\$100,00 or over	16	19
	Total	84	100

"The impact of social and environmental factors... motivational stage, therapeutic relationship, goal alignment, ownership and control, have been found to be related to health behaviour change program attrition."
(Suchorab,pg.16, 2012)

Occupation Type (N=81)			
	Managerial	3	3.7
	Professional	9	11.1
	Technical	6	7.4
	Administration	11	13.6
	Clerical	22	27.2
	Retail	5	6.2
	Production	4	4.9
	Other	2	2.5
	Self-employed	5	6.2
	Home maker	2	2.5
	Retired	12	14.8
	Total	81	100
Ancestry (N=94)			
	Caucasian (white)	89	94.7
	Aboriginal (FN, Métis, Inuit)	2	2.1
	Other (Filipino, Latin American)	2	2.1
	Total	94	100

90 % of the women did not have any children below 15 living with them, when they started MetSyn.

Scope of the evaluation of MetSyn's 12 month program

The evaluation framework of the 12-month program which was developed collaboratively by the researchers and MetSyn staff, focused on the objectives of the original MetSyn proposal developed by the WMLHC Board, their medical director and the Saskatoon Health Region Chronic Disease Management Committee, and from a number of issues raised by the evaluation researchers. For example, data was collected on the 'path' the women took in joining MetSyn (Charts A and B) and on whether the participants (most were employed) had access to any workout facilities while on the job. The evaluation process was also expanded to collect data on a range of socio-economic and socio-psychological factors which theoretical and empirical literature suggests is critical in respect to the prevalence of metabolic syndrome and diabetes. The analysis of these socio-economic and the socio-psychological variables in relation to a number of program outcomes turned out to be limited and/or of no statistical significance.^{xix}

The following four questions guided the evaluation of MetSyn's 12 month program:

- 1) What was the change from the start of the program (baseline) and 12 months later in the average group measurements of the factors that contribute to metabolic syndrome?
- 2) What was the change from the start of the program (baseline) and 12 months later in average group measurements of the factors that contribute to metabolic syndrome, when data on participants in the TelAsk group and those in the noTelAsk group were split out and analyzed separately?
- 3) Did the participants report change in respect to the survey questions regarding their nutrition and their physical activity from baseline to 12 months later?^{xx}
- 4) How many participants no longer fulfilled the criteria for metabolic syndrome at 12 months? Is there evidence that the number of metabolic factors of those women who met the criteria for metabolic syndrome at 12 months, had changed by the 12-month mark?

Process involved in responding to the four research questions.

The approach to investigating the issues raised in Questions #1, 2, and 3 was similar. The process involved applying the paired samples t-test to the women's measurements (blood analysis results, blood pressure and body measures) taken when they entered the program and at the end of the program. The t-test is a method of measuring change when the same people have the same measurements taken at two different times. This test measures the average group change and includes a test of statistical significance.

The process employed to investigate Question # 4 involved comparing the number of metabolic factors the participants had upon entry to MetSyn with the number of factors they had at the end of the 12-month program.

Responses to the four research questions

Question #1 involved the application of the Paired Samples T-test to the baseline metabolic syndrome measurements and the 12-month measurements for the group of 94. The slight differences in the N within the tables which follow (Tables 6 to 10) indicate that baseline data was missing for a few of the participants and therefore the data from these participants could not be used in this comparative analysis.

In Table 6 we see that average group measurements of waist circumference and systolic blood pressure measures were decreased to a degree that is of statistical significance at the 12 month mark. Thus, in response to question #1 we can say that there was a positive change from the start of the program (baseline) and 12 months later, in the measurements of these two factors which contribute to metabolic syndrome. The same cannot be said about the other four measurements since the differences in baseline and 12 month measurements could have occurred by chance.

Table 6: Average Group Change in Metabolic Syndrome Criteria from Baseline to 12 Months. Values are listed as mean (\pm Standard Deviation).

Variable	N	Baseline	12 Months	P-Value
Waist Circumference (cm)	94	111.7 (\pm 14.14)	107.5 (\pm 14.07)	0.000*
Systolic BP (mmHg)	94	135.3 (\pm 16.53)	130.2 (\pm 13.99)	0.002*
Diastolic BP (mmHg)	94	82.3 (\pm 8.96)	83.8 (\pm 8.92)	0.123
Fasting Blood Glucose (mmol/L)	91	5.84 (\pm 0.855)	5.73 (\pm 0.902)	0.075
Triglycerides (mmol/L)	93	1.94 (\pm 0.889)	1.80 (\pm 0.766)	0.082
HDL Cholesterol (mmol/L)	93	1.20 (\pm 0.460)	1.27 (\pm 0.318)	0.153

*P-value significant at the .05 level

Question #2 led to dividing the women into two groups: those who received the automated calls (TelAsk group) and those who did not receive these calls (noTelask group). The Paired Samples T-test was applied to the measurements of the participants in each of these groups. Tables 7 and 8 indicate that the average group change in the number of metabolic syndrome factors which were found to be significant was higher in the noTelAsk group than it was in the TelAsk group. The P-values in Table 7 (the TelAsk group) indicate that there was statistically significant positive average change **in 3 factors**: waist circumference, systolic blood pressure and in fasting blood glucose. The P-values in Table 8 (the noTelask group), indicate that there was statistically significant positive average change **in 4 factors**: waist circumference, systolic blood pressure, triglycerides and HDL Cholesterol.

At 12 months the ‘Vancouver’ metabolic syndrome project, which has been referred to earlier in this report, demonstrated statistically significant average group change in 4 factors: waist circumference, systolic blood pressure, diastolic blood pressure and triglycerides.^{xxi}

Table 7: Average Group Change in Metabolic Syndrome Criteria from Baseline to 12 Months for participants in the TelAsk Group. Values are listed as mean (\pm Standard Deviation).

Variable	N	Baseline	12 months	P-Value
Waist Circumference (cm)	49	113.1 (\pm 13.66)	108.6 (\pm 13.79)	0.000*
Systolic BP(mmHg)	49	137.4. (\pm 19.01)	132.2 (\pm 16.53)	0.042*
DiastolicBP(mmHg)	49	84.0 (\pm 9.20)	84.6 (\pm 9.93)	0.654
Fasting Blood Glucose (mmol/L)	46	6.03 (\pm 0.94)	5.78(\pm 1.03)	0.015*
Triglycerides (mmol/L)	48	2.02 (\pm 1.03)	1.96 (\pm 0.933)	0.588
HDL Cholesterol (mmol/L)	48	1.22 (\pm 0.586)	1.24 (\pm 0.280)	0.768

*P-Value significant at the .05 level

Table 8: Average Group Change in Metabolic Syndrome Criteria from Baseline to 12 Months for participants in the noTelAsk group. Values are listed as mean (\pm Standard Deviation).

Variable	N	Baseline	12 Months	P-Value
Waist Circumference (cm)	45	110. (\pm 14.63)	106 (\pm 10.35)	0.000*
Systolic BP (mmHg)	45	132. (\pm 12.2)	128 (\pm 13)	0.012*
Diastolic BP (mmHg)	45	80.4 (\pm 8.40)	82.8 (\pm 7.66)	0.070
Fasting Blood Glucose (mmol/L)	45	5.65 (\pm 0.720)	5.68 (\pm 0.756)	0.715
Triglycerides (mmol/L)	45	1.84 (\pm 0.709)	1.64 (\pm 0.493)	0.033*
HDL Cholesterol (mmol/L)	45	1.19 (\pm 0.273)	1.30(\pm 0.354)	0.000*

*P-Value significant at the .05 level

These findings suggest that the TelAsk IVR system, **(as it was operationalized** within MetSyn) did not play a significant role in the MetSyn Pilot Project. It is critical, when considering the possible utility of automated calls in regard to lifestyle change, to keep in mind that MetSyn was a Pilot Project with specific objectives. If, for example, the participants had been given a choice of whether they wanted to be in the TelAsk group or in the noTelAsk group, the results in Table 7 and 8 may have been different. MetSyn, however, was a Pilot Project with specific objectives which called for specific conditions and as such it was important to have the participants assigned randomly to the TelAsk/noTelAsk groups.

The investigation of Question #3 involved the application of the paired samples T-test to participant responses, at baseline and at 12 months, to identical survey questions on nutrition and physical activity.^{xxii}

Table 9 presents the T-test findings in respect to the nutrition measures. In looking at Table 9 we see that there was statistically positive average group change in respect to two of the nutrition measures: 'stage of change' and the number of positive nutrition habits.

Table 9: Average Group Change in Nutrition Measures from Baseline to 12 Months for MetSyn participants. Values are listed as mean (\pm Standard Deviation)

Variable	N	Baseline	12 Months	P-Value
Nutrition stage of change (pre-contemplation, contemplation, preparation, action, maintenance)	85	4.04. (\pm .892)	4.56 (\pm .698)	0.000*
Number of positive nutrition habits	87	7.60 (\pm 2.98)	8.94 (\pm 2.34.)	0.000*
Number of reasons to eat healthy	88	6.02 (\pm 1.80)	5.99 (\pm .1.86)	0.857
Nutrition Confidence(rating of 1 to 5 , lowest –highest, of eating healthy in a number of situations)	81	3.42 (\pm 0.864)	3.56 (\pm 0.935)	0.251

*P-Value significant at the .05 level

Most of the nutrition measures did not have a normal distribution. Therefore the Wilcoxon Signed Ranks Test was used to confirm the findings of statistical significance which the paired samples t-test had generated. The findings of statistical significance as presented in the

“It (TelAsk) was good.”
(Participant)

“Change the message. It was more a pest than a help.” (Participant)

“The voice is a tad too cheerful.” (Participant)

92% of participants reported that the TelAsk was “easy” to use. 66% said it was helpful, while 33% felt it was not helpful.

above table were confirmed.

In looking at the baseline and the 12 month statistics which the Wilcoxon Signed Ranks Test generated (see Appendix F) we can say that at the end of the program: 11(13%) of the women reported that they were at an earlier 'stage of change' than when they started, 46(54%) indicated that they had moved to a more advanced stage and 28(33%) ended up being where they were in the beginning. This is an encouraging finding in that, 54%, or just over half of the women, reported that they had moved to a more advanced stage in how they were dealing with nutrition change.

The other finding of statistical significance which is displayed in Table 9 is in the change of the number of positive nutrition habits reported at 12 months. Looking again at the statistics generated by the Wilcoxon Signed Ranks Test, we see that, out of 87 women: 19(22%) reported fewer positive habits; 52(60%) reported more positive habits and 16(18%) reported the same number as when they entered the program. This is also an encouraging finding in that 60% of the women reported that over the year they were in the program, they had adopted more good eating habits.

Table 10 displays average change in the women's physical activity by applying the same type of analysis and statistical tests that were used in the analysis of change in respect to the nutrition variables.

Table 10: Average Group Change in Physical Activity Measures from Baseline to 12 Months. Values are listed as mean (\pm Standard Deviation).

Variable	N	Baseline	6 Months	P-Value
Activity at work	85	2.07 (.704)	2.09(\pm .750)	0.783
Activity Leisure time	83	2.00 (\pm 1.13)	2.76 (\pm 1.27)	0.000*
Physical Activity stage of change (precontemplation, contemplation, preparation, action, maintenance)	83	3.72 (\pm 0.83)	3.99 (\pm 0.99)	0.021*
Physical Activity Confidence	79	3.57 (\pm 0.89)	3.47(\pm 0.99)	0.449

*P-Value significant at the .05 level

“Action plans /labels discussed at more than one meeting.did not feel that I was a failure” Participant

Table 10 indicates that there was statistically significant positive average change in the measurements of leisure time activity and in the 'stage of change.' The Wilcoxon Ranks test was used to confirm these findings.

The statistics of the Wilcoxon Ranks Test (Appendix F) provides detail of the reported change in leisure time physical activity and in 'stage of change.'

These statistics indicate that: 50(60%) participants reported more physical activity during their leisure time while 8(10%) reported less such activity and 25(30%) reported no change in their leisure time physical activity. This is another encouraging finding as we see that slightly over 60 % of the women were more active in their leisure time than they were when they started MetSyn.

In respect to the 'stage of change' measures which were reported by the participants, 33 (40%) of the women report moving to a more advanced stage while 36 (43%) stayed at the same stage, however 14 (17%) reported moving to a less advanced stage than they were at when they entered the program.

Taken as a whole, the positive change reported by the participants in respect to the nutrition and physical activity measures suggest that some women who made progress in reducing their metabolic syndrome measures may very well maintain this progress given the lifestyle changes indicated in Tables 9 and 10.

Question #4 was investigated by **first** identifying the women who completed MetSyn in respect to the number of metabolic syndrome factors (there are 5 factors-see Table 1, page 7) each woman had at 'baseline' and at the 12 month mark (Table 11). **Secondly** a cross- tab analysis (Chart D) was undertaken to get a fuller sense of change in the number of metabolic factors each participant had over the span of the program. It is important ,when considering the information in Table 11 and Chart D to be mindful that 'number of metabolic factors' refers to how many (0 up to 5) of the risk factors each participant had at specific times and does not refer to the change of measures within the metabolic factors that is reported on in Tables 6-10. The results of the cross-tab analysis, however, did not meet the criteria of statistical significance. Thus, it could be said that the changes shown in Chart D may have occurred simply by chance. Nevertheless, given that MetSyn is an exploratory Pilot Project, the authors decided to report this

information. Given that complete data on all measures was not available for the 94 women who finished MetSyn, the N used in Table 11 and Chart D was 88.

Table 11. *Participants by Metabolic Factors at Baseline and at 12 months.

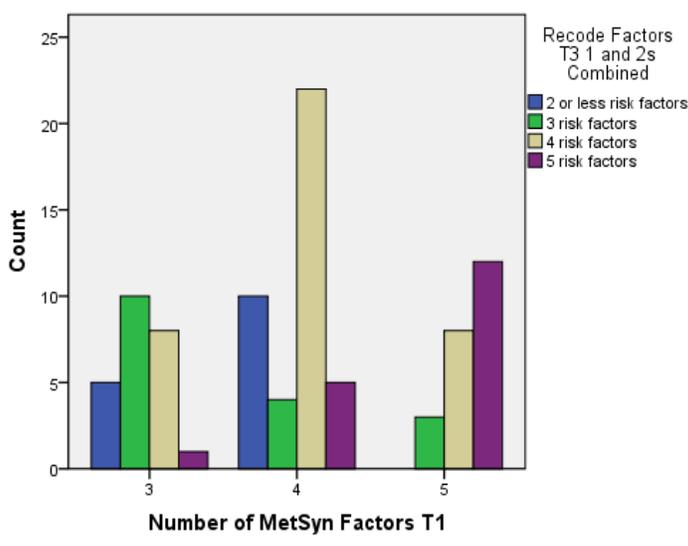
# of Factors	# of participants at baseline	# of participants at 12 months
2 or less		15
3	24	17
4	41	38
5	23	18
Total	88	88

*** Those that completed the 12 month program.**

“Did start to move more than I used to.” Participant

“All very good I liked all the speakers. I’m kind of sad it is coming to an end.” Participant

Chart D: Bar Chart of # of Metabolic Factors (risk factors) that Participants had at baseline (x axis) and at 12 months (vertical count). N=88.



In looking at Table 11 and chart D we see that, at the 12 month mark, 15 women (17%) no longer fulfilled the criteria for metabolic syndrome (2 or less factors). We also see that out of the 73 women

who still had metabolic syndrome at 12 months, there was a change in the number of factors some of these women had at the 12 month mark: 15 women had fewer factors than when they began, 14 had more factors, and 44 had the same amount of factors as when they entered MetSyn. Overall, 30 (15+ 15), participants had fewer factors at 12 months than at baseline.

The 'Vancouver' metabolic syndrome project^{xxiii}, which is noted earlier in this report, reported in 2010, that 38 % (N=640) of participants in their program no longer fulfilled the criteria for metabolic syndrome at 12 months. This 18 month program, which ran at St. Paul's Hospital, Vancouver, involved an eleven-person, multidisciplinary medical team, and an intensive lifestyle intervention.

In the 'Vancouver' program, for the first three months, patients came in 2.5 hours every two weeks for nutrition education, support, and exercise training on site. From 4-12 months they came in once a month, while from 13 -18 months they were monitored and could repeat some sessions.

Part Four: MetSyn Outcomes –A Summary

Although the exploratory nature of the MetSyn Pilot Project, including decisions made by the those in charge of designing MetSyn have been described earlier in this report , it is useful to bring to mind once again some key limitations of the 'outcomes' of MetSyn. In brief, any attempt to generalize from the outcomes as listed below, is seriously limited. Exploratory pilot projects are intended to generate findings which often result in further investigation. Meanwhile , those who are involved in helping women prevent diabetes ,will find it useful to keep in mind several aspects of MetSyn: that the participants , themselves, took the initial step to join MetSyn (they were not selected through a sampling strategy for example); that the public call to join MetSyn came from a well –known women's health centre in Saskatoon ; that the automated calls were implemented in a specific fashion, as described in Part Three of this report and that the statistical analysis described in the above pages was undertaken only on information from the 94 women who completed MetSyn.

The following listing of the outcomes of MetSyn mark the success of this Pilot Project in fulfilling its three objectives as described on page two of this report.

Statistically significant outcomes of the 12 month program:

On change in average group measures of metabolic syndrome factors:

For the whole group of participants there were 2 positive outcomes: average group measures of waist and systolic blood pressure decreased (Table 6).

For the TelAsk group (N=49); there were 3 positive outcomes: average group measures of waist, systolic blood pressure and fasting blood glucose decreased (Table 7).

For the noTelAsk group (N=45); there were 4 positive outcomes: average group measures of waist, systolic blood pressure and triglycerides decreased while HDL cholesterol (good cholesterol) increased (Table 8).

On change in average group measures of participant response to survey measures, which indicated change in nutrition and physical activity:

In respect to nutrition, there were two positive outcomes: average group measures of 'stage of change' indicated advancement and the number of positive nutrition habits increased (Table 9).

In respect to physical activity, there were two positive outcomes: average group measures of 'stage of change' indicated advancement and the amount of physical activity during leisure time increased (Table 10).

The outcomes noted above speak for themselves. The automated calls, as operationalized within MetSyn, appear not to have played a significant role in MetSyn. The changes made in the measurements of metabolic factors are important and suggest that there can be positive change in these measures within a short period of time. However, since positive change in lifestyle practices regarding eating and physical activity is critical in reducing metabolic syndrome measures over the long term, the improvements which were made in respect to nutrition habits and physical activity are encouraging.

Other outcomes of the 12 month program:

15 women who entered the program with metabolic syndrome did not fulfill the criteria for this diagnosis at the end of the program. (Table 11, Chart D)

Of the 73 women who continued to have metabolic syndrome at the end of the program, 15 had fewer factors; 14 had more factors and for 44 women the number of factors remained as they were at the start of the program. (Table 11, chart D). In all, 30 women out of 88 (34%), had fewer metabolic factors at 12 months than they had when they entered MetSyn. This appears to be ‘good news’ and it ought to be shared with women in Saskatoon.

The above outcomes, noted in respect to the number of metabolic factors, deserve additional consideration, since there appears to be both a lack of research and agreement amongst clinicians as to which of these factors are most critical for one’s health. However, it may be that, as it has been argued, that a diagnosis of metabolic syndrome can in itself be a motivator for lifestyle change. It may very well be that inspiring patients to reduce their number of factors may work as a well-defined goal for those who take on the difficult task of trying to improve their eating habits and the amount of physical activity they do on a regular basis.

Adding the voices of 43 participants

This report is based on the 94 women who finished MetSyn. At the end of the program, 43 women out of those who attended the final program session responded to a questionnaire which covered a number of topics including questions regarding ‘improvements’ and ‘strengths’ of MetSyn. Although there is no evidence that these 43 women were representative of the participants who finished MetSyn and thus caution should be taken in considering the information in Table 12 and Table 13, it is important to ‘give voice’ to those participants who did make comments.

Table 12 summarizes the comments of the 36 women who noted changes which would improve the 12 month program.

Table 12: ‘Improvement’ comments (clustered by typical quotations) of 36 women who completed MetSyn.

Quote	# of Participants
“Meet more often”	11

*The project director’s (PD) log shows: **for those in the TelAsk group:** 106 calls were made to participants because TelAsk triggered the need for such and 23 calls were made to participants because of automated calls being missed. There were three other contacts to the PD: the log shows 1 email and 2 calls **from those in the no TelAsk group.***

“More ‘one on one’”	8
“Set up extra structured exercise times”	7
“Make us more accountable”	4
“Smaller group and more discussion”	4
“Discounts at gyms”	2
Total	36

In looking at Table 12, we see that almost two thirds of these ‘improvements’ speak to a desire/need for more meetings, more personal contact with program staff (one on one) and more interaction with each other than that which was provided by the ‘low demand’ feature of MetSyn.

Table 13: ‘Strengths’ comments (clustered by typical/multiple quotations) of 15 women who completed MetSyn.

Quote	# of Participants
“Having blood lists and weight, other measurements, goal setting & monitoring”	5
“Qualified experts/reinforcement at every session. Variety of topics”	4
“Realize I am not alone, see acquaintances at meetings”	3
“Other (somewhat specific/technical)”	3
Total	15

Table 13 suggests that the blood work analysis, the measurements taken, the 'tools' (change goals/monitoring/label literacy) and the calibre of information presented were seen as helpful to the women.

Taken together, the responses of these 43 participants as represented in Tables 12 and 13, suggest that MetSyn may have been more effective if, for example, a short support group with some 'one-on-one' had been added to the 12 month program.

Assessing Outcomes of the Building Awareness Phase

- Identified the need and interest for metabolic syndrome reduction programs: high entrance numbers /some turned away.
- Identified the usefulness of awareness activities and reaching out directly to the community via meetings, media, ads, poster and pamphlets in respect to this type of program (Chart A).
- Identified the high degree of agency and initiative this group of women demonstrated in respect to checking out / joining a new secondary prevention program (Chart B).
- Identified the willingness of many Saskatoon family physicians to accommodate the referral and testing requirements of women who joined MetSyn (Tables 3, 4).
- Identified, that although the WMLHC Board, the Medical Director and the Project Director were clear in wanting Aboriginal women to be part of MetSyn and thus took steps to facilitate such, there is a need for Aboriginal women to have the option of joining innovative programs such as MetSyn, which they design and which are informed by the history, culture and everyday realities of the lives of Aboriginal women. Seven Aboriginal women joined MetSyn.

“In my opinion, some aspects of MetSyn would work for some Aboriginal people but the whole program would need to be developed within Aboriginal tradition and Aboriginal philosophy of what a good life is. And you do need a separate program for women as otherwise the women would be so self-conscious.” Sharon Clark, Aboriginal Engagement Facilitator, taped interview, December, 2011.

Part Five: Going Forward- Building on the Energy and Spirit of MetSyn

This report concludes with one recommendation and some ‘thinking points.’

Report Recommendation: That the Women’s Mid-Life Health Centre invite all 179 women who registered for MetSyn to a presentation of this report.

Thinking Points

Think Practical: MetSyn has shown that there is public interest in metabolic syndrome as an agent for individual change in lifestyle. New programs based on this concept need not be as complex as MetSyn, which required external evaluation.

Think Money: Community-based groups can be effective in raising financial support from the private sector to try out new ways for reducing the prevalence of metabolic syndrome. All funding for MetSyn was from private sources.

Think Passion: Most change in democratic societies comes from harnessing ideas and notions which individuals and small groups come to form commitments around. Individuals, businesses, workplaces, and local CBO/NGOs in Saskatoon who have a passion for reducing the prevalence of metabolic syndrome in this community need to get on with innovation in this area and not wait for leadership from large bureaucracies such as the Saskatoon Health Region or the Ministry of Health.

Think Harnessing: For many people, a medical diagnosis leads to their initial commitment to lifestyle change. This ‘light bulb for change’ could be harnessed more effectively in respect to metabolic syndrome. The strongest ‘health relationship’ many individuals have is with their family doctor. This relationship is called upon by some physicians every day as they assist patients to change their habits. But facilitation of such change is ‘hit and miss.’ This needs to change.

Think Harnessing Again: The women who entered MetSyn were healthy in many ways: 70% were working, all were active. This suggests that it may be useful to use traditional media and social media to position a diagnosis of metabolic syndrome as a positive early warning.

Think Small: MetSyn's attrition rate as well as the remarks of some MetSyn participants, (Table 12), which suggest that MetSyn was too 'low demand' for some participants is in keeping with the 'no size fits all' attitude that is basic to successful behaviour change programs. Choice, choice and choice could be the mantra of those designing programs to reduce metabolic syndrome. What is needed in Saskatoon is a flowering of a variety of small, diverse and niche lifestyle change programs in all areas of Saskatoon, which are inexpensive to join.

Think Small Again: As is the case of most problems faced by society, there is not a 'silver bullet' approach to decreasing the prevalence of diabetes. It is a complex illness. Meanwhile we need to be mindful of the pay-off of minor reductions in the number who have diabetes. **A 2% reduction in prevalence rates would have a 9% reduction in healthcare costs for treating diabetes.**^{xxv}

Think Taking Personal Action: While keeping in mind the economic barriers many in Saskatoon do face in trying to eat better it is clear that some individuals could be doing more on a personal basis to avoid diabetes Type 2. If we assume that many of the 45%^{xxvi} of women (18 and over) in the Saskatoon Health Region who are overweight or obese, **are** able to buy healthy food and join exercise programs, why are we not taking up the challenge to save ourselves from diabetes? More of us must do exactly that. This, as the authors of this report know well, is not easy. Currently, powerful social factors, such as time-stressed lives and the persistent promotion of unhealthy food work against women who can afford work-out costs and healthy food. However, Saskatchewan women do have a history of successfully resisting overwhelming societal realities including, for example, finally getting the vote, obtaining more equality at work and only recently achieving longer maternity leave. As women, and especially as mothers, those of us who are not dealing with constant stress and worry because of low incomes, simply must get on with being healthier in this unhealthy society.

Think Primary Prevention & Secondary Prevention: The province of Saskatchewan needs a highly visible, well funded, comprehensive strategy for the **primary prevention** of diabetes. It has been well established by social scientists that socioeconomic status is one of the most reliable predictors of health disparities. Clearly low socioeconomic status is a factor in the prevalence of diabetes in Saskatchewan. Furthermore, critical theory researchers are now taking

29.5% of women, 18 years & over who live within the Saskatoon Health Region are overweight. (BMI: 25-29.99). But another 15.9% of women of this age group are obese (BMI: 30 plus). In all 45.4% of women over 18 in the Saskatoon Health Region are considered to be at risk for serious illnesses in which weight is seen as a factor. Can. Community Health Survey, 2009/10.

Median Total Income of Saskatoon families (couple families with or without children and lone parent families) for 2010, in Saskatoon) was 80,570. Statistics Canada, CANSIM table 111, 0009.*

**Means that 50% of families in Saskatoon have incomes over 80,570 and 50% have incomes less than 80,570*

In 2009, direct hospitalization costs for each diabetic patient was \$4,200.00

- *The estimated annual expense for medication and supplies for an individual costs from \$1,000.00 to \$15,000.00*
- *As reported in 2010, the total cost (excluding that paid by the patient) was \$419,000,000.00 (Saskatoon Health Region, 2011)*

a life course approach in explaining how lower socioeconomic status yields cumulative disadvantaged health outcomes over an entire lifetime to many in Canada (see, for example, Seabrook & Avison pg.50-68,2012).^{xxvii}

MetSyn is an example of a secondary prevention program for individuals who are at high risk for diabetes and as such makes no claim of reducing the primary causes of diabetes.

However, programs like MetSyn can play a role in the primary prevention of diabetes. If our medical care system, our workplaces and we as individual citizens were more committed to adopting secondary prevention strategies aimed at metabolic syndrome, there could be significant savings in the proportion of the province's budget that goes towards funding health care. Such savings ought to be directed to reducing economic inequities, which is essential in mitigating the primary causes of Type 2 diabetes

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Without committed individuals who are prepared to 'try something new', exploratory endeavours of almost all kinds are almost impossible. It is not easy to face the metabolic syndrome dragon. It does take courage to step forward and say, "I want to make some changes in my eating and exercise habits". We are grateful to all the women who participated in MetSyn.

Appendix A

Women's Mid-Life Health Centre of Saskatchewan (WMLHC)

The Women's Mid-Life Health Centre of Saskatchewan, founded in early 2003, is a multi-disciplinary clinic providing a unique and comprehensive service to women in the climacteric and post-menopausal phase of life. The Centre is a non-profit organization and has a registered charitable status. It is governed by a 13 member volunteer board of directors and employs three staff – an Executive Director at 0.75 FTE; a Medical Director on at 0.25 FTE; a nurse 0.8 FTE (the Saskatoon Health Region funds half of the salary of this position) and a part time Office Assistant. The Centre provides a half-day per week referral clinic, which is situated in St. Paul's Hospital Ambulatory Care and offers a range of educational and support services to women aged 40 to 64. This Centre enables women to make informed decisions about their health by promoting healthy lifestyle choices to prevent disease; by identifying women at higher risk of disease through appropriate screening; and by providing diagnosis and optimal treatment. This clinic enhances the continuing care provided by the family physician and specialists.

In September, 2011 the WMLHC was incorporated (upon a request from the WMLHC board) into the Women's Health Centre, Saskatoon City Hospital (SCH). The nurse position (.80 FTE) and the part time office assistant is now funded by SCH. SCH is part of the Saskatoon Health Region.

Appendix B

Select list of TelAsk involvement in projects/studies.

The following is the list of projects which TelAsk was involved in that was forwarded to the Medical Director of the WMLHC as background for the development of the MetSyn project:

Study: An Interactive Voice Recognition System to Continue a Hospital-Based Smoking Cessation Intervention After Discharge. Massachusetts General Hospital.

Study: Medication Safety Net, IVR Program: Acute Coronary Syndrome (follow-up on compliance with medications). University of Ottawa Heart Institute(UOHI)

Study: Community Implementation of the Air Quality Health Index in a High Risk Population. St. Joseph's Health Centre, University of Western Ontario.

Study: IVRCOG, Protocol to Evaluate Cognitive Status in an Older Population. School of Psychology Behavioural Neuroscience, University of Ottawa.

Appendix C

Letter to Saskatoon Family Physicians

"You may have heard of the Metabolic Syndrome Pilot Project being coordinated by the Women's *Mid-Life* Health Centre of Saskatchewan. We are currently recruiting women with Metabolic Syndrome (criteria listed below) from family physicians in Saskatoon and area, and are asking for your help in the referral process.

This project is a great option for your female patients who are very close to developing Type II Diabetes, or for those who have multiple risk factors and are continuously struggling with losing weight or making positive lifestyle changes. Briefly, we are piloting a computer technology that involves telephone follow-up to one-half of the study participants as they participate in the one-year nutrition and physical activity intervention. Our aim is to encourage those who are struggling to meet their goals by regularly 'checking-in' with them and providing educational support from certified exercise therapists or nutritionists when needed.

Diagnosis and referral of your patient is simple:

Fill out Metabolic Syndrome checklist below.

- 1) Fax this letter with checklist completed as well as a copy of the patient's most recent lab work (must be within last 3 months) to the Women's Mid-Life Health Centre at **978-7801**.
- 2) Provide your patient with standing blood requisitions (fasting blood glucose, cholesterol and triglycerides) for 6 and 12 month follow-up, with results copied to Dr. Vicki Holmes at the Women's Mid-Life Health Centre (978-7801).

We thank you very much for your time in referring your patients for this project. If you have any questions regarding this program, please phone 716-5248 or email metsynproject@gmail.com.

PATIENT NAME: ----- PATIENT PHONE #: ----- Value: -----
 Reference Criteria Is value outside healthy range?

Waist Circumference: _____ ≥ 80 cm Yes No

Blood Pressure: _____ $\geq 130/85$ mmHg or meds Yes No

Blood Glucose _____ ≥ 5.5 mmol/L or meds Yes No

Triglycerides: _____ ≥ 1.7 mmol/L or meds Yes No

HDL-C: _____ < 1.3 mmol/L or meds Yes No

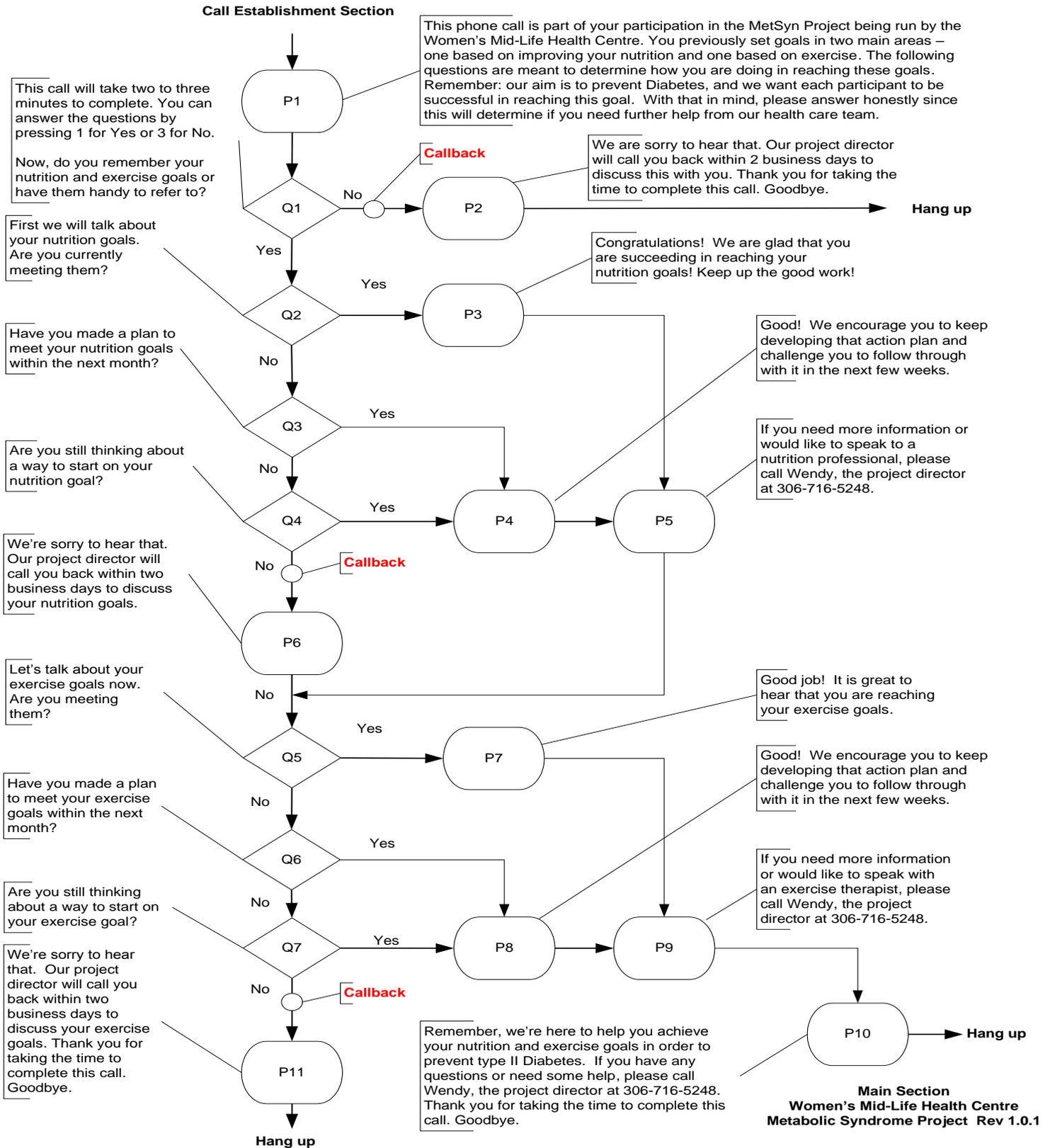
Three or more 'yes' answers denotes Metabolic Syndrome. .

Patient is medically cleared to perform moderate intensity exercise. Physician Signature:

Patient consents to release of health information: Patient Signature:

Appendix D

TelAsk Flow Chart of Questions included in the Automated Calls



Appendix E

The Metabolic Syndrome Pilot Project Evaluation Literature Scan ^{xxviii}

Although MetSyn was a unique, exploratory Pilot Project and no published studies which were closely matched to MetSyn were located in a 2009 and 2011 search, a number of broadly related studies were examined. These publications are listed below.

“Telephone-Based Support for Weight Loss Surgery: A Practice-Based Program Evaluation”

G. A. Benson, N.P. Pronk, J.J. VanWormer, A.S. Katz, T.J. Marr.
2011

This article outlines a telephone-based support program for participants both before and after weight-loss surgery, measures outcomes of the program, and compares differences in outcomes between participants.

The telephone support program was successful in promoting weight loss among participants, as well as improving various lifestyle behaviours. These positive outcomes were especially significant for those participants with glucose impairment.

“Duration of Lactation and Incidence of the Metabolic Syndrome in Women of Reproductive Age According to Gestational Diabetes Mellitus Status: A 20-Year Prospective Study in CARDIA (Coronary Artery Risk Development in Young Adults)”

E.P. Gunderson, D.R. Jacobs Jr., V. Chiang, C.E. Lewis, J. Feng, C.P. Quesenberry, and S. Sidney.
2010

Women who experience gestational diabetes mellitus (and those who do not) experience favourable effects on cardiometabolic risk factors when they are lactating. The objective of this study was to assess any lasting effects on incidence of metabolic syndrome as they relate to lactation duration.

The results showed that increased lactation duration did have lasting positive effects on risk of metabolic syndrome in all women, and the effects were strongest in those who had experienced gestational diabetes mellitus. Those women who had gestational diabetes mellitus and also

had the longest lactation durations were approaching the same incidence of metabolic syndrome as those women who did not have gestational diabetes mellitus in the study.

“14-Year Diabetes Incidence: The Role of Socioeconomic Status ”

Statistics Canada
2010

Findings from the National Population Health Survey dating back to 1994/1995 were used in this study to examine the relationship between socio-economic status and incidence of Type 2 diabetes over 14 years. Socio-economic indicators were household income, individual educational attainment, demographic factors (i.e. age) and relevant behavioural indicators (i.e. heavy drinking).

The study found that for women, lower income and educational attainment were associated with higher incidence of Type 2 diabetes, and the effects of lower socioeconomic statuses were independent of other indicators such as excess weight. The relationship between Type 2 diabetes onset and low-income/educational attainment for men disappeared when weight and behavioural indicators were taken into account.

“ Joint Scientific Statement: Harmonizing the Metabolic Syndrome”

K.G.M.M. Alberti, R.H. Eckel, S.M. Grundy, P.Z. Zimmet, J.I. Cleeman, K.A. Donato, J.C. Fruchart, W.P.T. James, C.M. Loria, S.C. Smith Jr.
2009

Metabolic Syndrome is a cluster of risk factors that tend to occur together and are related to onset of cardiovascular disease and Type 2 diabetes. Various organizations have proposed different criteria for diagnosing the metabolic syndrome, and differences usually concern measures of obesity since waist circumferences vary considerably depending on the population. Several of these organizations attempted to unify diagnostic criteria for metabolic syndrome, and the results are presented in this article.

Set points for components such as dysglycemia, raised blood pressure, elevated triglyceride levels, and low high-density lipoprotein cholesterol to be considered abnormal were agreed upon. However, waist circumference

varies in different populations and so there is no international standard for that component, although it is still included in screening for metabolic syndrome according to national and regional measures. Three abnormal findings out of the five indicators result in a diagnosis of metabolic syndrome.

“Rotating Shift Work and the Metabolic Syndrome: A Prospective Study”

D. De Baquer, M. Van Risseghem, E. Clays, F. Kittel, G. De Backer, L. Braeckman
2009

Several studies find a link between increased cardiovascular risk factors and shift work, but they do not explore the link between rotating shift work and incidence of the metabolic syndrome specifically. This study aims to assess that link.

The study found that rotating shift work did increase risk for the metabolic syndrome over six years. Furthermore, rotating shift work was found to be associated with onset of each of the individual components of the metabolic syndrome as well as with the syndrome as a whole.

“Dietary Patterns Associated With Metabolic Syndrome, Sociodemographic and Lifestyle Factors in Young Adults: The Bogalusa Heart Study”

P. R. Deshmukh-Taskar, C.E. O’Neil, T.A. Nicklas, S.J. Yang, Y. Liu, J. Gustat, G.S. Berenson
2009

Dietary patterns affect risk for metabolic syndrome, and in turn, dietary habits are affected by socioeconomic, socio-demographic, and lifestyle factors. The objective of this study is to examine those associations.

The study compared two major dietary patterns, the western dietary pattern and the prudent dietary pattern. Metabolic syndrome was found to be inversely related to the prudent dietary pattern. Higher socio-economic status was associated with prudent dietary patterns. Non-smokers and females were also found to be associated with prudent dietary patterns. The study concludes that tailoring programs to prevent the onset of metabolic syndrome to specific socio-economic, demographic and lifestyle factors may be beneficial.

“Lifestyle-Based Diabetes Prevention Seen to Endure for at Least a Decade”

S. Stiles, C.P. Vega

2009

Many studies find that lifestyle and behavioural intervention are effective protections against the onset of Type 2 diabetes. This study aims to assess for how long that protection lasts.

The study found that lifestyle and behavioural intervention were effective protection against Type 2 diabetes over ten years, possibly more effective than pharmaceutical intervention in the form of a drug called metformin alone. However, although lifestyle intervention is an important component of prevention of Type 2 diabetes, it is not a complete approach.

“ Health Benefits of a 4-Month Program for Individuals With Metabolic Syndrome”

T.L. Pettman, J.D. Buckley, G.M.H. Misan, A.M. Coates & P.R.C. Howe

2009

Programs aimed at obesity management that are highly individualized, intensive and strict are limited in their success due to difficulty with uptake and lack of access to resources. This study aims to measure the success of less rigid lifestyle intervention programs for participants with metabolic syndrome by comparing outcomes of the two approaches.

The study found that minimally prescriptive lifestyle intervention programs that were group-based and less resource intensive were an effective and also achievable alternative approach to obesity and metabolic syndrome management. Also, the group-based, less prescriptive approach was associated with high rates of retention, suggesting that it may be more sustainable over longer periods of time.

“Metabolic Syndrome Determinants in an Urban Population From Brazil: Social Class and Gender-Specific Interaction”

G.H. Marquezine, C.M. Oliveira, A.C. Pereira, J.E. Krieger, J.G. Mill

2007

This study aims to examine correlations between cardiovascular risk factors, demographic variables, and the incidence of metabolic syndrome in an urban population in Brazil.

The study finds that gender, age, and socio-economic status are related to higher prevalence of metabolic syndrome.

Those in lower socio-economic classes were associated with higher incidences of metabolic syndrome. Age was also positively correlated with metabolic syndrome for women, but the same effect was not found for men. Overall incidence was not different by gender, but individual components of metabolic syndrome did vary by gender.

“Sociodemographic Correlates of the Increasing Trend in Prevalence of a Gestational Diabetes Mellitus in a Large Population of Women Between 1995 and 2005”

V. Anna, H.P. Van der Ploeg, N. Wah Cheung, R.R. Huxley, A.E. Bauman 2008

Because gestational diabetes is a major risk factor for onset of Type 2 diabetes, this study aims to assess socio-demographic associations and gestational diabetes to better predict which mothers are at a greater risk for developing gestational diabetes.

The study finds that maternal age, socio-economic status, and ethnicity are related to gestational diabetes, and so preventative measures should be tailored to be culturally specific for high-risk groups.

“Does Literacy Mediate the Relationship Between Education and Health Outcomes? A Study of a Low-Income Population With Diabetes”

D. Schillinger, L.R. Barton, A.J. Karter, F. Wang, N. Adler

2006

There is a well-established, positively correlated relationship between health and education that is persistent across health conditions. However, the way differences in education may affect health outcomes has not been examined. This study sets out to assess the relationship between literacy and health outcomes in terms of glycemic control among diabetes patients. Literacy is important because it is strongly related to ‘health literacy’ or the ability for individuals to optimally function in health care environments.

The study found that higher educational attainment was related to better glycemic control, and also that literacy did mediate the relationship between health outcomes (glycemic control) and education in low-income populations. Reducing disparities in literacy may be an important part of improving health outcomes in low-income populations.

“Dietary Patterns in Middle-Aged Irish Men and Women Defined by Cluster Analysis”

R. Villegas, A. Salime, M.M. Collins, A. Flynn, I.J. Perry

2004

This study aims to assess relationships between dietary patterns and socio-demographic variables, behavioural variables, and risk factors for cardiovascular disease to contribute to understandings of the link between diet and disease.

The study found two dietary patterns: prudent and traditional. The prudent dietary pattern was associated with other health-seeking behaviours. More women, and particularly women from higher socio-economic statuses, were found to follow a prudent dietary pattern accompanied by other healthy behaviours (i.e. non-smoking). Less healthy lifestyles were predominantly males who lived alone. The findings show that diet is a multi-dimensional concept, and so disease management and prevention programs should take that into account for greater success.

“The Metabolic Syndrome in the West Bank Population : An Urban-Rural Comparison”

H.F. Abdul-Rahim, B. Espen, R. Giacaman, N.H. Gordon, J. Jervell

2001

This study sets out to compare prevalence of the individual components of metabolic syndrome in urban and rural populations in Palestine rather than focusing only on prevalence of the syndrome overall.

The study finds that prevalence of elevated triglycerides, low HDL cholesterol, and obesity was higher for urban populations when compared with rural populations although there was no overall difference in prevalence of diabetes for these two groups.

“ The Effect of Automated Calls With Telephone Nurse Follow-up on Patient-Centered Outcomes of Diabetes Care: A Randomized, Controlled Trial”

J.D. Piette, M. Weinberger, S. J. McPhee

2000

Telephone-based support is a potential tool for programs that promote prevention and management of illness. This study assesses the efficacy of telephone-based support programs by evaluating health and other related outcomes for low-income patients with diabetes who participated in a telephone-based program.

The telephone program was found to have positive effects on health outcomes, patient self-care, and satisfaction with care. However, there were no measurable effects on patients' anxiety or health-related quality of life.

“Differences in Mortality and Morbidity in African Caribbean and European People With Non-insulin Dependent Diabetes Mellitus: Results of 20 Year Follow Up of a London Cohort of a Multinational Study” N.

Chaturvedi, J. Jarrett, N. Morrish, H. Keen, J.H. Fuller

1996

The objective of this study was to assess differences in prevalence and mortality of Type 2 diabetes between African Caribbean and European populations.

The study found that although people of African descent have higher rates of diabetes when compared with people of European descent, people of African descent have lower rates of heart disease and that persists even in cases of people with diabetes. As a result, information about risk factors derived from specific populations may not be universally applicable.

Appendix F

Wilcoxon Ranks Test – nutrition measures and physical activity measures

Nutrition Measures:

Descriptive Statistics					
	N	Mean	Std. Deviation	Minimum	Maximum
Nutr Stage of ChangeT1	88	4.07	.894	1	5
Nutr Habits Total NumberT1	88	7.65	3.006	0	12
# reasons to follow healthy eating habitsT1	89	6.04	1.802	2	8
Recoded Nutr Confidence T1	84	3.45	.870	1	5
Nutr Stage of Change T3	90	4.57	.688	1	5
Nutr Habits Total T3	92	8.82	2.431	2	12
# reasons to follow healthy eating habitsT3	92	5.96	1.839	2	8
Recode Nutrition Conf T3	87	3.57	.910	1	5

Ranks				
		N	Mean Rank	Sum of Ranks
Nutr Stage of Change	Negative Ranks	11 ^a	29.14	320.50

T3 - Nutr Stage of ChangeT1	Positive Ranks	46^b	28.97	1332.50
	Ties	28^c		
	Total	85		
Nutr Habits Total T3 - Nutr Habits Total NumberT1	Negative Ranks	19^d	29.50	560.50
	Positive Ranks	52^e	38.38	1995.50
	Ties	16^f		
	Total	87		
# reasons to follow healthy eating habitsT3 - # reasons to follow healthy eating habitsT1	Negative Ranks	29^g	27.07	785.00
	Positive Ranks	25^h	28.00	700.00
	Ties	34ⁱ		
	Total	88		
Recode Nutrition Conf T3 - Recoded Nutr Confidence T1	Negative Ranks	23^j	26.59	611.50
	Positive Ranks	31^k	28.18	873.50
	Ties	27^l		
	Total	81		

- a. Nutr Stage of Change T3 < Nutr Stage of ChangeT1
- b. Nutr Stage of Change T3 > Nutr Stage of ChangeT1
- c. Nutr Stage of Change T3 = Nutr Stage of ChangeT1
- d. Nutr Habits Total T3 < Nutr Habits Total NumberT1
- e. Nutr Habits Total T3 > Nutr Habits Total NumberT1
- f. Nutr Habits Total T3 = Nutr Habits Total NumberT1
- g. # reasons to follow healthy eating habitsT3 < # reasons to follow healthy eating habitsT1
- h. # reasons to follow healthy eating habitsT3 > # reasons to follow healthy eating habitsT1
- i. # reasons to follow healthy eating habitsT3 = # reasons to follow healthy eating habitsT1
- j. Recode Nutrition Conf T3 < Recoded Nutr Confidence T1
- k. Recode Nutrition Conf T3 > Recoded Nutr Confidence T1
- l. Recode Nutrition Conf T3 = Recoded Nutr Confidence T1

Test Statistics^c				
	Nutr Stage of Change T3 - Nutr Stage of ChangeT1	Nutr Habits Total T3 - Nutr Habits Total NumberT1	# reasons to follow healthy eating habitsT3 - # reasons to follow healthy eating habitsT1	Recode Nutrition Conf T3 - Recoded Nutr Confidence T1
Z	-4.240 ^a	-4.143 ^a	-.373 ^b	-1.217 ^a
Asymp. Sig. (2-tailed)	.000	.000	.709	.224
a. Based on negative ranks. b. Based on positive ranks. c. Wilcoxon Signed Ranks Test				

Physical Activity Wilcoxon Ranks Measures

Descriptive Statistics					
	N	Mean	Std. Deviation	Minimum	Maximum
Activity at Work T1	86	2.06	.709	1	4
Recoded PA Leisure T1	85	1.4471	.68149	1.00	3.00
Physical Activity Stage of Change T1	86	3.74	.843	2	5
Coded PA Conf T1	82	3.60	.901	1	5
Activity at work T3	90	2.09	.759	1	4
Recode PA Leisure T3	89	1.8090	.76688	1.00	3.00
Physical Activity Stage of Change T3	87	4.01	.982	2	5
Recode PA Confidence T3	86	3.50	1.003	1	5

Ranks				
		N	Mean Rank	Sum of Ranks
Activity at work T3 - Activity at Work T1	Negative Ranks	11 ^a	18.95	208.50
	Positive Ranks	19 ^b	13.50	256.50
	Ties	55 ^c		
	Total	85		
Recode PA Leisure T3 - Recoded PA Leisure T1	Negative Ranks	5 ^d	24.80	124.00
	Positive Ranks	34 ^e	19.29	656.00
	Ties	44 ^f		
	Total	83		
Physical Activity Stage of Change T3 - Physical Activity Stage of Change T1	Negative Ranks	14 ^g	26.57	372.00
	Positive Ranks	33 ^h	22.91	756.00
	Ties	36 ⁱ		
	Total	83		
Recode PA Confidence T3 - Coded PA Conf T1	Negative Ranks	25 ^j	25.44	636.00
	Positive Ranks	22 ^k	22.36	492.00
	Ties	32 ^l		
	Total	79		

a. Activity at work T3 < Activity at Work T1
b. Activity at work T3 > Activity at Work T1
c. Activity at work T3 = Activity at Work T1
d. Recode PA Leisure T3 < Recoded PA Leisure T1
e. Recode PA Leisure T3 > Recoded PA Leisure T1
f. Recode PA Leisure T3 = Recoded PA Leisure T1
g. Physical Activity Stage of Change T3 < Physical Activity Stage of Change T1
h. Physical Activity Stage of Change T3 > Physical Activity Stage of Change T1
i. Physical Activity Stage of Change T3 = Physical Activity Stage of Change T1
j. Recode PA Confidence T3 < Coded PA Conf T1
k. Recode PA Confidence T3 > Coded PA Conf T1
l. Recode PA Confidence T3 = Coded PA Conf T1

Test Statistics				
	Activity at work T3 - Activity at Work T1	Recode PA Leisure T3 - Recoded PA Leisure T1	Physical Activity Stage of Change T3 - Physical Activity Stage of Change T1	Recode PA Confidence T3 - Coded PA Conf T1
Z	-.537 ^a	-4.018 ^a	-2.123 ^a	-.792 ^b
Asymp. Sig. (2-tailed)	.591	.000	.034	.428

a. Based on negative ranks.
b. Based on positive ranks.
c. Wilcoxon Signed Ranks Test

Endnotes

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- ⁱ There has been some controversy as to whether the component factors of the metabolic syndrome, act individually or as a syndrome itself. See Bayturan, o., et al (2010)
- ⁱⁱ The bulleted statements which follow represent correlations and do not constitute claims of causality, nevertheless they represent important information.
- ⁱⁱⁱ Myrna Bye, Regina General Hospital, Unit Co-ordinator and manager of the renal program, retired in March 2012.
- ^{iv} Appendix A provides a description of the WMLHC of Saskatchewan
- ^v While the 12 month program of MetSyn was a new endeavour for the WMLHC Board and staff, their commitment to community education played a vital role in the Building Awareness activities which were an essential part of MetSyn.
- ^{vi} Stiles, S., Vega, C.P.
- ^{vii} By 2006 (when MetSyn was initially developed) medical practitioners who attended professional conferences would be aware of the use of automated telephone calls as a tool in disease management(ATDM), which dates to the nineties in the United States. The idea of testing out this technology with a group of active women (the majority in MetSyn were employed) who are not diagnosed with a serious, chronic disease, however, was innovative –‘something new.’
- ^{viii} Appendix B identifies a number of projects which TelAsk was involved with at around this time
- ^{ix} Inexpensive once the algorithm(the sequence of computerized questions) and the implementation process has been developed, as it now has been, by the WMLHC
- ^x A copy of the proposal which was sent to AstraZeneca is available from Dr. Holmes, Medical Director, Women’s Health Centre, Saskatoon City Hospital.
- ^{xi} 153 people did show up on that stormy night, while another 26 went through the introduction to MetSyn in makeup sessions.
- ^{xii} As noted on page 17 , FN 11, the actual count of those that were considered as entering the program is 179 (153 attended the session on Oct.27,2010 and 26 ‘attended’ that session by participating in make-up sessions (due to weather conditions on Oct 27)
- ^{xiii} The Project Director, Wendy Verity, reports that in most instances these calls were made within a week.
- ^{xiv} There were, as expected, some delays in getting in the blood work
- ^{xv} Dr Judith Martin (University of Saskatchewan) and Dr. Bonnie Jeffery (University of Regina). Judith was contracted earlier by the WMLHC (DEC 2009-April 2010) to present MetSyn to the U of S Ethics Review Board, to assist WMLHC , their Medical Director and the Chronic Disease Management Committee develop an operational plan (month by month) for implementing the Pilot as was designed by the committee. She also developed the plan for budgeting resources over the time span of the program; identified personnel requirements, set up the recruitment process and assisted with hiring the Project Director (PD). The Medical Director of WMLHC served as the supervisor of the PD and the project overall. Judith was a board member of the WMLHC from 2007 to Dec. 2009. The governance policy of the board of the WMLHC stipulates that Board Members are eligible for contracts with the WMLHC. Martin, nevertheless, did resign from the board, prior to taking on contract work with WMLHC
- ^{xvi} Appendix E includes the Literature Scan.
- ^{xvii} .The Vancouver, (St. Paul’s Hospital) metabolic project (did not include automated calls) had an attrition rate of 30 -40%.The Building Resistance to Diabetes and Heart Disease (BRDHD)program which the SHR offers tracked 287 individuals who were screened into their BRDHD program. 53% attended 1 or 2 sessions, while 47% did not attend any.
- ^{xviii} This research, which was approved by the U of Regina Ethics Board, was supervised by Dr. Bonnie Jeffery with field supervision provided by Dr. Martin.
- xixThe high attrition rate and the number of cells needed to make meaning of correlations between a variable which described ‘the change in number of metabolic factors which participants had at the end of the program’ with the socio-economic variables was a problem. This problem was reproduced when trial correlations were run between the socio-economic variables and a variable which described change in specific nutrition and physical measurements by the end of 12 months.

^{xx} An analysis was done in respect to Question # 3, with the participants split by TelAsk-yes/no , with findings being the same as for the whole group in respect to the findings on nutrition measures and physical activity measures with one exception in that for the no TelAsk group the change in the 'stage of change' measures was not statistically significant whereas it is shown to be significant in Table 10 (in which there is no TelAsk/noTelAsk split)

^{xxi} Walker, M. et al, "Oral Presentations at the PCNA Annual Symposium", 2010. ; Burns, S.L., "Comprehensive Care for the Prevention and Reduction of Diabetes: A Self-Management Focused Program." A 2009 Poster

^{xxii} The survey instruments, modified versions of Stage Assessment measures (References :Lippke, Sonia, et al) and the Stanford Brief Activity Survey (References: Taylor-Piliae, R. E., et al), which were used to measure change regarding nutrition and physical activity, are available from Dr. Vicki Holmes, Medical Director Women's Health Centre , Saskatoon City Hospital.

^{xxiii} See endnote xxi

^{xxv} Saskatoon Health Region (2011). Diabetes in Saskatoon Health Region: A report of the medical health officer.

^{xxvi} Sidebar insert, page 4: 15.9% of women 18+, Saskatoon Health Region, are obese and another 29.5% are overweight. Can. Community Health Survey, 2009/2010.

^{xxvii} Seabrook, J.A. and Avison,W.R.,2012. "Socioeconomic Status and Cumulative Disadvantage Processes across the Life Course: Implications for Health Outcomes." Canadian Review of Sociology: 49.1, February, 2012:50-68.

^{xxviii} Complete citations for all articles listed in the literary scan are found in the "References" section of this document.