

## PCNA 16<sup>th</sup> Annual Symposium – Poster Abstracts

**Abstract # 314**

**Category: Data-Based Research**

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### **PARTICIPATION RATES IN OUTPATIENT CARDIAC REHABILITATION ARE NOT DIFFERENT FOR MEN AND WOMEN**

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**Background:** Based on previous studies, it is widely believed that women eligible for outpatient cardiac rehabilitation (CR) are less likely to participate than are men. The purpose of this study was to examine participation rates of men and women in our contemporary CR program and to determine if differences between participants and non-participants exist.

**Methods:** A retrospective analysis of 450 patients referred to our outpatient CR program from January 2005 through July 2007 was completed. Participation rates were determined and univariate analyses were performed to identify differences by gender as well as between participants and non-participants.

**Results:** Participation rates in CR were similar for men and women (65% vs 62%,  $P = 0.54$ ). For participants in CR, women were older ( $66 \pm 12$  years vs  $62 \pm 12$  years,  $P < 0.01$ ), more often widowed (32% vs 4%,  $P < 0.0001$ ), less likely to be employed (22% vs 38%,  $P < 0.01$ ), and more likely to be diabetic (33% vs 21%,  $P = 0.04$ ) than were men. Compared with non-participants, those of either gender who participated in CR were younger ( $64 \pm 12$  years vs  $70 \pm 13$  years,  $P < 0.001$ ), more likely to be college educated (29% vs 14%,  $P < 0.001$ ), more likely to be married (74% vs 62%,  $P = 0.03$ ), more likely to be employed (33% vs 19%,  $P = 0.004$ ), less likely to smoke (16% vs 27%,  $P = 0.006$ ) and less likely to be diabetic (25% vs 36%,  $P = 0.01$ ). Rates of comorbid conditions were similar for women regardless of participation status (50% for non-participants vs 52% for participants,  $p=0.85$ ), while men who did not participate had more comorbidities than did participants (63% vs 38%,  $P < 0.0001$ ).

**Conclusion:** In contemporary outpatient CR programs, participation rates are similar for men and women. Participation rates are lower for older patients of both genders and for men with multiple comorbidities.

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### **IMPACT OF ETHNICITY AND MENOPAUSAL STATUS ON CV RISK FACTORS**

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**Background:** Epidemiologic studies identified risk factors (RF) for cardiovascular disease (CVD) in women. Most women who experience heart disease have pre-existing modifiable RF. Increased prevalence of CVD has been reported in middle-aged women possibly related to the under-recognition of modifiable RF that occur around menopause. Certain ethnic groups have an increased risk for developing specific RF.

**Hypothesis:** Menopause and ethnicity influence modifiable CVD RF in women.

**Methods:** 2259 women were evaluated for modifiable RF. Women were categorized by ethnicity and menopausal status. Dyslipidemia, HTN and Metabolic Syndrome (MS) were diagnosed according to JNC 8, NCEP ATP III criteria.

**Results:** 60% of the sample was post-menopausal: 57% Caucasian, 25% African American (AA) and 14% Hispanic. Thirty percent of the women were pre-menopausal: 34% Caucasian, 22% AA, 38% Hispanic. Remaining 9% were peri-menopausal: 46% Caucasian, 27% AA, 23% Hispanic. Significant escalations in HTN and dyslipidemia ( $p < 0.05$ ) were observed in all ethnic groups with the transition through menopause. Specific ethnic variations were observed. AA and Hispanics had significant escalations in the incidence of the MS, elevated triglycerides and diabetes (all  $p < 0.05$ ). AA women had increases during pre- and peri-menopause. Hispanic women had increases in dyslipidemia between pre- and peri-menopause, while MS increased between peri- and post-menopause. Caucasian women had increases in MS and dyslipidemia between peri- and post-menopause. Framingham risk scores were higher in AA women across all menopausal stages.

Three percent ( $n=77$ ) women experienced premature menopause: 30% Caucasian, 30% Hispanic, 39% AA. Modifiable RF in this group were high: 45% HTN, 45% MS, 42% dyslipidemia, 92% overweight.

**Conclusion:** Menopausal status and ethnicity influence the incidence of modifiable CVD RF in women. Women with premature menopause had a high incidence of CVD RF. Nurses should evaluate women for CVD RF during pre-menopause and closely monitor them as they progress through menopause.

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### **DRIED BLOOD SPOT MEASUREMENT OF INSULIN LEVELS PROVIDE A CONVENIENT TOOL TO STUDY POSTPRANDIAL DYSMETABOLISM: A NOVEL PROTOCOL FOR CARDIOMETABOLIC RISK ASSESSMENT**

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Postprandial dysmetabolism describes the post-meal metabolic conditions that predispose individuals to atherosclerosis. High postprandial insulin has been associated with risk of coronary artery disease and cardiovascular events in non-diabetics, independent of postprandial glucose levels, but appropriate testing protocols for risk assessment have not yet been established.

We have developed a finger stick dried blood spot (DBS) test for insulin that correlates highly with serum values ( $r=.93$ ). DBS testing can be conveniently done at home, allowing larger scale clinical studies under realistic dietary conditions to assess the impact of lifestyle on postprandial dysmetabolism.

We collected DBS from 19 healthy volunteers before and at 4 time points after consuming 5 different breakfast meals on 5 test days at least a week apart. Meals consisted of: 1) glazed donuts, fruit smoothie; 2) boiled eggs, sausages, 2% milk; 3) bagel, cream cheese, boiled egg, 2% milk; 4) pancakes, syrup, tea with cream/sugar; 5) oatmeal, almonds, apple, skim milk. Glucose levels were determined using a glucose meter at each time point.

Results showed that postprandial DBS insulin levels mirrored postprandial glucose, indicating a correspondence with glycemic index of the meal. However, at the 2 hour time point most commonly used in meal studies, glucose was always within a normal postprandial range of  $<140$  mg/dL, whereas insulin levels could be classified as “abnormal” ( $>15$   $\mu$ U/mL) or normal. Meal 2 (lowest in carbohydrate) produced significantly lower glucose levels than all other meals at 2 hours postprandial, and significantly fewer abnormal insulin levels. Meal 4 (highest in carbohydrate) showed significantly more abnormal insulin levels than the other meals.

The study shows for the first time that the postprandial insulin levels tested using DBS under normal lifestyle conditions may be a more meaningful alternative to postprandial glucose assessment to determine long term cardiometabolic risk in non-diabetics.

Meal	1	2	3	4	5
Normal 2-hour insulin/Total n	13/16	17/19	12/18	5/16	10/14
% Normal	81%	90%	67%	31%	71%

A Wilcoxon paired sign test compared any given meal to every other meal (using only participants that had data for both meals in a given pairing). Significant differences were found only for meal 4 (a lower % of people with normal insulin) and meal 2 (a higher % of people with normal insulin).

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### **THE EFFECTS OF EDUCATION REINFORCEMENT ON MEDICATION RECONCILIATION AMONG PATIENTS IN AN OUTPATIENT CARDIAC REHAB SETTING**

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**Introduction:** Medication reconciliation is a hospital-based initiative to avoid medication errors such as omissions, duplications, dosing errors, or drug interactions that may inhibit standard of care for the patient. As part of the continuum of care, it is imperative for an outpatient Cardiac Rehab (CR) setting to maintain medication reconciliation among patients for the proper treatment and standard of care.

**Purpose:** The purpose of this study was to determine the effects of education reinforcement on a patient’s compliance with having an updated medication list.

**Methods:** Upon entering CR, patients are asked to bring a current list of their medications with them for their initial evaluation. At the end of CR, patients are asked if they have a current medication list with them to verify any changes or updates to their medications without prior notification the list is needed.

**Results:** Two hundred seventy-seven patients were asked to present and verify their medication list upon completion of the CR program. Their results were compared to that of their responses upon entering the program. Two hundred two (73%) patients

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had a current medication list upon entering a CR program and 218 (79%) had a current medication list upon discharge from CR. A 2-proportion analysis revealed that there was no statistical significance ( $p\text{-value}=0.138$ ) with education reinforcement among patients with a current medication list at discharge compared to entering the program.

Conclusions: Results of the study showed that educational reinforcement during CR had no significant impact on medication reconciliation among patients participating in CR. A limiting factor our study found is the standardization of education reinforcement among staff in CR.

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### **A CLINICAL DATABASE IS A USEFUL TOOL IN CHRONIC DISEASE MANAGEMENT**

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Background summary: We have developed a clinical database in our primary care free clinic (2489 patients) in order to improve the efficiency of our chronic disease management.

Study objectives: The usefulness of this database has been tested in terms of its ability to reveal trends and identify patients who need more intense follow-up and self-management support.

Method: Data were analyzed for a cohort of 264 patients with known hypertension and Type 2 diabetes over a 12 month period (9/06-9/07). Patients were sorted into 3 subgroups based on target organ status. CVDM I (with history of heart attack, stroke, heart failure or kidney failure), CVDM II (with enlarged left ventricle or albuminuria), and CVDM III (the rest of the cohort). This identified an interim level acuity previously unrecognized that has a high risk for target organ damage soon. We applied standards for level of control and frequency of testing to these subgroups. Level of control was defined as B/P < 130/80 (blood pressure), A1C <7 (glucose) and LDL <100 (lipids).

Results: An inverse relationship was noted between the percentage of patients not testing (22% - B/P, 31% - A1C and 40% - LDL) and those not at goal (43% - B/P, 37% - A1C and 30% - LDL). Level of control was lowest in the CVDM II subgroup (A. 23% B/P at goal vs. 38% CVDM I, 40% CVDM III; B. 32% A1C >9 vs. 17% for CVDM I, 14% for CVDM III). Lastly, relatively little difference was seen in major complication rates between all hypertensive patients (19% in 500 patients) and those who also have diabetes (21% in 264 patients). Our database identified individual patients in every category.

Conclusion: We concluded that our database is a useful tool and has wide application for chronic disease populations.

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### **SIMULTANEOUS ACHIEVEMENT OF OPTIMAL LIPID TARGETS WITH THE COMBINATION OF ROSUVASTATIN 5MG AND FENOFIBRIC ACID 135MG IN PATIENTS WITH MIXED DYSLIPIDEMIA**

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Background: Mixed dyslipidemia (MD) is characterized by multiple lipid abnormalities, including low high-density lipoprotein cholesterol (HDL-C), and high low-density lipoprotein cholesterol (LDL-C), triglycerides (TG), non-HDL-C, and apolipoprotein B (ApoB). Along with LDL-C, guidelines advocate the use of combination therapy to treat other lipids that contribute to cardiovascular risk. The optimal targets are LDL-C <100 mg/dL, non-HDL-C <130 mg/dL, HDL-C >40 mg/dL (>50 mg/dL women), TG <150 mg/dL, and ApoB <90 mg/dL. In a previous study, a higher % of patients treated with rosuvastatin (R) 10mg + fenofibric acid 135mg (FA) for 12 weeks simultaneously achieved targets of LDL-C and non-HDL-C (55.8% vs 47.3% and 3.1%); HDL-C, TG, and LDL-C (25.5% vs 8.2% and 2.7%); and HDL-C, TG, LDL-C, non-HDL-C, and ApoB (23.4% vs 8.2% and 2.7%) than R 10mg or FA monotherapy, respectively. In addition, a higher % of patients treated with R 20mg + FA achieved targets of HDL-C, TG, and LDL-C (26.0% vs 9.1%); and HDL-C, TG, LDL-C, non-HDL-C, and ApoB (25.5% vs 8.7%) than R 20mg.

Objective: This analysis of a phase 3 study evaluated the proportion of patients with MD who simultaneously achieved optimal targets for multiple lipid parameters after treatment with R 5mg + FA.

Methods: Patients (N=760) with LDL-C  $\geq$ 130 mg/dL, TG  $\geq$ 150 mg/dL, and HDL-C <40 mg/dL (<50 mg/dL women) were randomized to R 5mg, FA, or R 5mg + FA and treated for 12 weeks. The proportion of patients who simultaneously achieved

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combined targets of LDL-C and non-HDL-C; LDL-C, HDL-C, and TG; and LDL-C, non-HDL-C, HDL-C, TG, and ApoB at the final visit were assessed. R 5mg + FA was compared to R or FA monotherapies.

Results: R 5mg + FA treatment resulted in a significantly greater proportion of patients simultaneously achieving the combined targets of LDL-C and non-HDL-C; LDL-C, HDL-C, and TG; and LDL-C, non-HDL-C, HDL-C, TG, and ApoB compared to R or FA monotherapies (Table).

Table: Proportion of patients [n/N, (%)] achieving optimal lipid targets			
Target	R 5mg	FA 135mg	R 5mg + FA 135mg
LDL-C and non-HDL-C P value	71/241 (29.5)	11/245 (4.5)	93/236 (39.4) 0.03 <sup>a</sup> <0.001 <sup>b</sup>
LDL-C, HDL-C, and TG P value	19/241 (7.9)	10/245 (4.1)	52/236 (22.0) <0.001 <sup>a</sup> <0.001 <sup>b</sup>
LDL-C, non-HDL-C, HDL-C, TG, and ApoB P value	17/241 (7.1)	10/245 (4.1)	51/236 (21.6) <0.001 <sup>a</sup> <0.001 <sup>b</sup>

R, rosuvastatin; FA, fenofibric acid; <sup>a</sup>Compared with R monotherapy; <sup>b</sup>Compared with FA monotherapy; Lipid targets were LDL-C <100 mg/dL, non-HDL-C <130 mg/dL, HDL-C >40 mg/dL in men or >50 mg/dL in women, TG <150 mg/dL, and ApoB <90 mg/dL.

Conclusions: In patients with MD, higher proportions of patients treated with R 5mg + FA achieved optimal targets for multiple lipid parameters than R or FA monotherapies. These results expand on previously reported data with higher doses of R + FA.

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### NON-HDL-C IS MORE ACCURATE THAN LDL-C IN IDENTIFYING CARDIOVASCULAR RISK AND IS A SIGNIFICANT THERAPEUTIC TARGET FOR TREATING DYSLIPIDEMIA

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Background: Treating LDL-C alone in patients with elevated non-HDL-C leaves patients at increased risk for cardiovascular events (CVE).

Objective: To demonstrate the value of targeting non-HDL-C for the prediction and reduction of CVE risk. Non-HDL-C, the sum of all pro-atherogenic lipid particles including LDL-C, very low-density lipoprotein cholesterol, and other remnant lipoproteins, is easily calculated (total cholesterol minus HDL-C) without a fasting sample or additional cost.

Methods: Major published, peer-reviewed studies from 1996 through 2009 that compared non-HDL-C with LDL-C for predicting cardiovascular disease among patients with dyslipidemia were identified and summarized.

Results: Twelve non-interventional/epidemiological studies that directly compared the capabilities of non-HDL-C and LDL-C in predicting CVE risk were identified (N=52,388). In those studies, non-HDL-C was superior or equivalent to LDL-C in predicting CVE across a broad cross-section of patients. In addition, a meta-analysis of 30 interventional trials (N=131,021) that evaluated statin, niacin, fibrate, and other monotherapies, showed a 1% decline in risk for every 1% decline in non-HDL-C, irrespective of drug therapy. In that meta-analysis, LDL-C changes alone were approximately one half as accurate as non-HDL-C changes in predicting CHD risk reductions (LDL-C model/non-HDL-C model: K=0.43).

Conclusions: Changes in non-HDL-C following lifestyle modification or pharmacologic intervention were equivalent or more predictive of change in CVE rates than changes in LDL-C in these studies. Lipid treatment guidelines recognize the significance of non-HDL-C for predicting and reducing CVE risk. A greater emphasis on using non-HDL-C along with LDL-C in routine clinical

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practice may result in better identification of those at high cardiovascular risk and help to achieve greater CVE risk reduction among those who are already on lipid lowering therapy.

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### DEPRESSIVE SYMPTOMS AND DIETARY ENERGY DENSITY INDEPENDENTLY PREDICT ABDOMINAL OBESITY

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**Background Summary:** Approximately 50% of U.S. adults have abdominal obesity, associated with cardiometabolic risk (CMR). Stress can precipitate or exacerbate depressive symptoms, reinforce unhealthy dietary choices and potentially lead to abdominal obesity, as indicated by elevated waist circumference (WC). Energy dense diets, high in saturated fats and sugars yet low in micronutrients, may contribute to abdominal obesity.

**Study Objective:** To examine depressive symptoms, perceived stress and dietary energy density (kilocalories/gram [DED]) as predictors of WC in overweight adults.

**Methods:** Participants (n=87) were overweight (Body Mass Index  $\geq 25$  kg/m<sup>2</sup>), 73.6% women, 50.6% African-American, mean age  $41.3 \pm 10.2$  years. **Variables and measures:** Perceived stress (Perceived Stress Scale [PSS]), depressive symptoms (Beck Depression Inventory-II [BDI-II]), weighed 3-day food record to calculate DED (mean food and beverage energy/mean food and beverage weight) and consumed food and beverage weight (grams). WC was measured using standardized procedures. Descriptive statistics and sequential regression explained and predicted WC.

**Results:** WC was  $103.4 \pm 12.7$  and  $103.2 \pm 14.9$  cm for men and women, respectively with 73.6% reflecting increased CMR. PSS was  $16.47 \pm 7.19$ ; BDI-II was  $8.67 \pm 8.34$  with 21.8% reporting depressive symptoms. Consistent with national data, mean DED was  $0.75 \pm .22$  kcal/gram. Regression showed BDI-II ( $p \leq .01$ ) and DED ( $p \leq .01$ ) explained 18.5% of WC variance above that explained by age ( $p = .07$ ) and consumed food and beverage weight ( $p \leq .01$ ). PSS did not explain WC variance.

**Conclusions:** Depressive symptoms and higher DED independently predicted WC explaining variance above that accounted for by heavier consumed food and beverage weight. Higher stress was associated with increased depressive symptoms which may indirectly contribute to elevated WC. Reducing depressive symptoms and DED by replacing high caloric, high fat foods with those high in water and fiber may be important interventions to lower WC and decrease CMR in adults.

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### ESTIMATES OF CARDIOVASCULAR RISK REDUCTION WITH NIACIN EXTENDED-RELEASE AND SIMVASTATIN IN MIXED DYSLIPIDEMIA

William Insull, Jr, MD, Baylor College of Medicine, Houston, TX; Ping Jiang, MS, Min Tian, MS, Roopal B Thakkar, MD, and Robert J. Padley, MD, Abbott, Abbott Park, IL

**Background:** Statins are known to reduce the risk of cardiovascular (CV) events by approximately 33% in patients with elevated LDL-C. The residual risk may be attributable to other abnormal lipid fractions such as low HDL-C, a strong predictor of risk. There are no reports for the LDL-C and HDL-C effects of niacin extended-release and simvastatin (NER/S) on CV risk.

**Objective:** To estimate CV risk reduction following NER/S treatment for 52 weeks, this study factored changes in LDL-C and HDL-C from the OCEANS trial into 2 risk-prediction algorithms.

**Methods:** Screening and 52-week serum HDL-C and LDL-C data of 85 treatment-naïve mixed dyslipidemic patients were entered into the CV-risk model of Brown et al. (2006):  $[(-1.288 \times \% \Delta \text{ in HDL-C}) + (0.971 \times \% \Delta \text{ in LDL-C})]$ . Screening and 52-week lipid data, systolic BP, smoking behavior, and diabetes mellitus status for a subset of 29 treatment-naïve males, 35–65 years of age, were factored into the PROCAM algorithm to estimate 10-year risk of acute coronary events. The PROCAM calculation assumed all patients had a family history of MI.

**Results:** The mean (SD) screening serum HDL-C =  $46.1 (10.2)$  mg/dl and LDL-C =  $180.4 (39.9)$  mg/dl of 85 treatment-naïve patients improved by +27.9% (22.9) in HDL-C and –42.3% (22.7) in LDL-C with 52 weeks of therapy, producing an estimated

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76.9% (41.9) CV-risk reduction relative to screening. The PROCAM 10-year risk of acute coronary events of 16.6% (9.6) at screening was reduced by –61.5% (36.0) with 52 weeks of therapy.

Conclusions: Two different risk estimation algorithms predict substantial risk reductions after niacin extended-release and simvastatin treatment vs statin reductions, –77% and –62% vs –33%. Confirmation of these estimated benefits awaits ongoing studies.

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### COMBINATION NIACIN EXTENDED-RELEASE AND SIMVASTATIN TREATMENT IMPROVES ATHEROGENIC LIPOPROTEIN PARTICLE PROFILE COMPARED WITH ATORVASTATIN MONOTHERAPY IN MIXED DYSLIPIDEMIA

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Background: Lipoprotein particle numbers and their cholesterol content correlate with cardiovascular risk. Statin monotherapies reduce low-density lipoprotein particle numbers (LDLp) but have little effect on particle size, which may also impact atherogenicity.

Objective: To compare the effects of combination niacin extended-release and simvastatin (NER/S, Simcor®) vs atorvastatin monotherapy (AT) on lipid particle size, number, and distribution in mixed-dyslipidemia patients.

Methods: In the SUPREME study, 137 patients, either statin-naïve or having statin-washout prior to randomization, received NER/S 1000/40 mg/day x 4 weeks, then 2000/40 mg/day x 8 weeks; or AT 40-mg/day x 12 weeks. Fasting lipoprotein particle number, size, and subclass distribution from baseline to 12 weeks were measured with NMR (Liposcience).

Results: NER/S therapy improved lipoprotein particle subclass numbers and sizes (Table) compared to AT across the atherogenic subfractions of LDL and remnants (VLDL/chylomicrons). NER/S produced greater reductions in LDLp and VLDL/chylomicron numbers, as well as the proportion of patients with a substantial particle burden (LDLp >1000 nmol/L), with a concomitant increase in particle size, compared to AT. LDL-C levels in response to NER/S vs. AT were not significantly different, although HDL-C and triglyceride levels significantly improved with NER/S (Table).

Conclusion: Combination niacin extended-release and simvastatin treatment produced improvements in the atherogenic lipoprotein profile, attenuating the particles associated with increased cardiovascular risk compared to atorvastatin.

Week 12 assessments	NER/S (n=74) <sup>a</sup>	AT (n=63) <sup>a</sup>	P-value
Patients with LDL particle number <1000 nmol/L <sup>b</sup>	34/74 (46%)	13/63 (21%)	0.002
Particle number changes <sup>cd</sup>			
LDLp	–52%	–43%	0.022
Small LDLp	–55%	–45%	0.011
VLDL and chylomicrons	–63%	–39%	<0.001
Particle size changes <sup>cd</sup>			
LDL	+3%	+1%	0.007
VLDL	+9%	+0.1%	<0.001
Triglycerides <sup>cd</sup>	–46%	–37%	0.01
LDL-C <sup>ef</sup>	–46%	–47%	0.861
HDL-C <sup>ef</sup>	+30%	+9%	<0.001

<sup>a</sup>Modified intent-to-treat analysis. <sup>b</sup>Fisher's exact test. <sup>c</sup>Median % changes.

<sup>d</sup>Wilcoxon's rank-sum test. <sup>e</sup>Mean % changes. <sup>f</sup>Repeated measures ANCOVA.

VLDL: very-low-density lipoprotein.

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### EXPLORING THE IMPACT OF LOW LEVEL CARDIAC REHABILITATION ON ABDOMINAL ADIPOSITY AND WAIST CIRCUMFERENCE

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**Background:** Core components of cardiac rehabilitation, outlined by the American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR) and the American Heart Association (AHA), aim to optimize cardiovascular risk reduction. Outpatient cardiac rehabilitation works to shift behaviors toward cardiovascular health through nutritional counseling, risk education, exercise training and psychosocial interventions. Risk-reduction goals, consistent with guidelines, encompass body weight, nutrition and physical activity.

**Objectives/Purpose:** To evaluate rate of change in body weight and waist circumference through the introduction of low level exercise training in the outpatient cardiac rehabilitation (OCR) population.

**Methods:** A review of 2008-2009 data from 160 high risk (HR) participants in OCR was conducted. HR patients, identified by risk stratification process, comprise those with functional capacity level of <5 metabolic equivalents (MET). MET levels, waist circumference and weight were collected at initial assessment (IA) and end of program review (EOP). Rate of change from IA to EOP was analyzed on the three parameters.

**Results/outcomes:** Significant changes ( $p<0.05$ ) occurred in MET levels and waist circumference. Exercise MET levels IA 2.9 increased to 6 EOP, mean improvement of 3.1MET's. IA waist circumference measured 99cm versus 96.6cm EOP. Mean waist circumference showed favorable body composition change with 2.4 cm reduction (standard deviation 2.57cm). No significant difference in mean baseline versus completion weights (IA 84kg, EOP 83.9kg).

**Conclusions:** Current practices in OCR lead to loss of abdominal adipose not overall body weight. Low calorie expenditure may explain the minimal effects on body weight. As a result of our study we are revising our OCR practices to intensify MET level progression, nutritional counseling and caloric expenditure. Future studies will assess program intensification and the impact on patient outcomes.

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### **NURSE-LED CARDIOVASCULAR PREVENTION IS EFFECTIVE FOR BOTH LOW-EDUCATED AND HIGHER EDUCATED PATIENTS**

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**Background Summary:** A substantial part of cardiovascular prevention could adequately be delivered in primary care. In Dutch general practice, practice nurses are officially involved in cardiovascular risk management. In our randomized trial, it was found that cardiovascular prevention could just as effectively be carried out by practice nurses as by general practitioners.

**Objective:** To assess the hypothesis that patient educational level is related to the effectiveness of nurse-led cardiovascular prevention.

**Methods:** A pragmatic randomized trial with one-year follow-up was held at six health care centres (25 general practitioners, 6 practice nurses, approx. 30 000 patients). Eligible patients were aged 30-74, with at least a 10% ten-year SCORE risk of fatal cardiovascular diseases (approximately 18% Framingham risk). The final study population consisted of 701 patients. Half of the patients received nurse-led care whereas half received care by the general practitioner. At the end of the trial patients received a self-administered questionnaire by post. The questionnaire contained questions about perception of quality of nurse-led care and patients' characteristics, such as educational level.

**Results:** Educational level appeared not to have influence on the effectiveness on risk factor levels in usual care by general practitioners and nurse-led care. Adding educational level as confounder in analysis of variance turned out not to be significant. On the contrary, a larger number of missing measurements after one year was found among the higher educated. Regarding patients' positive experiences with nurse-led care, no difference between the low-educated and higher educated was found. However, higher educated patients more often stated that the consultation with the practice nurse was not particularly beneficial for them ( $p<0.034$ ).

**Conclusions:** Nurse-led cardiovascular prevention is effective for both the low-educated and higher educated high risk patients.

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### GENETIC AND ADVANCED CORONARY HEART DISEASE RISK FACTORS ARE UNDER-DIAGNOSED IN CARDIAC REHABILITATION PATIENTS

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**Background Summary:** Recent advances in genetics and aspects of advanced risk factor analysis provide cardiac rehabilitation clinics the opportunity to create a unique community service and provide an opportunity to improve aspects of secondary prevention.

**Specific Objectives:** We hypothesized that advanced lipoprotein disorders, and genetic contributors to CHD risk were under-detected in cardiac rehabilitation patients.

**Design and Methods:** Eighty-nine consecutive patients referred to the cardiac rehabilitation clinic were examined for advanced risk factors and the presence of genetic polymorphism linked to CHD risk. Advanced risk factors were defined as disorders of HDL subclass and LDL subclass distribution (by gradient gel electrophoresis), Lp(a) (by immunochemistry), fasting insulin (by immunochemistry), and the KIF6 and Apo E polymorphisms (by PCR).

**Results:** Mean ( $\pm$ SD) age = 62.3 $\pm$ 12.8 yr, LDL-C = 88 $\pm$ 35 mg/dl, Triglycerides 123 $\pm$ 83 mg/dl, and HDL-C 63 $\pm$ 16 mg/dl Females and 45 $\pm$ 11 mg/dl Males. Forty-eight percent of all men and 55% of all women carried the KIF6 polymorphism ( $p=0.58$ ). 31.8% had LDL-C > 100 mg/dl and 28.6% of these subjects carried the Apo E4 allele. 34.8% of subjects met all ATPIII lipid guidelines and could be considered adequately treated. Of these, 61.3% carried the KIF6 polymorphism, 19.4% the Apo E4 allele, 58.1% had Lp(a) > 30 mg/dl, 36.0% had fasting insulin  $\geq$  14, 43.8% had gender specific low HDL2b, and 3.1% expressed the small LDL pattern B trait.

**Conclusion:** 92.1% of cardiac rehabilitation patients had advanced risk factors or genetic polymorphisms linked to increased CHD risk that were not diagnosed prior to the cardiac rehabilitation referral. Screening for advanced risk factors in the cardiac rehabilitation setting can reveal previously undiagnosed disorders and genetic polymorphisms that may impact patient management decisions and potentially long term outcomes.

**Abstract # 335**

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### VALIDATION OF A GENDER-DEPENDENT BLOOD-BASED GENE EXPRESSION TEST FOR DIAGNOSIS OF OBSTRUCTIVE CORONARY ARTERY DISEASE IN NON-DIABETIC PATIENTS

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**Background:** The current diagnosis of significant coronary artery disease (CAD) in stable chest pain patients without prior known disease follows a varied clinical path, and is especially challenging in women. Using whole blood samples from the PREDICT trial, a clinical angiographic population, a gender-specific gene expression- test, has been developed.

**Methods:** Total blood RNA was isolated from PAXgene™ tubes drawn from subjects undergoing coronary angiography participating in the PREDICT multi-center trial. Cases had  $\geq$ 50% stenosis in >1 major coronary artery; controls had < 50% luminal stenosis as determined by quantitative coronary angiography. A 23 gene RT-PCR and demographics based classifier was developed from data on 640 patients in the PREDICT trial. The algorithm consists of gender and age specific gene-expression terms, gene-expression- ratios and is reported on a 0-40 scale. The performance characteristics of the test were prospectively determined in 526 non-diabetic patients (192 cases and 334 controls; 57% male).

**Results:** ROC analysis yielded an overall AUC = 0.70, ( $p=10^{-16}$ ) with significant performance in both the male and female subsets, ( $p < 0.001$  in each gender). The algorithm was significantly additive to clinical variables (Diamond-Forrester method) (AUC 0.72 vs. 0.66,  $p < 0.01$ ) in ROC analysis; classification of clinically defined patient disease status was also significantly improved ( $p = 0.004$ ). At a threshold algorithm score of 14.75, the test sensitivity was 85% with a specificity of 43%. In this population, 34% of the patients had scores below this threshold.

**Conclusion:** This whole blood gene expression test provides clinicians with a new and novel, non-invasive diagnostic approach in assessing stable chest pain in non-diabetic patients. It incorporates age and gender in the diagnostic algorithm and appears to improve upon the personalized risk stratification for obstructive CAD.

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**Abstract # 339**

**Category: Data-Based Research**

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### **INFLUENCE OF CAROTID IMAGING TECHNOLOGY IN THE TREATMENT OF ASYMPTOMATIC ADULTS WITH EARLY STAGE ATHEROSCLEROSIS**

Susan Halli, DNP, CFNP, Robert Scales, PhD, Judith A. Turner-O'Connell, BS, RD, Aleese Murik, BS, Steven Ressler, MD, R. Todd Hurst, MD, Mayo Clinic-Scottsdale, AZ; Cengiz Akalan, PhD, Ankara University, Ankara, Turkey

**Background:** The early detection of cardiovascular risk in apparently healthy individuals may reduce premature death and morbidity when combined with appropriate treatment.

**Objective:** This study investigated the effect of imaging technology on provider recommendations for statin therapy and therapeutic lifestyle change (TLC) in a group of adults who elected to participate in a cardiology-based prevention program.

**Design & Methods:** The study involved a single visit observation of participants. Eighty-six (63% male) apparently healthy asymptomatic adults received a carotid intima media thickness (CIMT) test with B-mode ultrasound, blood chemistry/lipid profile and graded exercise stress testing (GXT). Plaque was considered to be present when CIMT was >1.5 mm and >50% of the surrounding intima-media. Everyone received a physical examination from a physician and/or cardiac nurse practitioner plus the option of a nutrition consultation and a physical performance evaluation that was conducted in conjunction with a motivational interview.

**Results:** The mean age of the participants was 50 years ( $SD=8.5$ ) and there was no prior history of atherosclerosis or diabetes. Twenty-seven (31%) participants were taking a statin on entry to the program. The mean LDL was 130 mg/dL ( $SD= 39.7$ ). Six GXT results required further cardiac evaluation but none were diagnosed with obstructive atherosclerosis. However, 58 participants (67%) had the presence of non-occlusive plaque ( $n=42$ ; 49%) or a CIMT score in the >75<sup>th</sup> percentile ( $n=16$ ; 18%) for age, gender, and race. After completing the program, 41 participants (48%) were prescribed a statin and 10 (12%) were recommended to either change their dose or switch to an alternate statin.

**Conclusion:** In this self-selected population, there appears to be evidence of increased cardiovascular risk that required additional treatment after participation in a cardiology-based prevention program. CIMT may enhance traditional methods to detect cardiac risk and influence treatment in asymptomatic individuals.

**Abstract # 340**

**Category: Data-Based Research**

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### **DIABETIC POST-CABG CARDIAC PATIENTS AND THEIR OBVIOUS NEED FOR MORE INTENSIVE CARDIAC REHABILITATION**

Bharathi Reddy, MD, Nancy Rullo, MS, MA, Kiseok Lee, MS, Donna Cheslik Candy, RN, John P. Nicolson, MD, New York Hospital Queens

**BACKGROUND:** Diabetes is a major risk factor for cardiac morbidity and mortality. Cardiac rehabilitation programs provide an efficient venue in which to deliver effective preventive care.

**OBJECTIVE:** Because of increased morbidity and mortality risk in diabetic patients we speculate that diabetic cardiac patients need a more intensive and focused cardiac rehabilitation program.

**METHODS:** Retrospective analysis on 174 patients with diabetes ( $n= 21$ , 17 males and 4 females) and without diabetes ( $n=153$ , 115 males and 38 females), age ( $68.13\pm 6.16$ ) completed a twelve week cardiac rehabilitation (CR) program at the Cardiac Health Center at New York Hospital Queens. Exercise tests were performed on all patients' pre and post CR utilizing a standard Bruce protocol.

**RESULTS:** In patients with diabetes the diagnoses were categorized 4.8% angina, 66.7% CABG, 4.8% MI, 23.8% PTCA; in the non diabetic group, diagnoses were 6.4% angina, 48.2% CABG, 5.0% MI, 37.6% PTCA and 2.8% has other cardiac conditions. Baseline exercise capacity was similar in both groups and standard cardiac rehabilitation yielded similar improvement post-CR MET levels in both groups; diabetes group ( $5.9\pm 1.6$ METS to  $7.1\pm 1.6$ METS  $p<0.05$ ) non-diabetes group ( $5.6\pm 1.7$ METS to  $6.9\pm 1.8$ METS  $p<0.05$ ). However, after CR, diabetic patient's post-CABG demonstrated significantly less improvement in exercise capacity compared to non-diabetic post-CABG patients. Post exercise stress testing on diabetic patients post CABG showed a 16% improvement in functional capacity as compared to 23.6% improvement in non diabetic patients post CABG ( $p< 0.05$ ).

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**CONCLUSIONS:** This study revealed that all diabetic patients with coronary artery disease showed similar improvement in functional capacity after CR except for those diabetics post-CABG. Diabetic post-CABG patients have higher incidence of recurrent cardiac events with longer hospital stays. This emphasizes the need to identify diabetic post-CABG patients in contemporary cardiac rehabilitation programs and target them for even more aggressive programs of risk factor management focusing on more effective interventions in weight management, lipid lowering, glycolic control, patient's compliance along with exercise training. In conclusion, comprehensive cardiovascular risk reduction therapy is advantageous for coronary patients but more is needed for diabetic post-CABG.

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### **KENYA HEART AND SOLE: THE AFYA NJEMA PROJECT**

Eileen M. Stuart-Shor, PhD, ANP, Mercy W. Kamau, RN, BSN, BSc, University of Massachusetts Boston, Boston, MA; Mary Muchendu, KRN, KRM, BSN, MED EDUC, Ann Gathi, RN, BSN, Kijabe Hospital School of Nursing, Kijabe, Kenya; Irene Ndigirigi, KRCHN, HNB, MED EDUC, Jacob Kariuki, RN, BSN, Tumu Tumu School of Nursing, Tumu Tumu, Kenya

**Background:** Cardiovascular disease (CVD) accounts for 60% of deaths in Sub-Saharan Africa. Current understanding is limited to applying Western models of risk prediction; globalization, sedentary lifestyle and western diets. Previously, we reported high rates of hypertension (HTN) and diabetes (DM) in three Central Kenyan communities.

**Objectives:** The purpose of this project was to partner with Kenyan nurses to expand our previous work assessing CV risk factor prevalence in Central Kenya by adding metabolic measures and individual and community level risk factors.

**Methods:** Using community based participatory research, a convenience sample of consecutive cases who presented to 5 clinics in Central Kenya were screened for CV risk factors by the US/Kenyan teams using PCNA Guidelines. The NP team collaborated with local clinics to treat individuals identified as high-risk. A community asset survey was conducted using the social-ecological domains in the Chronic Disease Model.

**Results:** 640 individuals (mean age 52.7%, 75% female) were screened and found to have high rates of HTN (49.9%), DM (19.7%), and overweight/obesity (46.4%). Women were more likely to have HTN ( $p=0.006$ ) and to be overweight/obese ( $p=0.00$ ). As they age (<45, 45-64, 65+) men and women had increased rates of HTN (25.0%, 46.8%, 56.8%) and DM (12.8%, 21.1%, 25.1%). 52% had 2+ risk factors. Individuals self-reported their health to be fair, physically active (farming) and low in dietary intake of western food. The 14 priority health issues identified did not include CV risk factors.

**Conclusions:** Similar to US blacks, these community level Kenyan data demonstrate: high rates of CV risk factors; age and gender-related increase in risk; and multiple risk factor clustering. Contrary to other reports, adverse patterns of CV related health behaviors were not observed. More research is needed to understand the CV risk of Kenyans in order to develop a culturally appropriate risk reduction intervention.

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### **METABOLIC SYNDROME PROFILE AT THE HEART OF AN URBAN POPULATION**

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**Background Summary:** Metabolic syndrome, a clustering of three of the five risk factors of hyperglycemia, central obesity, elevated triglycerides, decreased HDL cholesterol, and hypertension, is a principal risk factor for CVD and diabetes. Although the effectiveness of CVD risk factor management has been demonstrated, care remains suboptimal particularly among women, racial and ethnic minorities and low-income populations. The prevalence of metabolic syndrome in these populations is understudied.

**Objective:** To examine the prevalence of metabolic syndrome in a low-income, principally minority, urban dwelling sample of patients at community health centers.

**Methods:** Data were collected at baseline from participants in a randomized trial to reduce total CVD risk in urban community clinics. Using the revised NCEP-ATPIII criteria, we analyzed the prevalence of metabolic syndrome in a subgroup of 164 patients without diagnosed CVD or diabetes.

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Results: The sample was primarily women (73%) and African American (84%), with a mean age of 55 years. A total of 40% had annual family incomes less than \$20,000 and 71% reported a high school education. A sum of 107 (65%) of the sample met the criteria for metabolic syndrome: 36% had 3 risk factors, 27% had 4 and 2% had 5 risk factors. There was a high prevalence of abdominal obesity (100%), hypertension (80%), low HDL-C (49%), hyperglycemia (40%), and hypertriglyceridemia (21%).

Conclusions: These findings support the high-risk status of this population, particularly compared to the 34% prevalence of metabolic syndrome in the general population  $\geq 20$  years of age reported by NHANES. This study draws attention to the critical need for effective interventions to reduce the prevalence of cardiovascular risk factors among African American females with problematic impediments to care such as low income, unemployment, and inadequate insurance.

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### **A COMMUNITY-BASED, CROSS-SECTIONAL STUDY OF THE PREVALENCE OF METABOLIC SYNDROME AND ITS COMPONENTS BETWEEN FILIPINO AMERICAN AND FILIPINO WOMEN**

Irma B. Ancheta, PhD, RN, Cynthia Battie, PhD, Christine V. Ancheta, BSH, Calinica Caudilla, MSN, RN

Background: Heart disease is a significant contributor to morbidity and mortality in women of Filipino ethnicity. However, it is not known if the risk factors of metabolic syndrome (MetS) for this disease vary as a function of residency.

Objective: To determine if the prevalence of MetS and its individual risk factors vary between Filipino American women (FAW) and Filipino women (FW).

Design: MetS was determined by the International Diabetes Federation guidelines using central obesity ( $\geq 80$ cm) plus two components including: blood pressure, triglyceride (TGL), high-density lipoprotein (HDL) and glucose levels. A community-based screening of 60 FAW (Northeast Florida) and 56 FW (Visayas Region) was completed using the same protocol at each site. Multiple regression and Chi Square were used for analysis.

Results: MetS prevalence was similar in both groups (RR=0.94, CI=0.66-1.32,  $p = 0.08$ ) with 55% in FAW and 52% in FW. In contrast, significant differences were noted for MetS components (OR=5.744, CI=1.54-21.43,  $p < 0.006$ ). FAW exhibited higher mean waist circumference (FAW:  $97 \pm 13$ , FW:  $89 \pm 13$ ,  $p < 0.001$ ) and glucose (FAW:  $120 \pm 35$ , FW:  $108 \pm 18$ ,  $p = 0.04$ ). FW exhibited decreased HDL (FAW:  $53 \pm 15$ , FW:  $37 \pm 13$ ,  $p < 0.001$ ). No differences were noted in mean TGL (FAW:  $164 \pm 99$ , FW:  $142 \pm 92$ ), systolic blood pressure (FAW:  $126 \pm 18$ , FW:  $122 \pm 20$ ) and diastolic blood pressure (FAW:  $79 \pm 13$ , FW:  $79 \pm 12$ ).

Conclusion: MetS is present in both FAW and FW regardless of geographical location. FAW exhibited more MetS components than FW. Importantly, central obesity was a greater issue for FAW while low HDL levels were predominant in FW. This study emphasizes the need to develop effective culturally tailored strategies that target the specific MetS risk factors in ethnic populations as a function of residency.

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### **THE ROLE OF THE NURSE IN A CARDIOVASCULAR RISK MANAGEMENT PROGRAM IN SOUTH AFRICA**

Wanya D. Sypkens, BScN, MSN, Life Wilgers Hospital, Faerie Glen Pretoria, South Africa

Background: Cardiovascular risk management is a new concept in South Africa (SA). A limited number of comprehensive health risk management programs exist, where a variety of conditions are managed, including HIV/AIDS and cardiovascular disease. However, the focus is mainly on exercise and a multidisciplinary approach is rarely followed.

Since 1994 (democracy in SA), the number of black South Africans that became part of the higher income group increased dramatically, resulting increasingly in a Westernized lifestyle. The need for cardiovascular risk management programs therefore becomes greater and clarification of the nursing role in such programs more crucial.

Study Objectives:

- To explore the role of nurses currently involved in the limited facilities for cardiovascular risk management.
- To make recommendations for improving and expanding the role of the nurse in cardiovascular risk management in SA.

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**Methods:** An exploratory study was done, using qualitative methodology. The study population was nurses employed in comprehensive health risk management facilities. In-depth interviews were conducted. Qualitative methods were used in the analysis of these interviews. A literature control was done. The role of the nurse in such a program was investigated and described.

**Results:** Three themes emerged from the qualitative data, namely, the nurse's characteristics, competencies and role in a cardiovascular risk management program. These three themes were subdivided into ten categories and further into sub-categories. A literature control was done to validate the findings and to make recommendations for expansion of the nursing role in this field in SA.

**Conclusion:** Areas for improvement and expansion of the nursing role in SA were identified in the risk management of the following: Modifiable cardiovascular risk factors (examples: smoking cessation, hypertension; dyslipidaemia, diabetes mellitus; overweight) and Emerging risk factors (examples: micro-albuminuria, oxidative stress; Hyperhomocysteinuria;)

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### **Abstract # 317**

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#### **CARDIOMETABOLIC RISK SCREENING USING SIMPLE AND CONVENIENT DRIED BLOOD SPOT TECHNOLOGY**

Sanjay Kapur, PhD, Sonia Kapur, PhD, Margaret Groves, MPhil, David Zava, PhD, ZRT Laboratory, Beaverton, OR

**Background:** Cardiovascular and metabolic risk factors are gaining more attention as potential targets of intervention to combat against increased mortality due to cardiovascular disease (CVD) and type 2 diabetes mellitus (T2DM). Insulin resistance, elevated triglycerides, raised hemoglobin A1c (HbA1c) and inflammatory markers like C-reactive protein (CRP), in addition to other factors have been clearly shown to relate to these conditions. New tools must be made available to clinicians to formulate optimal treatment strategies for effective management of such cardiometabolic risk conditions.

**Methods:** Blood spots obtained from finger sticks on a filter paper were air-dried for 4 hours at room temperature after collection. Using an automated dried blood spot (DBS) puncher, 6.0 mm blood disks were obtained for testing and rehydrated in assay buffer/ methanol. All samples were tested in parallel. Samples were evaluated for the presence of insulin and high-sensitivity CRP using conventional commercial kits based on a direct- sandwich ELISA technique. The triglyceride assay involved enzymatic hydrolysis by lipase of the triglycerides to glycerol and free fatty acids. The glycerol produced was then measured by coupled enzyme reactions. HbA1c was tested using an immunoturbidimetric assay.

**Results:** The blood spot CRP values demonstrated good correlation with the serum CRP values, providing the correlation coefficient of 0.9776, slope 0.7317, intercept 0.031. Fasting and non-fasting triglyceride levels, when compared in blood spot and serum samples resulted in a correlation of 0.9. A positive correlation was found in insulin levels from fasting ( $R^2 = 0.99$ ) and non-fasting ( $R^2 = 0.93$ ) blood spot and serum samples, respectively. The correlation coefficient was found to be 0.96 for HbA1c measurements in serum and bloodspot samples.

**Conclusion:** We have developed rapid, reliable and accurate methods for fasting blood insulin, high-sensitivity CRP, HbA1c and triglyceride detection in dried blood spot samples. Our preliminary results have also shown the automation feasibility of this assay for high throughput screening studies. This wellness panel can be helpful as a first step in comprehensive prevention and treatment approach for patients at cardiometabolic risks (CVD, T2DM, or metabolic syndrome).

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### **Abstract # 319**

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#### **IMPLEMENTING A CARDIOVASCULAR PREVENTION PROGRAM FOR WOMEN WITH A DOLLAR AND A DREAM**

Patricia Delaney, RN, Denise Goldstein RN, MSN, APN-C, Mary Collins, RN, MSN, APN- C, The Valley Hospital, Ridgewood, NJ

**Background:** While one in three women die of heart disease, women are twice as likely as men to die after a heart attack, and have poorer outcomes than men with all standard therapies. Understanding the unique presentation, and the outcomes of this disease in women, prevention is fundamental in the care of female patients.

**Objectives:** The Center for Women's Heart Health at The Valley Hospital was conceived to provide community outreach to women in the form of education, screening, and if necessary, treatment and follow- up, of identified risk factors and/ or cardiovascular disease. By providing a free program, any woman, regardless of financial status or insurance coverage, would have access to this vital service.

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**Methods:** After identifying a growing need for prevention in the female population, we created an education and screening model, utilizing existing space and staff, during off hours, to implement a pilot program. By partnering with local corporations and community groups, free lectures were provided to educate women, and to market the program. Additionally, free cardiovascular screenings, including history and focused physical exam, were provided to target and address risk factors for heart disease.

**Results:** After screening 150 women, and providing 36 learning sessions, data from the physicals, as well as patient responses, and downstream revenue were analyzed and shared with hospital administration. The Center for Women's Heart Health at The Valley Hospital was then established. With hospital support, it was expanded to include an additional full time nurse practitioner and an administrative assistant to handle the overwhelming demand for service.

**Conclusions:** In two years of operation, over 1000 women, ages 25 – 85, have been screened, and more than 3600 women have been educated, validating the need for such a program. Through donations and fundraising, the program remains a free service, with downstream revenue to the hospital supporting marketing and salaries.

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### **STRENGTHENING THE CARDIOVASCULAR TEAM CARE MODEL BY CREATING A NOVEL POSTGRADUATE CCA-FELLOWSHIP**

Kenneth E. Korber, PA, MEDSURG Enterprises Ltd, Arlington Heights, IL

**Background:** Postgraduate Physician Assistant (PA) training has its beginnings with several surgical training programs started in the mid-1990s. Since that time, there are more than 45 formal fellowships or post-graduate residency programs that provide certification of advanced clinical experience for primary care PAs. At least eighteen medical and surgical specialties are represented within the mix of PA postgraduate training; but there are no programs in the United States that offer a clinical immersion experience in the care of patients with cardiovascular disease.

**Methods:** A didactic and clinical curriculum was designed and vetted to include the results from a membership survey of PA scope-of-practice from the Association of Physician Assistants in Cardiology (APAC), in 2003. These data, combined with national data from the American Academy of Physician Assistants (AAPA) and a regional health care system feasibility study, provided the learning goals for a 12-month, stipend-supported, postgraduate training experience in rural and urban cardiology.

**Results:** This is the first report of a comprehensive curriculum developed within a health care system caring for rural and urban patient populations. The curriculum structure is linked to a cardiologist-preceptor model and can be reproduced within an academic medical center setting or customized for a large community-based cardiology group practice.

Each PA-Fellow is immersed in a year-long learning experience under the tutelage of practicing cardiologists and experienced PAs working in private or academic cardiology practice settings. The didactic year content is derived by piggy-backing the cardiovascular learnings from existing Departmental training modalities and formatting them into a parallel classroom, conference, and bedside schedule.

Clinical training for the CCA-Fellow consists of specialty and subspecialty block rotation experiences; similar to a M3/M4 program. Since the CCA-Fellow is already licensed to practice while participating in this postgraduate program, many of the patient care services rendered by the CCA-Fellow are amenable to reimbursement. By using this approach, program administrators can expect a revenue-neutral budget within 1 year of the start-up calendar. The model is designed for between 1 and 3 CCA-Fellows per academic year and has a start-up cost between \$138,565.00 and \$352,674.00, depending on the number of CCA-Fellows admitted the first year. These costs include the marketing and admissions process, salaries for key staff, and a documentation process and plan that enables a process for national accreditation.

**Conclusions:** Learning objectives and a didactic and clinical cardiovascular curriculum plan for the first CCA postgraduate training fellowship has been created as a privately-funded pilot project. To date, this is the only curriculum in the United States with a mission to combine elements of urban and rural cardiology for patients with newly-diagnosed or established heart disease.

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### **PERIPHERAL ARTERIAL DISEASE: THE UNKNOWN CARDIOVASCULAR RISK**

Marge Lovell, RN, CCRC, London Health, London, Ontario

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PAD is a common atherosclerotic disease with a worldwide prevalence estimated to be in the range of 3-10%, increasing to 12% to 29% in the elderly. PAD is characterized by atherosclerotic occlusive disease of primarily the lower extremities and is a powerful predictor for atherothrombotic disease in other vascular beds. PAD causes a decrease in blood flow to the legs and feet that can result in muscle fatigue and pain when walking (claudication). This leads to significant disability and diminished quality of life. Progression of PAD can lead to critical limb ischemia which is associated with an increased risk of amputation. Patients with PAD have advanced atherothrombosis and are at elevated risk for stroke, myocardial infarction and cardiovascular death.

The incidence of PAD increases with age and is often under-diagnosed and under-treated as it can be a “silent” condition that often has no symptoms leaving thousands of people at risk for heart attack and stroke. As the aging population increases, the prevalence of PAD and its associated morbidities will increase.

It is mandatory for all health care professionals to be more astute in identifying patients at high risk and ensuring appropriate management of their risk factors. An overview of PAD including etiology, risk factors, diagnosis, and management will be highlighted. In addition, a North American effort to increase PAD awareness and improve the health and care of PAD patients will be reviewed.

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### **BELLINHEART IS BLOGGING INTO SOCIAL MEDIA TO CONNECT AND EDUCATE THE COMMUNITY**

Kelly Galler, MSN, GNP, Bellin Health System, Green Bay, WI

**Purpose:** To be successful at reducing cardiovascular risk, the community must be engaged. Blogging, social-web-applications and networking are rapidly growing arenas for interacting with community members. Society values opportunities to ask questions and receive answers. Public dialogue on cardiovascular issues builds relationships while the user participates in their health.

**Implementation:** www.BellinHeart.org and www.BellinHeartblog.org deliver messages about cardiovascular disease prevention and management. The heart blog gives detailed information on these topics and offers interaction. “Ask Kelly” is a tool where the reader can send a secure email question. The blogger can also write a public comment on any post. @BellinHeart is real-time, micro-blogging with Twitter. This reaches more followers with headline stats and links them into the blog. Additional drivers include online key-words, Facebook and Google ads, plus refrigerator magnets, t-shirts at public events, and local business presentations.

**Evaluation and outcomes:** Site traffic over the past eleven months reveals BellinHeart’s success. Compared to similar sites, BellinHeart.org has 611% more pageviews, and BellinHeartblog.org has 6.6% more pageviews with an average time on the site 122.7% longer. This time demonstrates superior engagement with BellinHeart and is further supported by 27% recurring visits, 1-2 “Ask Kelly” questions per week and 13 article comments. @BellinHeart has 460 followers, 882 tweets, refers 15% of traffic to the blog and is frequently retweeted and mentioned.

**Implication for practice:** BellinHeart has effectively formed a virtual community where public engagement is strong. Trustworthy, interactive posts that personalize each member’s heart health will keep them visiting. Instead of reaching one person in clinic, or small groups with presentations, social media allows BellinHeart to reach thousands everyday, all day. It is feasible to expand social media as a means of cardiovascular prevention to other organizations while BellinHeart will continue current practice, expand to other specialties and add online chats.

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### **SISTERS IN ACTION (SIA): AN EFFECTIVE PROGRAM TO LOWER OBESITY IN AFRICAN AMERICAN WOMEN**

Linda Heine, BSN, RN, Cassandra Hankins, MA, LLPC, Spectrum Health Hospitals, Grand Rapids, MI

**Background:** African Americans make up 20.4% of the population in Grand Rapids, MI. Nationally 78% of African American women are overweight, 50.8% obese. Kent County Behavioral Risk Factor Survey identified 37.3% of residents as overweight and 28.3% obese. The SIA program is a comprehensive healthy lifestyle improvement initiative focusing on the obesity crisis among African American women in our community.

**Objective/Purpose:** To improve the health of 300 African American women.

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Methods: Program design had input from women in the community. Design included partnering with the YMCA, allowing barriers to be addressed through free family memberships.

Implementation: 300 participants with Body Mass Index (BMI) of 25-55 were recruited. Biometric screenings included blood pressure, BMI, fasting lipids, blood glucose, cardiovascular risk factor identification and Polar Tri-Fit screening pre and post 12 weeks intervention. Each 2 hour session consisted of exercise and education 3 times per week. Multidisciplinary staff provided exercise and educational classes with special emphasis on nutrition and a depression workshop.

Results/Outcomes: Average age was 45. Between time 1 and time 2 screening: 41% of 255 participants lost at least 1 BMI point; significant improvement in the percent of participants with ideal blood pressure was demonstrated- 39% increased to 56% in 252 participants; 77% of enrollees demonstrated pre-hypertension or hypertension at entry. Total of 280 participants; 23 dropped; 80% completed 12 weeks of intervention; 65.5% completed 70% of 24 weeks, 90% increased fruits and vegetables, 90.8% decreased total calories and 100% stated their quality of life was improved.

Conclusions: SIA demonstrates an effective program to address obesity in African American.

Implications: SIA demonstrates an easily replicated model in which church leaders, a health care system, the YMCA and the women themselves bring their strengths together within the community to make comprehensive, long term improvements in their health and their families to decrease cardiovascular disease.

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#### **INNOVATION IN THE MANAGEMENT MODEL OF PEDIATRIC HYPERLIPIDEMIA AT THE HOSPITAL FOR SICK CHILDREN**

Nita Chahal, MN, NP Peds, Helen Wong RD, Cedric Manlhiot, BSc, Brian W. McCrindle, MD, MPH, The Hospital for Sick Children, Toronto, ON, Canada

Background: Traditionally, families referred to the pediatric lipid clinic were expected to attend an education class after their initial assessment. This approach has had some challenges due to limited compliance with attending the education class and minimal success with their lifestyle changes and in their lipid profile.

Objective: A new education program complemented by peer education was implemented in which new patients had education and management tailored to the family's needs at the time of initial assessment to improve lifestyle, foster weight loss and ultimately improve lipid profile. We sought to assess the efficacy of this new strategy.

Method: The purpose of this retrospective study is to compare and examine the traditional and the new modified collaborative approach by their anthropometric measurements, blood pressure, screen time and physical activity in minutes/day and nutritional assessment between initial and at the follow-up assessment.

Results: 75 patients were enrolled (37 intervention/38 controls) (age at baseline 11.1±3.5 years, 37 males (49%)). No baseline differences between groups other than physical activity (median 3.6 hours/week controls vs. 2.3 hours/week intervention, p=0.06). A total of 5 patients were prescribed lipid-lowering medication at their initial assessment (2 intervention, 3 controls). For the group overall, total cholesterol (baseline average 5.79±1.65mmol/L vs. follow-up 5.52±1.39mmol/L, p=0.02) and LDL-cholesterol level (baseline 3.96±1.63mmol/L vs. follow-up 3.58±1.38mmol/L, p=0.01) significantly decreased between follow-up and baseline, no differences were seen between the groups, association was not influenced by the use of medication. Nutrition scores were found to significantly improve between the baseline and follow-up assessment (median 5.25/10 baseline vs. 6.60/10 follow-up, p=0.004), with a marginally higher increase in the intervention (+1.71/10) than the control group (+1.00/10) (p=0.12). The intervention group had greater reduction in weight percentile (+1.8% control vs. -8.9% intervention, p=0.03), screen time (+1.3 hours/week controls vs. -7.0 hours/week intervention, p=0.05) and in their physical activity (+2.0 hours/week controls vs. +4.0 hours/week intervention, p=0.05).

Conclusion: The new individualized approach complemented by peer education was found to foster greater lifestyle changes than the traditional approach.

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### **Abstract # 336**

### **Category: Innovation in Patient Care**

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#### **WOMEN'S CARDIOVASCULAR RISK ASSESSMENT PROGRAM: SOLVING THE PUZZLE OF WOMEN'S HEART DISEASE, A UNIQUE APPROACH**

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Gary J. Rogal, MD, FACC, Saint Barnabas Healthcare Systems, Livingston, NJ; Janie Baranyay, RN, APN, FPCNA, Saint Barnabas Medical Center, Livingston, NJ

Purpose: Development of a Women's Cardiovascular Risk Assessment Program to help women personalize the message of heart disease as their number one killer.

Design/Implementation of the project: Establishment of a multi-disciplinary committee challenged with capturing women as they present to the medical community throughout the lifespan to provide a cardiovascular risk assessment thus empowering women to take control of their cardiovascular health.

Evaluation and outcomes:

Number of women seen = 83

Age: average = 54.45

Education: 87% with > high school education

Medical providers: No physician = 5%, Obstetrics/gynecology = 6%, Cardiology = 2%, Internal med/family practice = 87%

Family history: 15% positive for premature cardiovascular disease (CVD), 15% positive for sudden death

Personal history: Negative for hypertension (HTN) = 25%, negative HTN with systolic blood pressure > 120 = 44%; negative for hyperlipidemia (HPLD) = 65%; negative HPLD with total cholesterol > 200 = 55%, triglycerides > 150 = 31%, high density lipoproteins < 50 = 22%, low density lipoproteins > 100 = 52%; negative for diabetes = 90%, negative diabetes with fasting glucose > 100 = 41%

Weight: average current weight = 158.6 lbs, average body mass index (BMI) = 27.05; average waist measurement = 33", average weight gain from age 20 = 35.9 lbs

Top stressors: Work = 31%, Family = 31%

Sleep disturbance: trouble falling asleep = 12%, trouble staying asleep = 33.7%

Implications for practice: Women need and want to know their personal risk. Even when there is no previous history of elevated CVD risk factors, many women exceed the goals for blood pressure, serum lipids and glucose established nationally for CVD prevention. Additionally many women have elevated BMIs, are highly stressed and are not sleeping well. A baseline age for this type of assessment needs to be established to allow for the development of unique preventative interventions.

**Abstract # 337**

**Category: Innovation in Patient Care**

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### **CARDIOVASCULAR DISEASE, OBESITY & DIABETES IN THE UNITED ARAB EMIRATES: THE INCIDENCE AND THE BARRIERS TO EDUCATION AT SHEIKH KHALIFA MEDICAL CITY (MANAGED BY CLEVELAND CLINIC)**

Kristy Jones, RN, David Jobson, RN, Sheikh Khalifa Medical City, Abu Dhabi, United Arab Emirates

Background: The UAE has developed radically since independence in 1972. National income has increased from 4.7 million AED in 1972, to 229 million in 2002. Schools and public hospitals have been built. 50 years ago there was no electricity or plumbing. Now the country is the 4<sup>th</sup> largest oil producer in the world, and the richest per head of population.

Developments have also brought the burden of CVD, obesity and diabetes due to adopted sedentary lifestyle, secondary to urbanization. This presents a challenge for cardiac educators. Health promotion and education is vital in mortality reduction.

Objectives: Examine prevalence of CVD, diabetes and obesity in the national population of UAE utilizing WHO data and data from the Cardiac Department at SKMC. Identify barriers to education for patients with CVD, and families, based on local research and significant experience nursing CVD patients in the Middle East.

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Method: Presentation of data to identify CVD patients' educational need. Research studies complement the 10 and 30 years respective cardiac nursing experience of two Clinical Resource Nurses with 3 and 15 years of this experience in the Middle East, mainly UAE.

Results: Language, cultural expectations, and gender limitations contribute to barriers to delivery and effectiveness of patient education.

Conclusion: WHO studies in UAE have identified CVD and diabetes as a leading cause of mortality. The UAE population of 5.6 million has the second highest prevalence of diabetes in the world with >25% diagnosed. Combined mortality rates of diabetes and CVD are 75% of total cause of death for UAE nationals.

32.4% of the population have BMI >25, and 24.4% have BMI >30. The next generation shows no sign of improvement with 33.4% children with BMI >25.

The importance of education for these patients is evident. Barriers to education must be recognized, understood and minimized in order to affect positive outcomes and reduction in CVD incidence.

### **Abstract # 342**

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#### **WOLFE HEALTHY CHILD INITIATIVE: AN AFTER SCHOOL OBESITY PREVENTION PROGRAM FOR CHILDREN AGE 9-12**

Laura Allton, RN, BA, Michelle La Londe, MA, Kathy Spencer, RN, MSN, Robert Thompson, MD, Teresa Caulin-Glaser, MD, Ohio Health/McConnell Heart Health Center, Columbus, OH; Lori Mooney, RD, Ihumma Eneli, MD, Nationwide Children's Hospital, Columbus, OH

Background: Obesity leads to an increase in diabetes and cardiovascular disease (CVD). Childhood education and prevention are key in reducing the future development of CVD, diabetes, hypertension, and stroke.

Objective: This pilot study evaluated the effectiveness of a nutritional education program coupled with exercise in 9 to 12 year old children.

Methods: The program provided nutritional education and exercise activities to children in an after-school program. Ninety minute sessions were held 7 times over 3 months. Sessions consisted of nutritional education, healthy snacks and exercise. Sessions were led by dietitians, exercise physiologists and nurses. Participants completed a Child and Adolescent Trial for Cardiovascular Health Behavior Questionnaire (CATCH HBQ) upon program entry and completion. CATCH HBQ evaluates children's nutrition intentions, preferences, knowledge, self-efficacy, exercise self-efficacy and levels of social support/norms.

Results: 17 children (10.4 ± 1.13 yrs) enrolled in the pilot study, 1 child left the study prior to completion. On average, the children attended 96% of the sessions. The CATCH HBQ was completed upon program entry and exit by 12 children (table 1).

TABLE 1: CATCH OUTCOMES  
Complete Pre and Posts

Variable	N	Pre	Post	Difference		% with a Positive Change
		Mean (SD)	Mean (SD)	Mean (SD)	p value	
Intentions - Nutrition	12	6.08 (2.97)	8.75 (2.86)	2.67 (4.36)	0.06	75.0
Preferences - Nutrition	12	6.25 (2.96)	8.33 (2.53)	2.08 (2.61)	0.02	66.7
Knowledge - Nutrition	12	11.08 (2.64)	10.42 (3.58)	-0.67 (1.78)	0.23	25.0
Social Support and Norms	12	11 (5.13)	12.25 (5.63)	1.25 (3.08)	0.19	58.3
Self Efficacy - Nutrition	12	9.5 (5.23)	8.83 (4.57)	-0.67 (4.08)	0.58	41.7
Self Efficacy - Physical	12	3.58 (1.83)	3.25 (2.18)	-0.33 (1.87)	0.55	33.3

Conclusion: Although underpowered to determine statistical significance, clinically significant changes were indicated by an increase in CATCH HBQ scores. The majority of participants had clinically significant changes in nutrition intentions, nutrition preferences and social support/norms.

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This study demonstrated a positive change in healthy food choices and preferences. The program will be continued and data collected to confirm short term effectiveness. Outcome measurements to assess the long-term clinical impact of the program need to be implemented.

**Abstract # 345**

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### **ASSESSMENT OF DEPRESSION ON ADMISSION IN CARDIAC MEDICAL AND SURGICAL PATIENTS; A PILOT STUDY**

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**Problem:** Major depressive disorder is a risk for cardiovascular disease (CVD). Studies suggest depression/depressive symptoms are present in 20-25% of cardiac inpatients, up to 50% of patients having coronary artery bypass (CAB), and in 33% of heart failure patients. The American Heart Association (AHA) recommends formal screening for depression in CV patients; a practice not currently standardized at Mayo Clinic.

**Objectives:** 1) Evaluate the feasibility of implementing a standardized depression assessment tool on admission; 2) Determine the prevalence of depressive symptoms on admission; 3) Identify significant PHQ-9 subscale scores for 12 CV diagnoses

**Implementation:** Between 1/5/09 and 4/5/09, patients admitted to all CV surgical services and 3 medical CV services, were administered the PHQ-9 by NP/PA providers. The PHQ-9 tool consists of 9 questions assessing presence and severity of depressive symptoms. Three levels of intervention were defined. Patients were given education, offered medication, counseling, or psychiatric services, based on PHQ-9 scores. A medical record review was done, to ascertain prevalence and type of depressive symptoms, as well as protocol adherence by providers.

**Evaluation:** 151 CV medical and surgical patients (64 women, 87 men) completed the PHQ-9. 25.8% reported mild symptoms (25% women, 26.4% men, NS). 15.9% indicated moderate to severe symptoms (15.6% women, 16.1% men, NS) A prevalence of 41.7% with at least mild depressive symptoms was found. Feasibility of PHQ-9 administration was assessed by provider feedback.

**Implications for Practice:** Evidence has shown that cardiac patients are at risk for poorer outcomes with depression. Questions remaining: 1) Which healthcare providers are appropriate to conduct the initial screening and follow up? 2) Is the PHQ-9 depression assessment tool appropriate for hospital use? 3) How does the initial screening impact outcomes after hospital dismissal?

Further studies and innovative strategies must be explored to answer these questions and improve psychosocial outcomes of heart disease events.

**Abstract # 346**

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### **BRINGING CARDIOVASCULAR EDUCATION TO THE PATIENT: A NOVEL APPROACH TO ENGAGE PATIENTS AND FAMILIES IN LEARNING**

Melissa Stell, RN, Maureen Garmey, RN, Adrienne Garo, RN, MSN, Liz Hooper, RN, Joan Cichon, University of Virginia Medical Center, Charlottesville, VA

**Background:** Cardiovascular disease is the #1 killer world-wide and has many preventable or modifiable causes. Information given verbally or by printed handout is often not retained. Providing a stimulating learning experience at the correct time, educational level and learning style is known to increase understanding and retention.

**Purpose:** The aim of this innovative project is to apply the educational theory to create an attention grabbing, interactive learning center that is self directed, accessible and easy to use accommodating all educational levels and learning styles.

**Description:** We designed a learning center integrated into the waiting rooms of the outpatient cardiology clinic that is eye-catching and appealing. It includes two computers that open to a website with links to selected internet cardiology education sites; films, interactive tutorials, and animations that stimulate the senses. Open shelving in the center of the waiting room is filled with models and exhibits patients can touch, labeled as a "self guided tour." Colorful educational displays hang on the

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walls; a DVD plays a looping program on heart health and handouts are available for the taking. A volunteer serves to engage patients and help with the computers.

Outcomes: Patients and families in the waiting room are observed daily handling the models, watching the videos, asking questions and exploring the website. Feedback from patients and staff is very positive. The program has been so successful that the initiative was recognized with our institution's Excellence in Patient and Family Education Award 2009 and we have been asked to consult with other groups.

Conclusion: Applying educational theory creatively to a cardiology learning center integrated into the waiting room is an easy, effective and efficient way to engage and inspire patients in understanding their cardiovascular system and heart health.

**Abstract # 347**

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### **SOCIAL DETERMINANTS OF HEALTH PERSPECTIVE INFORMS PRACTICE FOR DIABETES AND CARDIOVASCULAR PREVENTION IN A CANADIAN METABOLIC SYNDROME PROGRAM**

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Purpose: Economic and social conditions determine health, particularly in diabetes and cardiovascular disease (CVD). Physical, social and personal resources possessed by individuals influence lifestyle management. Targeting risk factor reduction through biomedically-based programs has not been achieved on a large scale. We have implemented a new program addressing the social determinants of health (SDH) in clients with metabolic syndrome.

Design: Clients take part in an 18 month, multidisciplinary, nurse-managed, physician supported program. Programs are based in the community and hospital setting. Working in partnership, SDH indicators such as income level, education, gender, culture, etc are integrated to better direct appropriate behavior change. Strategies targeting physical activity, nutrition, weight management, psychosocial risk factors, and self-management are addressed. Care becomes individualized to promote need satisfaction and to support coping in the clients own environment, thereby creating positive outcomes.

Outcomes: Baseline characteristics of the first 640 patients (age  $52 \pm 11$ , male 39%) enrolled in the program is listed in the Table. At 12 months there are significant improvements in total cholesterol, LDL, triglycerides, anthropometrics and blood pressure. Importantly, 38% no longer fulfill the criteria for metabolic syndrome at 12 months.

Variables	N	Baseline	12 months	M12 - Baseline	p-value
TC	211	5.5 [4.7;6.3]	5.2 [4.3;5.9]	-0.2 [-0.8;0.2]	<0.001
LDL	208	3.3 [2.6;3.9]	3.0 [2.3;3.6]	-0.1 [-0.5;0.3]	0.006
HDL	211	1.6 [1.0;1.4]	1.2 [1.0;1.4]	0.0 [-0.1;0.1]	0.11
TG	211	2.1 [1.5;2.8]	1.7 [1.2;2.5]	-0.2 [-0.8;0.2]	<0.0001
TC/HDL	210	4.7 [3.8;5.6]	4.2 [3.5;5.3]	-0.3 [-0.8;0.2]	<0.0001
FBG	211	6.0 [5.5;6.5]	5.9 [5.5;6.4]	0.0 [-0.4;0.4]	0.20
Weight	199	98 [85;116]	93 [80;109]	-2.2 [-5.5; 0.2]	0.002
Waist Circ	187	112 [102;123]	106 [97;116]	-3.5 [-7.5;0.0]	<0.0001
Systolic BP	194	130 $\pm$ 15	121 $\pm$ 13	-10 $\pm$ 15	<0.0001
Diastolic BP	193	80 $\pm$ 10	77 $\pm$ 9	-4 $\pm$ 11	<0.0001

Implications for Practice: This innovative model incorporates comprehensive care linking the social determinants of health to effectively target metabolic syndrome and the reduction of diabetes and CVD. Further evaluation of long term outcomes and community based partnerships need to be explored.