

Poster Presentations

P1 Coronary Heart Disease Impairment and Patients' Ability to Afford and Access Prescription Drugs

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Introduction: Ability to pay influences access to hospital and physician services. However, more data are needed to evaluate patients' ability to pay and access prescription drugs. This is especially needed for elderly patients with chronic diseases who frequently need multiple prescription drugs but who are on fixed incomes that limit their ability to pay for these essential prescription drugs. One important question is which factors influence the extent to which coronary heart disease patients with heart disease impairment in daily activities will not have access to prescription drugs because they cannot afford these prescription drugs. Older coronary heart disease patients with heart disease impairment, because they tend to be on fixed incomes and require multiple prescription drugs on a regular basis, may be more likely than younger coronary heart disease patients with heart disease impairment to not be able to afford and have access to prescription drugs. **Hypothesis:** The following study tests the null hypothesis that among coronary heart disease patients? with heart disease impairment, there are no age differences in their ability to pay and access prescription drugs. **Methods:** The results from the population-based 1998 National Health Interview Survey (N=30,534 adults) were used. Descriptive and correlational procedures evaluated possible age differences among coronary heart disease patients with heart disease impairment and their ability to pay and access prescription drugs, after adjusting for income, race, gender, and other predictors. **Results and Conclusion:** The null hypothesis was rejected. Older coronary heart disease patients with heart disease impairment were more likely than younger coronary disease patients with heart disease impairment to report that they did not buy needed prescription drugs in the past 12 months because they could not afford the prescription drugs ($r=.316$, $p<.000$, $N=451$). These age differences remained significant after controlling for income and other predictor variables. Drug prescription policies should target older, coronary disease patients with heart disease impairment, regardless of socioeconomic status, to facilitate better access to drug prescriptions.

P2 Testing Scales of Medication Compliance in Chinese Immigrants Who Are Taking Antihypertensive Medications

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Background: Medication compliance (MC), often defined as taking at least 80% of prescribed medications, remains a major concern in the control of hypertension (HPT) in the general US population. However, little information is available about MC in Chinese immigrants with HPT. Some scales of measuring MC are available by D. E. Morisky et al. that may be useful in studies of Chinese immigrants. **Objective:** To present the psychometric properties of two scales for measuring MC in Chinese immigrants with HPT. **Design:** Cross-sectional. **Methods:** We modified Morisky's earlier scale (Scale I) to convert dichotomous responses of yes/no to 1-5 ordinal scales and to add a 4-week time frame. We used Morisky's more recent unpublished scale (Scale II) as is with permission. Scale I asked if respondents forgot, missed, or carefully took HPT pills in the past 4 weeks. Scale II asked if respondents forgot, missed, stopped, forgot when traveling, took pills yesterday, had a reminder system to help take pills, stopped when HPT was under control, or felt hassled about sticking to treatment. For both scales, a higher score indicates a better MC. The two measures were administered in 200 Chinese immigrants with HPT who were ≥ 18 years old, taking Western HPT medications and able to speak Mandarin. **Findings:** The mean (12.96 ± 2.31) on Scale I was on the high side of the observed range (3-15), indicating that respondents tended to report a high level of MC. The item-total correlation (ITC) ranged from 0.36 to 0.56 and the Cronbach's α was 0.65. The % at floor was low (1%) and that at ceiling was 38%. For Scale II, 4 items did not meet a minimum ITC of ≥ 0.30 . The remaining 4 items had a mean (3.30 ± 1.00) on the high side of the observed range (0-4); the ITCs ranged from 0.31 to 0.59; the Cronbach's α was 0.62. The % at floor was low (4%) but % at ceiling was moderately high (55%). **Conclusions:** These two scales had a good ITC range and an acceptable Cronbach's α . The % at floor was low for both scales, indicating that they can detect a negative change of MC for most respondents. The moderate ceiling effect for both scales indicated that these scales can only detect a positive change for 50% to 60% of respondents. These two scales need to be tested and modified in future studies to enhance their applicability in Chinese immigrants with HPT.

P3 What is an Appropriate Measure for Medication Compliance in Chinese Immigrants Who Are Taking Antihypertensive Medications?

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Significance: Medication compliance (MC), often defined as taking at least 80% of prescribed medications, remains a major concern in the control of hypertension (HPT) in the general US population. However, little is known about MC measures associated with blood pressure (BP) control among Chinese immigrants. This study will provide important information about MC measures in this population. **Objective:** To explore an appropriate MC measure in Chinese immigrants with HPT. **Design:** Cross-sectional. **Methods:** We assessed four MC measures in 200 Chinese immigrants with HPT, recruited in the San Francisco Bay area. The inclusion criteria were: A Chinese immigrant ≥ 18 years old, taking Western antihypertensive medications, and able to speak Mandarin. MC was measured in four ways: 1) the self-report 4-item MC scale, 2) the self-report 3-item MC scale, 3) 7-day recall and 4) pill count by the

investigator. BP was measured per the Joint National Committee VI standard procedure. **Findings:** The proportion of BP control was 51%. The proportion of MC was 55% for the 4-item MC scale and 75% for the 3-item MC scale. The proportion of MC by 7-day recall was 91%. Over half (53%) did not bring in their medication(s) even after a reminder call was made on the day before their appointment. Among those who brought in their medication(s), 73% of patients had added their new refills to the old bottles resulting in an unreliable pill count. **Conclusions:** The proportion of MC (55%) by the 4-item MC scale was consistent with the proportion of BP control (51%); and this scale appears to be the most appropriate measure for MC in Chinese immigrants with HPT. The 3-item MC scale and 7-day recall tended to overestimate MC. The pill count method failed to estimate MC. The association between the 4-item MC scale and BP control need further confirmation in Chinese immigrants with HPT.

P4 Determinants of Compliance with Statin Therapy in a Managed Care Population

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Methods: This retrospective analysis used claims data from a large, national, employment-based independent practice association database. Subjects were identified based on the existence of a filled prescription for statin therapy during the period of April 1, 1999 through June 30, 2001. Subjects had to be ≥ 18 years of age, continuously enrolled in the health plan for two years, and new users of statin therapy. Non-compliance was defined by a medication possession ratio of $<80\%$ for the duration of followup. **Results:** Of all subjects who met the inclusion criteria, 58% (35,383 of 61,006) were males with an average age of 51 (S.D. 9.4). According to the National Cholesterol Education Program (NCEP) Adult Treatment Panel (ATP) III, approximately 35% (21,352 of 61,006) were at high-risk and 20% (12,201 of 61,006) were at moderate-risk for CHD. As expected compliance with therapy decreased with followup and was lowest at 12 months after initiation of therapy: 59.1% (36,041 of 61,006) were compliant at 90 days, 47.5% (28,998 of 61,006) at 180 days, and 37.6% (22,935 of 61,006) at 365 days of treatment. In addition, 11.9% (7,259 of 61,006) had only one filled prescription for a statin drug during the follow-up period. The average medication possession ratio for all patients during their treatment period was 0.80 (S.D. 0.38). According to the results of the multiple logistic regression analyses for high-risk patients, older subjects (OR=1.03 OR; 95% CI: 1.02-1.03) and males (OR=1.42; 95% CI: 1.33-1.50) were significantly more compliant with statin therapy as were patients with more baseline outpatient visits associated with hyperlipidemia (OR=1.07; 95% CI=1.04-1.09). Further, as the average copayment for statins increased, there was a slight decrease in the likelihood of compliance (OR=0.99; 95% CI=0.98-0.99). **Conclusions:** The results suggest that hyperlipidemia treatment in the managed care setting needs further improvement, with special consideration to non-compliant patients. Among subjects at high-risk of CHD, additional focus should be given to younger patients, females, and those with fewer outpatient visits for hyperlipidemia treatment.

P5 Gender Disparities In The Use Of PCI In Patients With Acute Myocardial Infarction In Pennsylvania

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Objective: ACC/AHA guidelines for the management of acute myocardial infarction (AMI) support the recommendation of primary PCI as an alternative to thrombolytic therapy. The purpose of this research was to determine whether there were gender disparities in the use of primary PCI in Pennsylvania (PA) and whether outcomes were affected. **Study Design:** Retrospective analysis of a statewide database. Multivariate analyses were performed using binary logistic regression, controlling for relevant covariates. Retrospective matching on propensity scores was performed using a "greedy" matching algorithm. Data were provided by the PA Health Care Cost Containment Council and included 31,351 AMI patients at all acute care hospitals in the state of PA during the year 2000. Population was stratified by gender to identify disparities in treatment and outcomes. **Findings:** 10,170 (32.4%) AMI patients were treated with PCI and 21,181 (67.6%) patients were medically managed. Across all patients, women were significantly less likely to be treated with PCI than men (23.9% vs. 40%, $p<0.0001$) and were more likely to die in the hospital (12.7% vs. 9.7%, $p<0.0001$). Restricting the sample to patients treated at hospitals where PCI was available, women were significantly less likely than men to receive this form of therapy (34.4% vs. 65.4%, $p<0.0001$). They were also more likely to die when treated at hospitals offering PCI (10.1% women vs. 7.3% men, $p<0.0001$). Disparities in treatment and outcomes were confirmed in multivariate analyses. Controlling for age, race, severity of infarct and location and source of admission, women were observed to have a 25% lower odds than men of receiving PCI ($p<0.0001$) regardless of the availability of PCI. Propensity score methods to match 3,022 women who received PCI to 3,022 women who did not showed that women who received PCI were significantly less likely to die during their hospitalization (2.4% vs. 10.7%, $p<0.0001$). **Conclusions:** In PA, women are less likely to receive primary PCI for treatment of AMI. Women who received PCI experienced better outcomes. These results suggest that morbidity and mortality associated with AMI in women could be reduced by primary PCI. The reasons for the gender disparity in treatment require further investigation.

P6 Medicare Coordinated Care Demonstration Project: Home Telemonitoring for Heart Failure Patients

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The purpose of this project is to decrease the cost of care for Medicare beneficiaries with heart failure (HF). A key component of symptom management in HF is daily weight (WT) measurement. Patients are routinely taught to weigh daily and record their WT calling their provider or use a sliding scale of diuretic if weight increases more than 3 pounds overnight. There are many reasons why patients either do not weigh or do not call a provider. They may not understand, in spite of instruction, the significance of the weight change, they may not want to bother the provider, or they may have difficulty contacting the provider for a variety of reasons. This project randomly assigns patients to usual care vs equipping them with a special scale, blood pressure (BP) cuff, rhythm monitor and modem that relay WT and BP through the telephone lines to a central computer monitored by a nurse practitioner. The nurse can follow vital signs, daily weights and heart rhythm intervening as needed to control volume and blood pressure. Patients do not have to make judgments about whether the change is significant enough to call a provider or try to make contact with the provider. Forty-eight patients, 16 women, 24 African-American, with a mean age of 72 years were enrolled in the monitored group from 7/2002 through 12/2003. The number of days the patients transmitted WT and BP during the 1st, 6th and 12th months of the program were counted and expressed as a percent of 30 days. The WT was transmitted 85%, 75% and 66% respectively. BP was transmitted 77%, 67% and 63%. The numbers improved slightly when an adjustment was made for patients who did not transmit because they were in the hospital or called as instructed to say they were going out of town. First month WT and BP percentages were 93% and 80% respectively. Many of the patients with poor compliance said they just forgot to weigh or to call if they were going out of town. Since the failure to transmit is flagged for the monitor, they are called and reminded improving compliance. Patients were less likely to transmit BP than WT and the reasons are unclear although some have complained that the BP measurement is uncomfortable.

Withdrawn

Withdrawn

P9 Validity and Predictors of Adherence to Metformin in a Multiracial Clinical Trial

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The Action to Control Cardiovascular Risk in Diabetes (ACCORD) trial is comparing cardiovascular events in groups randomized to intensive vs. standard glycemic control (HbA1c <6.0% vs. ~7.5%). The primary measure of medication adherence is the response to the question: "Are you taking the medication all or almost all, some, or none of the time?" This single ordinal item was developed to minimize participant and staff burden, and was expected to be more easily understood than a quantitative estimate (e.g. ≥80%). In this ancillary study, self-reports and predictors of metformin adherence over a period of 6 months were compared to electronic

event monitoring (EEM). The participants were a convenience sample of 109 of the 1184 ACCORD Vanguard enrollees. The primary measure of adherence was the mean percentage of prescribed metformin taken during the 180 day monitoring period by EEM. The mean age was 63 years, 29% were female, 55% were White, 18% African American, 15% Asian, and 6% Hispanic, which was similar to the overall Vanguard population. The mean time spent with a study health educator at enrollment was 118 ± 96 minutes. Of the 109 participants, 102 (93.6 %) reported only "all or almost all of the time" adherence, 6 (5.5 %) reported "some of the time" at least once during the monitoring period, and 1 (0.9 %) reported "none of the time" once. The mean percentage of prescribed pills taken by participants who reported taking metformin all or almost all of the time was 81.0% ± 25.4%, some of the time was 65.3% ± 35.8%, and none of the time was 19.0% (p=0.03). In linear regression analysis, the amount of time spent with a health educator was the only significant predictor of adherence measured by EEM. For each additional 30 minutes spent with the health educator, percent adherence by EEM increased approximately 2% (p<0.01). Race was marginally significant (p=0.06), with white participants having an adherence rate 9% higher than non-white participants. Age, sex, educational level and entry HbA1c level did not predict metformin adherence. We conclude that a self-report of taking "all or almost all" of the metformin corresponded to a mean of about 80% of prescribed pills. Time spent with a health educator at enrollment was a strong predictor of increased adherence to the study metformin.

P10 The Effects of a Patient Education Tool on Knowledge and Cholesterol Control in Outpatients being Managed for Hyperlipidemia

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Background: Coronary artery disease is the major cause of death in the United States, and is associated with elevated LDL cholesterol. Effective treatment for hypercholesterolemia is available, but unfortunately, patient compliance with their prescribed regimen is often poor, with non-compliance rates exceeding 50% in some studies. We created a tool to improve compliance with a treatment regimen, and evaluated its effectiveness in a practice setting. **Methods:** We designed a "report card", indicating individual lipid goals based on NCEP III guidelines, and including the current lipid profile, past values for comparison, and a physician comment. Two physicians in the practice utilize these letters to communicate lipid values to their patients, while the other three physicians communicate lipid values by telephone or at office visits. After 1 year, the "report card" effectiveness was assessed in a sequential sample of fifty patients from each physician, recording actual lipid levels and assessing several measures of patient knowledge by questionnaire. Patients were included if their lipids were being actively managed for the preceding year. **Results:** Fifty sequential patients from each of the 5 physicians whose cholesterol was being actively managed for at least one year were evaluated; 83 received the lipid report cards (group A), and 167 received their values either at office visits or by telephone (group B). Mean age was 71 in group A and 69 group B (p=NS); 72% of group A and 52% of group B were male (p=0.002); 84% of patients in group A and 77% in group B had LDL goal of less than 100 mg/dl (p=NS). Mean LDL cholesterol was 88 ± 20 mg/dl in group A, and 101 ± 33 mg/dl in group B (p=0.0002). Knowledge of cholesterol medications was 78% in group A and 65% in group B (p<0.05). Knowledge of degree of control of cholesterol was 78% in group A and 55% in group B (p=0.001), while knowledge of actual cholesterol values was 19% in group A and 8% in group B (p=0.01). **Conclusion:** Utilizing a cholesterol "report card" to report patient lipid values and targets to patients may improve knowledge, medication compliance, and ability to achieve NCEP goals; this may translate into improved clinical outcomes. These findings will need confirmation in a prospective, randomized trial.

P11 Degree of Dyslipidemia Control at the VA Loma Linda Healthcare System

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Objective: To assess the extent of dyslipidemia control in patients at high risk* for cardiovascular events in whom LDL goal is <100mg/dL. **Methods:** Laboratory and ICD-9 databases were merged in order to identify high-risk individuals and assess their cholesterol indices. **Results:** One year search of the databases identified 9,875 patients with average age of 66(±11) yrs and a M/F ratio of 9,591/284 who met the criteria. There was no fasting lipid

panel (FLP) available for 38% of this population. Average Low Density Lipoprotein-Cholesterol (LDL-C) was 109 mg/dL while the goal was not achieved in 3,233 (57%) patients with available FLP. A total of 3,768 patients exceeded their non-High Density Lipoprotein-Cholesterol (Non-HDL-C) goal of <130mg/dL and 3,022 patients had HDL-C of <40 mg/dL. **Conclusion:** Even though the average LDL-C of 109mg/dL was not very alarming, over 57% of the patients did not achieve their LDL-C goal. In fact 25% of the patients were far from their goal with LDL-Cs exceeding 130mg/dL. Over half of the patients did not achieve their HDL-C goal and about 2/3 did not reach their non-HDL-C goal. This indicates a substantial need for improvement in the cholesterol indices of this high-risk group of the patients. Realizing the potential limitations of a database search, utilization and merger of databases in larger healthcare organizations provides an effective mean for assessment of degree of dyslipidemia control as well as other chronic conditions. *Definition of high- risk: coronary heart disease, peripheral vascular disease, abdominal aortic aneurysm, symptomatic carotid artery disease, thrombotic cerebrovascular accidents and diabetes.

AVERAGE CHOLESTEROL VALUES

| | AVG (STDV) | Median |
|--------------------------|-------------------|---------------|
| Total Cholesterol | 189 (44) | 184 |
| LDL-C | 109 (34) | 106 |
| HDL-C | 42 (12) | 40 |
| Non-HDL-C | 146 (41) | 142 |
| Triglycerides | 206 (198) | 159 |

Medication Adherence Among Patients with Chronic Kidney Disease

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Non-adherence to medical regimen is a major dilemma for health care. Patients with chronic kidney disease have significant comorbidity, thus are subjected to multiple medications. We studied the adherence to antihypertensive medication among 37 patients with chronic kidney disease and hypertension. We designed a specific adherence questionnaire for our study, based on current literature on adherence. Patients were enrolled during their routine clinic visit to kidney and hypertension clinic. Adherence questionnaire was introduced to the patients by a medical care provider. The mean age was 55±15, and 53% were females. Ischemic heart disease was present in 27%, peripheral vascular disease in 15%, and diabetes in 45%. Mean systolic blood pressure was 131±21 and mean diastolic blood pressure was 73±9. 45% of patients were on ACE-inhibitors/ARBs, 48% on beta-blockers, 33% on calcium channel blockers, 20% on alpha-blockers, and 52% were on diuretics. Of the total 45% were using special pill-box. 55% of patients said that if they miss one medication, they are very likely to miss other. 70% of the patients felt most comfortable when their physicians explain the use and benefits of medications instead of other health care providers. 65% of patients were using one or two medications over the counter and 13% were using at least one or two herbal medications. On specific questioning for antihypertensive medication adherence, 65% of patients said that did not miss any medication, and 80% claimed that they had taken the right dose. Most common cause of missing medication was forgetfulness (45%). When a dose is missed, 40% skipped it altogether, while 30% took it late. 42% of patients completely understood the reasons and benefits of taking medication, 42% understood quiet a bit, and only 3% claimed that they did not understand it at all. We conclude that physicians should explain the details of medications, than to defer it to other. All patients should routinely be questioned about over the counter and herbal medications. Early dementia may be an underlying reason for forgetfulness.

Using a Pharmacy Claims Database to Analyze Medication Adherence Trends in Patients Receiving Anti-Hypertensive Drugs

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Background: Medication non-adherence is a causative factor in hypertension-related morbidity and mortality. An awareness of adherence rates within a selected patient population may assist in the identification of factors that can enhance adherence and thereby potentially enhance treatment outcomes. **Objectives:** The objectives of this analysis were to evaluate and compare adherence rates with anti-hypertensive drugs by medication category within a health plan population. **Methods:** A prescription claims database of all anti-hypertensive medications was retrieved for the period September 2001 through March 2003. De-identified data were imported into Pfizer's Standardized Therapy Adherence Research Tool (START[®]) for analysis of medication adherence trends. **Results:** A total of 298 patients were evaluated. Patients receiving either angiotensin receptor blockers (n=26) or calcium channel blockers (n=37) had the longest average lengths of therapy at 221 and 202 days, respectively. Alternatively, patients receiving clonidine had the shortest average length of therapy at 91 days followed by patients receiving loop or thiazide diuretics. Patients receiving either loop or thiazide diuretics also allowed the greatest number of days to lapse between prescription refills. For all antihypertensive medication groups, a downward trend in persistence was observed over time. Patients taking calcium channel blockers, however, exhibited the best persistence with 86% of patients remaining on therapy at month-seven and 70% of patients persisting with therapy at month-eight. For each of the other antihypertensive medication groups, between 40% and 60% of patients remained on therapy during the first six months of therapy. **Conclusions:** Adherence to anti-hypertensive medications decreased over time with 40% to 60% of patients stopping anti-hypertensive therapy prior to completing six months of medication. The cardiovascular benefits are not realized if patients discontinue their medications prematurely. Based on these results the health plan intends to enroll all patients receiving anti-hypertensive medications into

a hypertension-specific disease management program to increase patients' awareness on the importance of medication adherence.

Analysis of Medication Adherence in Members Receiving Antihyperlipidemic Medications at a Small Midwest Health Plan

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Background: Good adherence has been associated with improved cardiovascular outcomes in post myocardial infarction patients and in those with hyperlipidemia. Many patients may not receive morbidity and mortality benefits from their antihyperlipidemic therapy due to premature discontinuation of medication or inadequate levels of treatment. **Objectives:** The objectives of this analysis were to evaluate adherence rates and to compare National Cholesterol Education Program (NCEP ATP III) low-density lipoprotein (LDL-C) goal attainment rates with antihyperlipidemic agents by drug class. **Methods:** Antihyperlipidemic prescription claims data and LDL-C values from February 2002 through October 2002 were evaluated. Prescription and lab data were de-identified and analyzed in Microsoft Access[®] and Pfizer's Standardized Therapy Adherence Research Tool (START[®]). This report represents an intent-to-treat analysis. **Results:** Of the 352 members evaluated for adherence, persistence decreased over time, with less than 60% of members remaining on therapy after eight months of treatment. Within this population, the antihyperlipidemic drug classes with the highest rates of adherence, as measured by average length of therapy and possession ratios (PR) included niacin (165.0 days, PR=0.75) and HMG Co-A reductase inhibitors or statins (165.3 days, PR=0.69). It should be noted that the sample size with niacin was small (n=8) compared to the statins (n=276). The fibric acid class (n=53) had an average length of therapy of 146.0 days with a PR=0.62, followed by the bile acid sequestrants (n=15) with an average length of therapy of 102.0 days and a PR=0.47. LDL-C goal attainment was assessed for 126 members with prescription claims within 15 to 45 days of their most recent LDL-C measurement. Overall goal attainment was 60.3%. Goal attainment was greatest for members on monotherapy with statins (62.5%), followed by niacin (50%) and fibric acids (30%). **Conclusions:** Statins remain the first choice of clinicians to treat hyperlipidemia due to their positive effect on cardiovascular outcomes. This analysis showed that statins provided greater member adherence. Future efforts regarding disease management will focus on the importance of adherence to drug therapy.

Effect of Limited English Proficiency on Compliance with Discharge Medications by Patients with Cardiovascular Disease

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To determine the impact of limited English proficiency on compliance with discharge medication, we studied 134 patients with cardiovascular disease (73 English Proficient (EP) and 61 Limited English Proficient (Spanish as primary language) (LEP)) at 48-72 hours and 30 days post discharge from hospital following admission for acute coronary syndrome, cardiac surgery or congestive heart failure. Patients were scored on compliance with their entire discharge medication list indicated by their physician; on whether there was reconciliation between the list of preadmission medications and discharge medications; whether they received verbal instructions on their medications; whether they received written instructions on their medications; whether they received instructions in their preferred language; and whether they were readmitted to the hospital or emergency department because of problems with medication compliance. The results are shown below: We conclude that patients with limited English proficiency are more likely to have problems with medication compliance at thirty days, are more likely to have problems with reconciliation of their pre-admission and discharge medication lists, and are less likely to receive written medication instructions and to receive instructions in their preferred language. In an effort to improve medication compliance, we are utilizing verbal and written instructions to patients in their preferred language; medication list reconciliation; a fact communication sheet to outpatient physicians; medication access screening ; and development of an electronic medication instruction translator to include medication schedule, prescriptions and patient-friendly instructions.

| Item | EP | LEP |
|---|-----------|------------|
| Compliance at 48-72 hours | 49% | 51% |
| Compliance at 30 days | 65% | 36% |
| Medication List Reconciliation | 43.8% | 25.0% |
| Verbal Instructions | 87.7% | 79.2% |
| Written Instructions | 71.2% | 6.3% |
| Instructions in Preferred Language | 78.1% | 8.3% |
| Hospital Readmission/Emergency Department Visit due to compliance problem | 12.3% | 10.4% |

P16

Use of Pre-operative Beta Blockers in Patients Undergoing Coronary Artery Bypass Surgery (CABG)

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INTRODUCTION: Pre-operative beta-blocker therapy is associated with decreased mortality in patients undergoing CABG. It reduces the incidence of post-operative atrial fibrillation, acute coronary syndrome and other post-operative complications such as prolonged ventilatory support, renal failure and stroke. In this study, we evaluated the use of pre-operative beta-blockers in our own institution. **METHODS:** We conducted a retrospective study of patients who underwent CABG at our institution between January 2001 and December 2002. Charts were randomly selected from DRG codes. Data regarding age, sex, race and use of preoperative beta-blocker were obtained from the anesthesia pre-operative evaluation records. Co-morbid conditions mainly DM, CHF, HTN, CRI (Cr $>$ 2.0) and history of CVA were recorded. The access program was used for analysis. Patients with incomplete records, allergy to beta-blockers, severe COPD or cardiogenic shock were excluded from analysis. **RESULTS:** A total of 707 patients were included in this study. There were 490 males and 217 females. Mean age of patients was 66.2 years SD \pm 10.7, (age range 36–92). Caucasians comprised 89% of patients, 4.8% African American, 0.4% Indian. Co-morbidities include DM (34.3%), CHF (11.0%), HTN (63.1%), CRI (4.4%) and CVA (9.3%). 73% of all patients received a beta-blocker pre-operatively. On subgroup analysis, 68% of diabetics, 68% of patients with CHF, 72% of hypertensives, 74% of patients with CRI and 76% of patients who had a previous CVA received pre-operative beta-blocker. **CONCLUSION:** Pre-operative use of beta-blockers in patients undergoing CABG in our institution is comparable to other institutions in Northern America.¹ Implementing a pre-operative protocol may further improve administration of this medication that has been shown to decrease mortality and operative complications associated with CABG.

P17

Adherence to Statin Treatment Guidelines and 6-Month Survival in Patients Following Percutaneous Coronary Intervention (PCI).

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Background: The reduction of death and disability from cardiovascular disease is enhanced with implementation of national treatment guidelines that include statins. The benefits of statins have been established clearly in the secondary prevention of cardiovascular disease. However, little is known about the potential benefit of implementation of statins on 6-month outcomes following PCI. **Methods:** Baseline data was collected in 1,832 consecutive PCI patients. Patients who survived to hospital discharge and completed 6-month follow-up were included in this analysis. Trained nurses collected baseline data of the index hospitalization from medical chart review. Variables included demographics, co-morbidities, procedural details, in-hospital outcomes and statin status at discharge. Six month follow-up data was ascertained by telephone interview and included cardiac morbidity and mortality, functional status and statin compliance. Kaplan-Meier estimation and Cox proportional hazards modeling were used for univariate and multivariate survival analysis. Propensity analysis was used in order to minimize the bias inherent in the decision to prescribe statins. **Results:** 68% of the PCI patients received statin therapy at hospital discharge. The Cox proportional hazards analysis revealed a significant all-cause mortality benefit at 6-months associated with statins prescribed at hospital discharge as per the national treatment guidelines (1.1% vs 4.2%; $p < 0.001$). Statin use was an independent predictor of 6-month survival ($p = 0.001$). **Conclusion:** Statin therapy at time of hospital discharge for PCI patients was associated with a significant reduction in all-cause mortality at 6-month follow-up. Early implementation of national treatment guidelines may help reduce death rates from cardiovascular disease. Randomized clinical trials will be required to determine if the administration of statins in the acute care setting is advantageous to survival.

| Variables | Hazard Ratio | 95% CI | p value |
|-----------------|--------------|------------|---------|
| Age \geq 75 | 2.00 | 1.00–4.01 | 0.05 |
| CHF | 2.02 | 0.97–4.20 | 0.06 |
| PVD | 2.44 | 1.19–5.00 | 0.015 |
| Renal Failure | 5.50 | 2.50–12.08 | 0.001 |
| Beta Blocker | 0.40 | 0.21–0.78 | 0.007 |
| Calcium Blocker | 0.33 | 0.14–0.79 | 0.013 |
| Statins | 0.31 | 0.16–0.61 | 0.001 |

P18

Superior Immediate and Longterm Outcomes in ACS Patients are Achieved by Initiating Statin Therapy Without In-Hospital Cholesterol Measurement

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INTRODUCTION: Current AHA guidelines recommend initiating statin therapy for hospitalized patients with acute coronary syndrome (ACS) based on lipid (FLP) testing within 24 hours of hospital admission. **HYPOTHESIS:** Initiating moderate dose statin without inpatient lipid testing would safely improve LDL-c outcomes, decrease recidivism and increase compliance with AHA recommendation for discharge on statin therapy. **METHODS:** Statin therapy was prescribed and follow-up FLP scheduled for 8–12 weeks post-discharge for all ACS patients without

contraindications since 1998. Pre-hospitalization FLP, when available, was used to adjust starting statin dose. To determine the immediate and long-term impact on LDL-c, a retrospective chart review was conducted over an 18-month period on 216 consecutive hospitalized ACS patients without prior statin used. **RESULTS:** Of the 216 (154 men, mean age 64 years), 206 (96%) took statins as prescribed and 205 obtained their initial FLP on average 13 weeks (range 8–36 weeks) following hospital discharge. Initial LDL-c results stratified by starting statin dose (Simvastatin/equivalent: 40–80mg = High; 20mg = Moderate; 10mg = Low) are depicted in the table. Initial moderate hypertriglyceridemia (200–500 mg/dL) was common (28%), but statins were continued in all these patients most of whom had combined dyslipidemia. TG $>$ 500 mg/dL prompted reconsideration of statin therapy in just 3 (2%) subjects. Patients were followed for mean 2.5 years during which time statin doses were adjusted, usually just once, in 100 cases (49%) resulting in High, Moderate and Low statin equivalent use in 66 (32%), 89 (43%), and 39 (19%), respectively; statins were discontinued in just 11 (5%) including 5 of the 10 whose initial LDL-c was $<$ 50 mg/dL. **CONCLUSION:** Foregoing in-hospital cholesterol measurement in ACS patients prior to statin initiation eliminates a logistic barrier, has few downsides, and yields superior immediate and long-term LDL-c outcomes.

| LDL-c (mg/dL) | Initial LDL-c by Starting Statin Dose | | | | Most recent LDL-c |
|---------------|---------------------------------------|-------------------|-------------|------------------|-------------------|
| | High (n= 25) | Moderate (n= 165) | Low (n= 15) | All (n= 205) | All (n=205) |
| $<$ 50 | 0 | 10 | 0 | 10 (5%) | 4 (2%) |
| 50–99 | 14 | 120 | 9 | 143 (68%) | 165 (80%) |
| 100–129 | 11 | 28 | 3 | 42 (20%) | 29 (14%) |
| $>$ 130 | 0 | 7 | 3 | 10 (5%) | 7 (3%) |

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Quality of Life and its Impact on Compliance Among Post-Myocardial Infarction Patients

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Objectives: Compliance to cardiac risk-reduction recommendations among post-myocardial infarction (MI) patients is an important predictor of mortality. Most investigators find depression to be a major factor predicting poor compliance in post-MI patients. Quality of life (QOL) is important to post-MI patients and only one cross-sectional study has examined the relationship between QOL measures and compliance among post-MI patients. **Hypothesis:** We assessed whether QOL prospectively predicts compliance among post-MI patients, even after considering the effect of depression on compliance. **Methods:** Acute-MI patients (N=285) were administered questionnaires on QOL, depression, and compliance in-hospital and four months post-MI. Multiple linear regression analyses separately examined cross sectional and prospective relationships between compliance and both physical health and mental health QOL domains. Each QOL domain was modeled as “compliance = QOL domain + depression.” We also analyzed additional models that included the relevant covariates of age, gender, race, diabetes status, prior MI, living alone, ejection fraction, and cigarette use. **Results:** In all the models, physical health QOL was related to compliance using cross-sectional ($p < .001$) and prospective ($p < .05$) approaches, even after adjusting for depression. Conversely, mental health QOL was not related to compliance. **Conclusion:** In conclusion, it is important to assess patient’s perception of their physical health QOL in the acute MI setting. Focused attention on those with low scores in physical health QOL may help identify those patients recovering from an MI who are at risk for non-compliance.

P20

An Example Application of New Methods for Analyzing MEMS Cap Opening Data

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Background: We recently developed adaptive Poisson regression methods for analyzing electronic monitoring event data and for evaluating subjects’ adherence using a measure of consistency between actual and prescribed adherence. We applied these methods to data from Medication Event Monitoring System (MEMS) caps attached to pill bottles containing a randomly selected antiretroviral medication for subjects from a prospective randomized clinical trial (The Adherence through Home Education and Nursing Assessment Project) examining adherence to highly active antiretroviral therapy for subjects with HIV disease. **Objectives:** 1. To assess MEMS cap usage for individual subjects as well as for groups of subjects. 2. To demonstrate the usefulness of these recently developed methods for visualizing adherence patterns not identifiable through traditional MEMS summary measures. **Methods:** Adaptive Poisson regression. **Results:** A total of 163 subjects returned 185 caps containing usable data with 11 to 1,306 cap openings per subject over usage periods of 29 to 729 days long and combining to over 75,000 cap openings. To compute cap opening counts/rates, we grouped the data for each subject into time intervals of at least 3 days long and at least 1% of total usage time, producing 9 to 100 intervals per subject for a total of over 13,000 for all subjects combined. We analyzed cap opening counts/rates for selected individual subjects as well as groups of subjects categorized on demographic characteristics, generating example plots for visualizing cap opening processes and their estimated adherence patterns over time during study participation. For example, while adherence decreased on the average over time for both

male and female subjects, average adherence for male subjects was uniformly closer to the prescribed rate. Conclusions: It is possible to capitalize on the rich amount of longitudinal information on adherence available in electronically collected data. Studies collecting electronic adherence data can utilize these methods to obtain deeper insights into subjects' adherence than is otherwise possible.

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Is There a Ceiling for Lipid Lowering Compliance? Computerized Community Cholesterol Control (4C)

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Background: Most of patients with coronary artery disease (CAD) are sub-optimally treated with lipid-lowering drugs. There is probably a ceiling for compliance in the range of 20–30% of patients. The 4C database gives an opportunity to clarify non-compliance determinants. **Objectives:** To quantify and characterize factors associated with non-compliance. **Methods:** By incorporating computerized databases we created a comprehensive registry including demographics, diagnosis, laboratory results and medication. This system detected patients eligible for lipid-lowering drugs and sends recommendations to their primary care teams. **Results:** One-year follow-up was available for 2,798 patients enrolled since January 2001. In a subgroup of 979 patients with initial LDL > 110 mg/dL, significant net improvement of medication with statins was achieved, particularly lowering the incidence of patients not on statins (from 48% to 41%) and increasing patients receiving medium drug potency (from 18% to 26%), ($p=0.0017$). The exact changes classified as "positive" or "negative" are presented in the table. GP's in a voluntary feedback reported that 34% of the recommendations could not be fulfilled. Factors associated with non-compliance are age over 65 years, being a minority, misdiagnosis of dyslipidemia and not being discharged from hospital by a cardiologist. **Conclusions:** 4C intervention demonstrated significant improvement of secondary prevention measures. Despite all the efforts, over 30% of eligible patients are not receiving statins, representing the ceiling of compliance. Ways to approach these noncompliance domains should be developed.

STATINS SHIFTS DURING ONE YEAR

| Group | Control, n=517 | Intervention, n=462 |
|--------------------------|----------------|---------------------|
| Initiated treatment | 11.2% | 14.5% |
| Up titration | 11.4% | 12.1% |
| No change | 27.3% | 30.1% |
| Positive status | 49.9% | 56.7% |
| Down titration | 1.9% | 1.9% |
| Ceased medication | 10.8% | 8.9% |
| Missed statin initiation | 37.3% | 32.5% |
| Negative status | 50.1% | 43.3% |
| Intervention vs. control | $p=0.034$ | |

P22

Computerized Community Cholesterol Control (4C): Meeting secondary prevention challenge

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Background: Most of patients with coronary artery disease (CAD) that should be treated with lipid-lowering drugs are sub-optimally treated. A computerized community cholesterol control (4C) may be an effective communication modality to enhance secondary prevention. **Objectives:** To study the impact of 4C on secondary prevention measures, identify under treatment characteristics and clinical outcomes. **Methods:** Patients from 112 demographically matched clinics, 56 in the intervention group, and 56 - routine practice (control). We created a comprehensive computerized registry of patients with CAD discharge from hospital. This system detected patients requiring screening or those eligible for lipid lowering drugs, then mailed reminders to the primary medical teams, (intervention arm). Periodic reinforcement of updated reminding was performed every 4 months. **Results:** One-year follow-up was available for 2798 patients. The intervention arm demonstrates better screening at 360 days (64.2% vs. 56.8%, $p<0.001$), as well as better medication (the % of patient on adequate medication, $p<0.0004$). Patients not receiving lipid-lowering drugs had significantly higher one-year mortality (13.1% vs 5.7%, $p=0.0001$). In a subgroup of 652 patients with LDL > 124 mg/dL, receiving lipid lowering drugs were associated with younger age ($p=0.007$), having a documented diagnosis of dyslipidemia ($p=0.0001$), having any MACE during the last year ($p=0.0001$), and after previous revascularization ($p=0.0001$), more after PCI than after CABG ($p=0.03$). Major cardiac events rate were significantly lower in the intervention arm only in a subgroup of patients with LDL > 124 mg/dL (13.4% vs. 22.4%, $p<0.002$). Significant lowering of LDL level associated with the intervention was demonstrated only in a subgroup of patients ($n=235$), with initially LDL > 124 mg/dL and without prior medication (122.9 ± 37.0 vs. 134.9 ± 35.0 , $p<0.023$). **Conclusions:** Patients not receiving lipid-lowering drugs have higher one-year mortality rate. 4C intervention demonstrated a significant improving effect on secondary prevention measures: screening and more effective medication. In a high-risk group with initially LDL > 124 mg/dL a significant reduction of major cardiac events rate was demonstrated.

Patients' perspectives on statin therapy for treatment of hyper-cholesterolemia: a qualitative study

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Health Care Practitioners' attempts to implement secondary prevention targets for coronary artery disease (CAD) may be restricted by low rates of persistence with statin therapy. Discontinuation rates are reported to be around 50% one year after commencement of therapy decreasing substantially over time. There is clearly a need to understand why some patients, despite having established CHD and elevated cholesterol, do not comply with their prescribed statin regimen. Aim: To explore patients' perspectives on statin therapy and compliance with their prescribed regimen. Setting: Primary care, West of Scotland. Methods: This qualitative exploratory study was conducted using in-depth one to one interviews in the patient's own home. The target population was a large primary care practice ($n=5,324$) in the West of Scotland. We identified 252 patients from this population who were aged ≥ 18 years and who had been diagnosed with existing CAD or as being at risk of CAD and who had been prescribed statin therapy for at least three months. Recruitment was by letter and follow up telephone call. From this group, 33 patients with different patterns of compliance were identified. We defined compliance as 'good' (70–100%), 'moderate', (41–69%) and 'poor' (< 41%). Level of compliance was determined by calculating the number of tablets refilled over a specified period and calculating this as a percentage of the number prescribed over the same period. Compliance behaviour, as identified by the repeat prescription data, was ratified at interview by asking respondents directly for this information. Findings: Compliance with statin therapy appeared to be associated with patients' personal beliefs about current health status, cholesterol, and recommended cholesterol-lowering strategies. Inadequate information, lack of feedback, and 'misreading of information' during patient-health care practitioner consultations appeared to be associated with patients' perceptions of the risks associated with hyperlipidemia and the need for continued drug therapy. Conclusions: Patients' beliefs and understanding about cholesterol, and the role of cholesterol modifying strategies should be determined prior to the initiation of therapy and at appropriate intervals thereafter.

P24

Adherence to Statin Medications in a Large Community Pharmacy Chain

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A comprehensive intervention program to improve patient adherence to HMG CoA reductase inhibitor (statin) medications in a large community pharmacy chain in the southwest US is currently underway. This report summarizes baseline information on statin adherence prior to program implementation. All statin prescriptions filled in the chain's 108 statewide pharmacies over one year were evaluated. Adherence was measured by several methods, including medication possession ratio (MPR), total days of therapy received, and medication persistence. These were calculated by each patient's overall length of therapy (LOT) and at various time intervals including 90, 180, 270, and 365 days. No front end washout was applied to maximize the time available to analyze persistence, although this limited our ability to analyze overall length of therapy for patients initiating new statin treatment. A 180 day back end washout period was applied; patients were not included if the first statin prescription was filled less than 180 days before the end of the collection period. This allowed us to calculate persistence up to 180 days in all patients. Between 8/10/2002 and 8/30/2003, 31,417 patients received 161,101 statin prescriptions. The mean number of patients per pharmacy was 295.2 ± 128.6 (range 1–664), and the mean number of statin prescriptions per pharmacy was 1491.7 ± 663.8 (range 1–3260). The numbers of patients on each drug were atorvastatin 18,794 (59.8%), pravastatin 6,182 (19.7%), simvastatin 4,749 (15.1%), fluvastatin 1,654 (5.3%), and lovastatin 38 (0.1%). The mean number of tablets received per prescription was 34.7, and the mean cost to the patient per prescription was \$30.01. Males represented 50% of the patients, and the mean age was 61.6 years. The MPR (LOT, 90, 180, 270, and 365 days) for all statins was 0.87, 0.89, 0.72, 0.63, and 0.54, respectively. Patients received a mean total number of days of therapy of 197. Persistence to therapy at 90 and 180 days was 83% and 66%, respectively. These data demonstrate that adherence to statin medications in a large community pharmacy chain is not optimal. Further analyses will be conducted to identify patients for inclusion in a comprehensive program to improve medication adherence.

P25

A Couples Approach to Lipid-Lowering Medication: Compliance and Maintenance

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It is now well established that medical treatment for hypercholesterolemia effectively reduces the risk of CHD and acute events in patients with elevated total cholesterol. Nevertheless, adherence to these medications is low despite their effectiveness, with many studies citing adherence rates ranging from a 22% to 40% after one year. "Partners for Life" is an intervention designed to examine whether an ongoing, intimate relationship can be used to help patients diagnosed with coronary artery disease adhere to a risk-reducing behavioral intervention and maintain healthy behavioral changes. Patients with diagnosed coronary artery disease were randomized to a standard behavioral treatment group or to a standard behavioral treatment group including a couples intervention and followed for 18 months. The couples intervention was designed to both change the patient's environment to facilitate cardiac risk-reducing behavioral changes and optimize social reinforcement and motivation for behavior change. Medication adherence was assessed using a computerized pill cap (TrackCap™ System) that records when the bottle containing the patient's lipid lowering

medication is opened (time of day, times per day). Results revealed that on average, patients took the correct number of doses of their medications 84% of the days assessed at 18 months, and 75% of their doses on the right schedule at 18 months. Parametric analyses were also conducted with the following aggregated time points to assess change across time: baseline to 6 months, 6 months to 12 months, and 12 months to 18 months with the following results: a significant group by time interaction for days compliant: $F(2,52.5)=3.2$, $p=.048$, and a trend, very close to significance, for group X time interaction for days correct: $F(2,55.3)=3.0$, $p=.058$. All interactions and trends were in the direction of patients in the couples groups making and maintaining more changes than patients in the individuals groups. These results suggest that focused attention to the issue of medication adherence can boost adherence rates above what has been reported in the literature both during the intervention and through at least 18-month follow-up. Second, there is an advantage to a couples approach to behavior change.

P26

Why Patients Stop Taking Medication?

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Objective: To investigate reasons for medication discontinuation at different point of prescription therapy as a basis to develop effective patient adherence programs. **Method:** Participants: A total of 6,000 patients age 18 or older who were taking simvastatin. **Setting:** More than 1,200 community pharmacies nationwide. **Data** was from computerized pharmacy records. **Design:** A questionnaire was developed to assess patient behavior at different points of time in therapy. Two groups of patients were selected: the lapsed group, who failed to pick up refills, will be compared to the adherent group, who has continuously picked up refills at the time of survey mailing. Each group was then subdivided into three groups. The three lapsed groups include patients who didn't pick up their first scheduled refill; patients who picked up their first but not the second refill; and patients who picked up their first and second but not the third refill. The three adherent groups include patients who picked up their first scheduled refill; patients who picked up their first and second refills; and patients who picked up their first, second and third refills. A questionnaire will be mailed to all six groups ($N=1,000$ for each group). **Results:** This is research in progress without results at this time. Preliminary results will be presented in this year's Compliance in Healthcare and Research conference. Final data and results will be submitted for presentation at the conference in 2005. **Conclusions:** Previous research has shown that patients' reasons for treatment discontinuation vary at different points in therapy. This study will give us insight about why patients discontinue therapy as treatment progresses. If successful, this study will aid health professionals to design targeted, evidence-based adherence programs in order to improve public health.

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National Evaluation of Adherence to Beta-blocker Therapy for One Year After Acute Myocardial Infarction in Patients with Commercial Health Insurance

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Background: The standard industry measure of beta-blocker therapy after MI is % of members prescribed a beta-blocker within 7 days of discharge (Health Plan Employer Data & Information Set, HEDIS). Yet full survival benefits of beta-blockers can only be realized with sustained, chronic therapy. **Methods:** Using pharmacy claims data, 11 health plans, members of the Council for Affordable Quality Healthcare (CAQH), performed a retrospective analysis of one-year survivors of MI to measure population adherence to beta-blockers for 30, 90, 180, 270, and 360 days after MI. For patients with MI in year 2001, beta-blocker claims were obtained for the 90 days prior to MI and for 12 months after MI. Health plans used common technical specifications; de-identified data were aggregated by CAQH to determine adherence to beta-blocker therapy overall, by age and gender, by region (NE, SE, MW, and W), and by type of health plan product (HPP). Adherence was defined as claims for beta-blockers for at least 75% of days during a measurement interval. Since the Medicare + Choice (M+C) population has a unique age distribution, multivariable logistic regression analysis was performed separately for M + C and for commercial HPPs. **Results:** The study population included 17066 patients from 46 states and D.C. (44% HMO/POS, 20% M+C, 27% PPO, 9% Indemnity). National cumulative adherence (the proportion of patients who were adherent) for 30, 90, 180, 270, and 360 days was 69%, 57%, 52%, 49%, and 45%, respectively. The proportion of patients adhering in M+C products (59%, 49%, 43%, 40%, and 37%) was lower than for commercial HPPs. Within M+C, patients ≥ 65 yrs had better adherence than those 35–64 yrs. Region was also predictive of adherence (SE lowest), but gender was not. For commercial HPPs, adherence was lower for females than males. Region was predictive of adherence (SE lowest), but age was not. For all HPPs, adherence decreased significantly over time; the largest drop was between 30 and 90 days. **Conclusion:** Despite having prescription coverage, only 45% of this large population was adherent to beta-blockers during the first year after MI. In order to capture the survival benefit potentially afforded by beta-blockers, quality improvement initiatives need to focus on longer term outpatient adherence.

P28

Managing Patient Compliance in an International Clinical Trial

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Introduction: Managing patient compliance to randomized therapy in clinical trials is of critical importance, especially with active controlled trials where non-inferiority is addressed. Tracking compliance, reporting this to sites and trial leadership, and effectively intervening to change patient/site behavior are formidable challenges. **Methods:** After enrollment ended in the VALIANT trial, a large, multi-site, international project, the trial team noted higher than expected study drug discontinuation (D/C) rates. With the prospect of further decreases in compliance in the long follow-up period, the team developed an Access Discontinuation Database (DDB) to track compliance by using data from site reports and the Interactive Voice Response System (IVRS). The IVRS collected data on randomization, study drug resupply, and D/Cs. The DDB collated reasons for D/C and allowed for site/country comparison. "Permanent D/C" was defined as no plan to restart study drug in a particular patient; "temporary D/C" indicated no study drug resupply for >140 days. The trial team developed standardized strategies for patient-specific issues and worked with the site personnel and study leadership. **Results:** Initial compliance reports indicated an increase in the permanent and temporary D/C rates. Shortly after implementing compliance reporting and standardized interventions, the D/C rate leveled and remained steady for the remaining 13 months of the trial. **Discussion:** This rate reduction suggests that the automated feedback of timely information assembled from trial reports improved study drug compliance rates in the overall trial. Sites were willing to expend additional effort to promote compliance when their site could be compared with others and when compliance strategies were offered. Although managing patient adherence in large trials is a complicated issue, a D/C database, patient-specific strategies, and a focused operational plan can be invaluable tools.

AVERAGE # OF NEW DISCONTINUATIONS/MONTH

| Discontinuation Type | Before DDB | After DDB |
|----------------------|------------|-----------|
| Temporary | 55 | -12.5 |
| Permanent | 233 | 41.7 |

P29

Self-Monitoring Promotes Long-Term Exercise Adherence Among Unfit Adults

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The purpose of this quasi-experimental study was to examine the effectiveness of a self-monitoring checklist, combined with personal coaching, on long-term exercise adherence among 103 male ($n=35$) and female ($n=68$) university faculty. It was hypothesized that exercisers who engaged in self-monitoring would maintain their exercise habit significantly longer - after three months - following the 8-week summer program as compared to a control group that did not use the checklist. The focus of the 40-item self-monitoring (SM) checklist was to remind exercisers to engage in proper thoughts and actions that would enhance exercise performance, to reinforce improvement, achievement, and competence, and to improve their level of personal satisfaction as an exerciser. All participants, ranging in age from 25.6 to 57.3 yrs., were unfit and had been sedentary for at least three months prior to the study. They were randomly and evenly assigned to one of two groups, experimental (self-monitoring) and control. All participants worked with a performance coach. Each week, the experimental group completed the SM checklist, which provided instruction on using proper behavioral and mental strategies during the week, on the day of their exercise session, at the exercise venue, and just prior to, during, and immediately following each exercise session. Performance coaches of experimental group participants reviewed the checklist with their client individually each week, reinforcing the need to maintain proper strategies and to overcome deficiencies. Phone interviews 90 days following the summer program indicated that 39 of 51 (76%) of the SM group was still exercising a minimum of 3 times per week, as compared to 19 of 52 (36%) control group exercisers. Interviews indicated that adherence was related to improved self-confidence, improved knowledge about proper exercise technique, scheduling a planned ritual, and social support (i.e., exercise with one or more friends).

P30

Multicultural Understanding of a Research Study and Its Relation to Medication Adherence

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Few studies have evaluated the relationship between level of understanding (LUS) of a research study and its relationship to medication adherence (MA). The goal of this study was to determine if LUS was related to MA. Twenty-three Hispanic and 22 African American women over the age of 65 who were participating in an osteoporosis study were asked to join a one year MA study. Face to face interviews in both English and Spanish were conducted in order to complete an assessment of their LUS at their first and last visit. The question asked was "In your own words please describe the study that you are participating in". The subjects' responses were rated on a 0–2 scale by the investigators. A subject received a score of 1 if they demonstrated some understanding of the study by mentioning 1–2 key words and a 2 for good understanding by using 3 or more key words such as osteoporosis, bone, estrogen and calcium. If subject did not mention any key words they scored 0. For conducting 2 general linear models (GLM), subjects with "good" LUS were combined with subjects scoring "some"

LUS, since only 6 women scored "good". MA by pill count divided by amount dispensed was calculated into percentage at these time points. RESULTS: Twenty-two percent of the subjects increased their LUS, while 11% decreased. Most women's LUS (64%) did not change. Overall, MA from the first visit to the last was adequate (81.8 to 84.9%). No significant relationship was found at baseline or end of study between level of understanding and medication adherence ($p > .05$). Our findings suggest that a participants' LUS does not contribute to their rate of MA although we only asked one open-ended question that may not accurately reflect their true ability to describe the study due to a wide range of educational levels and familiarity with medical terms. Other factors such as behavioral strategies, frequent contact with a health care professional, incentives and physiological improvement may play a larger role in adherence than understanding of a study.

P31

Self-Management of Type 2 Diabetes and Coronary Heart Disease Risk Factors in Black Women

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Type 2 diabetes (T2DM) is a strong risk factor for coronary heart disease (CHD) in women. The epidemic of obesity and T2DM in blacks highlights the need to better understand factors associated with achieving treatment goals. Emotional distress (Problem Areas in Diabetes [PAID]), provider support for diet and exercise behaviors (Health Care Climate Questionnaire), and DM self-efficacy were examined in relation to self-management of glucose (HbA1c) and CHD risk factors (CRFs), including lipids, blood pressure (BP), body mass index (BMI) and waist circumference (WC) at baseline in 85 black women prior to randomization in a culturally competent T2DM intervention program. The mean age was 48 ± 9 years, 39% were single, 64% were employed, 43% had yearly incomes $< \$10,000$ and most had a high school or college education. All but 5 had a BMI (kg/m^2) ≥ 25 , with 76% ≥ 30 . While 59% had undergone previous lipid screening, 79% had HDL-C ≤ 55 mg/dL, 66% had LDL-C ≥ 100 mg/dL, and 30% had TG ≥ 150 mg/dL; 58% had a BP $\geq 130/80$ mmHg. Higher PAID scores were associated with lower levels of provider support for diet ($r = -.29; p = .02$) and exercise ($r = -.22; p = .08$), and lower levels of self-efficacy ($r = -.41; p = .001$), while higher levels of provider support for diet were associated with higher self-efficacy ($r = .22; p = .05$). PAID scores were not significantly associated with HbA1c or CRFs. Higher levels of provider support for diet were associated with a lower BMI ($r = -.24; p = .02$), while higher levels of support for exercise were correlated with a lower WC ($r = -.21; p = .05$). Higher levels of DM self-efficacy were associated with lower HbA1c levels ($r = -.24; p = .03$), but not with other CRFs. The CRF profile in these women may contribute to an increased CHD risk. Successful culturally competent interventions that target multiple CHD risk factors and T2DM need to be developed in this population.

P32

Achieving Treatment Goals for Prevention of Coronary Heart Disease in Type 2 Diabetes

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Although traditional approaches to self-management of type 2 diabetes (T2DM) have focused on glucose control, prevention of coronary heart disease (CHD) requires reduction of multiple CHD risk factors (CRFs). Individual (age, personal model beliefs [PMBs] about T2DM, anxiety), illness-related (T2DM and CRF regimen), and family factors (marital status, income, social support) were assessed, using multivariate logistic regression, in relation to established goals for glucose (HbA1c), blood pressure (BP), lipids, body mass index (BMI), and waist circumference (WC) in 110 subjects undergoing screening for asymptomatic myocardial ischemia. Mean age was 61 ± 6.5 , with T2DM duration 8.3 ± 7.1 years; 53% were female. HbA1c was $\geq 7\%$ in 46% and was associated with anxiety ($p = .006$), longer T2DM duration ($p = .007$), insulin use ($p = .002$), and higher income ($p = .05$). Many were not achieving goals for BP (64%), high (HDL-C) (46%) and low-density (LDL-C) (67%) cholesterol, triglycerides (TG) (46%), BMI (56%) or WC (79%). BP $\geq 130/80$ mmHg was associated with longer T2DM duration ($p = .02$) and BP medication use ($p = .05$). LDL ≥ 100 mg/dl was associated with living alone ($p = .002$). TG ≥ 150 mg/dL was found with diuretic use ($p = .01$) and lower levels of PMBs ($p = .02$), exercise ($p = .02$), and support ($p = .01$). HDL-C ≤ 45 (men)/55 (women) mg/dL was associated with PMBs ($p = .05$) and lower levels of exercise ($p = .02$) and support ($p = .05$). BMI ≥ 25 kg/m^2 was associated with younger age ($p = .02$), BP medication use ($p = .004$), lower levels of exercise ($p = .004$), and higher income ($p = .05$). WC > 35 (women)/40 (men) inches was associated with female gender ($p = .004$), PMBs ($p = .02$), not using insulin ($p = .02$), and lower levels of exercise ($p = .03$). Providers need to recognize that many individuals with T2DM are not achieving CRF treatment goals. In addition, different individual, illness-related and family factors contribute to the inability to achieve treatment goals for glucose and CRFs. Multiple, individualized strategies should be used when implementing CRF reduction interventions in T2DM.

P33

Ethnic Differences in Adherence to Pharmacological Therapy

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Research has shown that health outcomes differ between African Americans and Caucasians. This difference may be due to differences in adherence to pharmacological therapy. The aim of this study was to determine whether differences exist in adherence to pharmacological

therapy across chronic disorders between African American and Caucasian samples pooled from existing data sets. A correlational descriptive design was used to examine adherence to medications over 2 weeks from 8 studies that used electronic event monitoring as a common measure for adherence. Subjects were diagnosed with hyperlipidemia, hypertension, CHF, rheumatoid arthritis, AIDS, PID, and organ transplantation. Subjects ($n = 1,304$) were 14% ($n = 176$) African American, 58% ($n = 759$) female, 64% ($n = 830$) married, 38% ($n = 494$) employed, mid-life ($M = 52.0$ years, $SD = 14.2$), with $>$ high school (HS) education (48%, $n = 630$) and an income of $\$10,000$ – $\$49,999$ (61%, $n = 672$). Adherence was summarized as % of doses taken, % of adherent days, and % of on time doses. Results showed adherence for African Americans vs. Caucasians was 74.1% ($SD = 33.0$) vs. 84.5% ($SD = 28.4$) for doses taken, 52.5% ($SD = 33.7$) vs. 68.3% ($SD = 32.6$) for adherent days, and 39.6% ($SD = 36.0$) vs. 60.8% ($SD = 34.8$) for on time doses. Hierarchical stepwise logistic regression showed that African Americans had 2.1 times the odds of Caucasians to have $\leq 80\%$ or $\geq 120\%$ adherence to doses taken after controlling for sociodemographic factors [Wald = 11.153 (df = 1), $p = .001$]. Hierarchical stepwise regression controlling for sociodemographic factors showed ethnicity explained significant additional variance in adherence summarized as adherent days [Change $F(1,1084) = 7.955$, Change $R^2 = .007$, $p = .005$] and on time doses [Change $F(1,761) = 12.049$, Change $R^2 = .014$, $p = .001$]. Overall, models explained 3.5–8.6% of the variance in adherence. Subjects who were African American, younger, had $<$ HS education, or were not married had lower adherence summarized as adherent days. Subjects who were African American, younger, had HS education or less, or had $<$ $\$10,000$ income had lower adherence summarized as on time doses. These findings support the development of culturally sensitive interventions to improve adherence to medications in African Americans.

P34

Challenges of Creating an Adherence Measure for Immunosuppressive Regimen Following Cadaveric Renal Transplantation

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In order to study the impact of non-adherence with adverse outcomes, a prospective study was conducted in which patients agreed to have their immunosuppressive drug use monitored via an electronic pill bottle cap for a year post transplant. The study was based on a cohort in which 857 patients were asked, but only 594 (69%) agreed to use the monitor cap. Of those who agreed to use the monitor cap 452 (76%) returned the cap for analysis. Of the caps returned, 120 (27%) had inadequate data due to non-use or non-functioning caps, and another 49 (11%) had an insufficient number of monitored days available. These included: uncertainty regarding the time frame monitors were used by patients, use of sectioned pill boxes, and changes on medication prescriptions over time. The final adherence measure was created for the remaining 283 (63%) patients. Beyond the obstacles of enrolling patients into this study of adherence, numerous challenges were encountered in creating an electronic measure of daily adherence. We developed approaches to address each of these challenges including: -Creating operational definitions of the first/last day of monitoring intervals without a monitor, and time a monitor was considered to have become full and nonfunctional. -- Determining when subjects were hospitalized and not using monitors and treat these intervals as missing data. -Determining when subjects were likely to have been using a sectioned pillbox. -- Linking the monitoring data to daily data on medication prescription and dosing. -We conclude that it is logistically difficult to conduct studies of electronically measured adherence in the transplant setting, but that analytical strategies can be derived to develop summary measures of adherence from electronic data.

P35

Impact of an EMR Based Virtual Heart Failure Clinic

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Comprehensive care of the heart failure (HF) patient requires a multidisciplinary approach with education focused on the patient as well as the treating physicians. Despite the widespread availability of treatment guidelines, it is well documented that adherence to guideline remains poor. The advent of electronic medical record (EMR) systems has the potential to allow physicians to practice population-based care more effectively using this technology to modify physician behavior at the point-of-care where treatment decisions are being made. The goal of this study is to measure the impact of an EMR-based virtual HF clinic on improving guideline adherence, tracking outcomes and providing decision support tools tailored to managing all HF patients. The intent was to improve care delivered to all HF patients during routine care. We have successfully implemented a virtual lipid Clinic for dyslipidemic patients and have adapted a similar model of care to manage $> 13,000$ HF patients who are cared by a network of over 50 cardiologists in remote locations. We modified the EMR by creating a HF patient tracking system. Special alerts were designed in the EMR that alert physicians and staff at the point of care if a particular HF patient is not receiving guideline based care (e.g. use of an ace inhibitor (ACE) or angiotensin receptor blocker (ARB) if the patient carries a HF diagnosis). The EMR system also identifies patients who do not have a left ventricular ejection fraction (LVEF) on chart or if their LVEF < 40 and is able to generate distributable physician compliance reports on a monthly basis. In the five months since inception of the new system the practice has identified and educated 160 patients into the program, flagging patients in need of more intense HF management. Preliminary results indicate that 82% of the HF clinic patients are now on ACE or ARB. At the end of the intervention we will show that a virtual HF clinic can be successfully and effectively operated by modifying the practice EMR system minimizing the need for outsourcing disease management or hiring increased staff. The practice hopes to collect information about hospitalizations, readmission rates, and mortality to obtain a long term view of the clinical and economic effectiveness the virtual CHF clinic.

P36

Impact of Redesigning an Outpatient Medication Refill Process with Enhanced Digital Decision Support

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Prescription refills are time consuming, labor intensive and an often overlooked aspect of office operations, but an important component of disease management. A digital system can assist with the monitoring needs by offering the ability to automate workflow and provide clinical decision support alerts which translate into better patient outcomes, improved compliance and reduced medication errors. The goal of this yearlong study was to examine the impact of a practice-wide process improvement effort focused on improving the compliance with the digital refill process and the accuracy of patient's medication history profiles. The discrete elements of the intervention include: educating the staff on a new refill policy, providing feedback with automated quarterly refill progress reports, and providing point-of-care guidelines and alerts within an electronic medical record (EMR). The automated medication refill process was redesigned to provide a more consistent, automated procedure for safe refilling. To view the impact of the intervention we generated an informational snapshot of baseline medication compliance status of the entire practice of 140,000 patients prior to 10/02. We monitored staff compliance to the prescription refill policy quarterly and provided in-services to staff where we found non-compliance to the new system. At the end of the study, we assessed medication refill compliance outcomes of all patients refilled for a period of a year since 10/02. The results indicate that the practice performed over 62,000 refills including, over 2,000 amiodarone and 24,000 statin refills. Office visit compliance for both amiodarone and statin refills grew from 82% to 100%, respectively. Laboratory results within 6 months of the refill date for amiodarone refills increased from 25% to 57%. The adherence to a refill policy for updating the EMR medication profile with the actual refill date rose from a baseline of 7% to 84% for all refills reviewed. The prescription refill process is an important patient encounter. Adding decision support and clinician feedback to an existing EMR improves this process and closes the loop in the process redesign. This particular decision support model is adaptable to other clinical modalities and medication management.

P37

Embedding Clinical Performance Measures into an Electronic Medical Record

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Evidence-based clinical care is critical to quality improvement. The AMA convened the Physician Consortium for Performance Improvement (PCPI), including representatives from more than 60 national medical specialty and state medical societies, AHRQ and CMS. The PCPI, the American College of Cardiology (ACC), and the American Heart Association (AHA) together developed standardized clinical performance measures for coronary artery disease (CAD), heart failure and hypertension. The performance measures are evidence-based process measures reached by consensus designed to be collected and reported on a regular basis. These measures, originally designed as paper-based tools, complicate data collection and hinder the use of decision support at the point-of-care. The purpose of this study was to determine if measures can be embedded in an electronic medical record (EMR) and incorporated into routine clinical care in that setting. The pilot involved a 50-physician cardiology practice 100% compliant in using an EMR for 6 years for all outpatient visits. All 1,941 CAD patients seen in the office during a month long period were included. The measurement set detailed specifications for identifying CAD patients and utilized ICD-9 codes and standard terminology. Performance measures included therapies for antiplatelets, statins, beta blockers, and ACE inhibitors, symptom and activity assessment and smoking cessation. The performance measure definitions mapped to EMR definitions and the EMR was modified to generate point-of-care reminders to support the measures. Data were obtained without additional clinician time. Results showed that performance measures can be embedded into an EMR and incorporated into routine clinical care without disrupting flow. The pilot was successful in determining that measures integrated into an existing mature EMR system utilizing disease-specific modules and alerts could become powerful bridge to outcomes improvements. By embedding standardized performance measures into an EMR, clinicians have a tool to develop a clinical culture that strives for quality and patient safety. In the near future when EMR systems become the standard of care we expect that embedded performance measuring tools will be commonplace.

P38

Racial Differences In Antihypertensive Medication Adherence, Attitudes, Beliefs And Experiences With Blood Pressure Care

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Racial differences in blood pressure (BP) control may be related to differential adherence to antihypertensive medications (meds), which in turn may be affected by various patient characteristics. To explore the associations among patients' attitudes and beliefs about BP, experiences with BP care and medication adherence, we interviewed 803 white (W) and African American (AA) hypertensive patients after an outpatient general internal medicine clinic visit in 3 Veterans Affairs Medical Centers. In bivariate analyses of 5 adherence items by race, AAs were more likely to stop taking meds if they felt worse, forgot to take their meds more often,

and intentionally did not take meds on more days than Ws. There were no racial differences in adding extra pills or in taking less meds because the patient felt s/he needed less. Regarding beliefs about BP, AAs were more likely to report that: a) BP medications would make them feel better, b) if the medications made them feel worse, they'd stop taking it, and c) they were more knowledgeable about their BP and how to deal with it. AAs rated BP as a more serious health concern than did Ws. AAs' physicians were more likely to ask if patients were taking meds as prescribed, to discuss how important meds are for BP control or other health problems that might result from high BP, things the patient could do to make it easier to take BP meds, and to provide written materials about BP, but Ws' physicians were more likely to request a follow up appointment for BP care (all p's <.05). In multivariate regression analyses with the 5 adherence items as dependent variables, and race, beliefs, attitudes and experiences as the independent variables, race did not remain significantly associated with adherence, but numerous beliefs, attitudes and experiences were, although the associations were not consistent across the models. These results indicate that AA patients have many positive beliefs, attitudes and experiences with BP care, but are less adherent to BP meds. Observed differences in BP medication adherence seem to be related to certain patient beliefs, attitudes and experiences with BP care. Such information may be helpful in targeting interventions to improve medication adherence and ultimately, diminish racial disparities in BP control.

P39

Medication Adherence as a Barrier to Optimal Control of HbA1c and LDL Cholesterol in Patients with Type 2 Diabetes Mellitus

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Type 2 diabetes mellitus is a prevalent condition associated with substantial morbidity, mortality, and health care costs. The disease often exists as part of a metabolic syndrome that may include dyslipidemia, obesity, and hypertension. Optimal management of these patients may prevent or delay the associated morbidity. However, there may be a number of barriers to providing optimal care. Nonadherence with prescribed medications is common and may be among these barriers. The purpose of this study was to assess the relationship between medication adherence and therapeutic control of HbA1c and LDL cholesterol in patients with type 2 diabetes. Pharmacy and medical claims data for a random sample of commercially insured, managed care patients with type 2 diabetes (HEDIS sample) were analyzed for calendar year 2001. Medication adherence was assessed using standard medication possession ratio (MPR) calculations for oral hypoglycemic agents and lipid-lowering agents. Adherence was defined as $MPR \geq 0.8$. Categorical data are reported as counts and percentages. Continuous data are reported as mean and standard deviation and compared using two-sample t-tests. Correlation analysis is reported using Pearson product moment correlation coefficients and r^2 values. The sample was 441 patients with type 2 diabetes (53% male) having a mean age of 53 ± 9 years. Adherent patients had a significantly lower mean HbA1c value ($7.2 \pm 1.5\%$) than non-adherent patients ($9.7 \pm 1.8\%$, $p = 0.001$). As adherence with oral hypoglycemic agents declined, HbA1c tended to increase ($r = 0.54$, $r^2 = 0.29$, $p < 0.001$). Adherent patients also had a significantly lower mean LDL cholesterol value (90 ± 25 mg/dL) than non-adherent patients (130 ± 43 mg/dL, $p = 0.01$). As adherence with lipid-lowering agents declined, LDL cholesterol tended to increase ($r = 0.50$, $r^2 = 0.25$, $p = 0.003$). In conclusion, there is a substantial relationship between adherence with oral medications and control of HbA1c and LDL cholesterol in patients with type 2 diabetes. Intervention strategies should include patient and provider education to address this important barrier.

P40

Predictors of Fluid Adherence Among Hemodialysis Patients

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Background: Fluid adherence by hemodialysis patients is critically important for better physical functioning and quality of life. Fluid adherence also reduces severe medical complications and premature death. Rates of fluid adherence are low, however, with estimates ranging between 7% and 59%. Variables associated with fluid adherence have not been well identified. **Objectives:** The specific aims of this descriptive study were to (a) determine the extent to which stage of fluid adherence changed and (b) identify factors (physiological, cognitive functioning, perceptions, thirst, and self-care strategies) associated with stage and/or change in stage over a 4-month period. **Theoretical framework:** The transtheoretical model for health behavior change and the health belief model provided the theoretical underpinnings for the study. Fluid adherence was operationalized as intent to adhere and actual behavior in 5 stages from precontemplation (no intent) to maintenance (intent with actual interdialytic weight gain ≤ 1 kg per day). **Methods:** A convenience sample of 230 adults receiving out-patient hemodialysis from 3 dialysis units was obtained. Baseline data were collected at entry into the study. A second data collection was performed 4 months after entry on the 186 individuals remaining in the study. **Results:** Participants had a mean age of 55 with a wide range of educational backgrounds. Participants had been receiving treatment for end-stage renal disease for a mean of 2.8 years. The sample was 80% African American, 58% were male, and 26% were married. No overall change in stage of fluid adherence from baseline to endpoint was found. Higher self-care effectiveness ($\beta = 0.42$, $p < 0.0001$), lower cognitive function ($\beta = -.28$, $p = 0.003$), and more perceived benefits to fluid adherence ($\beta = 0.22$, $p = 0.045$) were significantly associated with a more advanced stage of fluid adherence. Other variables such as barriers, co-morbidities, thirst, and laboratory values were not significant. **Conclusions:** These findings suggest that intent for behavior change may be an important variable when designing interventions. In addition, promoting effective self-care strategies and delivering messages that focus on the benefits of adherence may increase fluid adherence.

Durability Of Guideline Adherence In Coronary Disease And Diabetic Patients After Discharge From A Cardiovascular Risk Reduction Clinic

P41

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Background Specialized clinics improve guideline adherence in smoking cessation, blood pressure, glycemic and lipid control. However, little is known about the durability of guideline compliance after discharge from such clinics. The Cardiovascular Risk Reduction Clinic (CRRC) is a pharmacist-led, multi-disciplinary clinic at the Providence VA Hospital aimed to achieve compliance with the National Cholesterol Education Program and American Diabetes Association guidelines for the 4 traditional cardiovascular risk factors in patients with DM or CAD. Patients are discharged to usual care when the guideline recommended goals are met. **Objective** To evaluate the durability of guideline adherence in cardiovascular risk factor control after discharge from the CRRC. **Methods** We used chart review to identify 136 discharged patients from 375 candidates sequentially enrolled in CRRC during 2001–2002. We compared the guideline adherence rate in blood pressure, hemoglobin A1c, smoking and LDL cholesterol at baseline, at discharge, and at 3–6, 6–9, and 9–12 months after discharge. The absence of risk factor evaluation over >6 months was judged to be non-compliant with guidelines. **Results** Our patients were predominantly (98.4%) diabetic, 47.5% had CAD, and 45.9% had both CAD and DM. Patients' mean age was 65.1±10.5 years. Patients were discharged to standard care after 3.5±1.5 CRRC visits (124±88 days). Guideline adherence was most durable for DM and smoking control, and least durable for blood pressure control, but all risk factor compliance declined by 9–12 months, with most measures declining shortly after discharge. **Conclusion** While there is variation in time frame, most risk factors' compliance significantly declined from discharge over one year of follow-up. Since risk factor control has significant prognostic implications, we are currently investigating the optimal means of maintaining guideline compliance after discharge in a prospective trial.

GUIDELINE ADHERENCE RATE

| Compliance | Prior to CRRC (%) | At Discharge (%) | 3–6 | 6–9 | 9–12 |
|------------|-------------------|------------------|----------------------|----------------------|----------------------|
| | | | months post CRRC (%) | months post CRRC (%) | months post CRRC (%) |
| LDL | 31.97* | 72.73 | 60.94 | 58.46 | 57.52* |
| SBP | 36.76* | 75.74 | 30.15* | 38.05* | 33.33* |
| DBP | 89.71* | 95.59 | 74.26* | 81.82* | 81.68* |
| A1c | 40.44* | 66.18 | 72.79 | 69.12 | 55.88 |
| Smoking | 73.52* | 86.80 | - | - | 81.62* |

*P value <0.05 when compared to adherence rate at discharge

Patient-Physician Partnership to Improve High Blood Pressure Adherence

P42

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Background: Hypertension is a common, chronic condition that contributes substantially to cardiovascular morbidity and mortality and resource use. Patient nonadherence to recommended therapies and problems in physician management contribute to poor quality of care and negative health outcomes of hypertension. African Americans and socioeconomically disadvantaged persons are disproportionately affected by hypertension and its complications. **Methods:** Randomized controlled trial with a 2X2 factorial design including 50 physicians and 500 of their patients who have uncontrolled hypertension. Patient and physician interventions address the specific needs of inner city ethnic minorities and persons living in poverty through patient activation and physician communication skills training. Our main outcomes at 3 months and 12 months are appointment-keeping; adherence to medication and lifestyle recommendations; patient-physician communication behaviors; and blood pressure control. **Results:** We have recruited 48 primary care physicians from community-based practices. The mean age is 42.3 years, 52% are women, 33% African American, 38% white, and 21% Asian. Seventy-seven percent are general internists. Forty-four percent report previous communication skills training. Over half report being very confident in their ability to care for socially disadvantaged patients (54%) and ethnic minority patients (69%). In contrast, only 33% are very confident in their ability to care for patients who do not adhere to their recommendations. A small percentage of physicians strongly agree that: they can communicate effectively with patients (29%), engender trust from patients (16%), and establish patients as partners in care (17%). **Conclusions:** Physicians delivering care to ethnic minorities and socially disadvantaged patients with hypertension report communication challenges and a lack of self-efficacy in caring for these patients. **Implications:** Interventions to improve the patient-physician relationship are promising strategies to improve physician self-efficacy and skills in delivering care to socially disadvantaged, ethnic minority individuals with hypertension.

Clinician Experience With The Athena Dss Hypertension Management System: Facilitators And Barriers To Guideline Compliance

P43

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INTRODUCTION: Decision support systems (DSS) may support improved adherence to guidelines by operationalizing best practices into clinical workflow. Here, we explore facilitators and barriers to adherence reported during evaluation of a guideline-based DSS for hypertension (HTN), ATHENA DSS. **METHODS:** ATHENA DSS provided recommendations through pop-up windows in the Computerized Patient Record System (CPRS) in primary care clinics at three geographically diverse VA medical centers. ATHENA DSS combines patient data from CPRS with a HTN knowledge base to generate patient-specific advisories about blood pressure (BP) control and drug management at each clinic visit. After a randomized trial to evaluate the efficacy of ATHENA DSS for improving BP control, we analyzed rates of clinician interaction with ATHENA DSS and surveyed clinicians about their impressions of the system recorded using a four-item Likert scale. **RESULTS:** ATHENA DSS displayed HTN advisory pop-ups to 91 clinicians over a 15-month period. Recommendations were displayed for 10,165 unique patients and 17,219 visits. Clinicians interacted with ATHENA DSS in a mean 54% of visits (range 47–67%/mo). The survey response rate of attending physicians who received the intervention was 64% (28/44). A majority of clinicians (57%) found ATHENA DSS sometimes or often useful, rating among its benefits: facilitating consideration of HTN management (50%), intensification of HTN treatment (39%), and change of antihypertensive choice to guideline-recommended medications (36%). The most common reasons for disregarding recommendations were the belief that inadequate BP control was due to patient non-adherence to therapy (68%), concern that an inaccurate BP reading was used to generate recommendations (68%), and insufficient time to consider the recommendations (46%). **CONCLUSIONS:** ATHENA DSS was used extensively by clinicians in the study. Clinicians reported that decision support for hypertension was useful and could facilitate guideline-based management decisions such as choice of antihypertensive therapy. Patient non-adherence to therapy, potential inaccuracy in blood pressure data, and time pressures were cited as barriers to following guideline recommendations.

Compliance Regarding A Home Ergometer Training Program In Heart Transplant Recipients

P44

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After heart transplantation the focus of interest has changed from surgical technical advances to improvement of the long-term prognosis. Physical capabilities after heart transplantation are still limited to 68% compared with the healthy population within the same age range. Compliance to the therapeutic regimen is obligat for survival after transplantation. Health-related behavior and physical exercising are necessary parts of the therapeutic regimen. Patients are advised to exercise each second day, e.g. by a home ergometer, and to stay on a healthy low-fat diet. The Compliance regarding these two components is relatively unknown. We created a prospective supervised home ergometer training program to improve physical capabilities and exercise tolerance for 22 patients after heart transplantation. After written informed consent was given, patients received a computer programed ergometer for use at home. The compliance to this special part of the regimen was measured by using a programed electronic chip, and exercise protocols. Patients are 100 ± 26 months after transplantation, age range 50–68 years. Actual BMI values are 28.2 ± 3.5; cholesterol values 178,7 ± 28,16 mg/dl. Pharmacological treatment comprises double- or triple immunosuppression as well as a lipid lowering therapy. Overall, 5021 home ergometer training sessions were completed without incident. Patients realized their exercising approximately all 4,28 days (range 2,99 - 8,17). Patients compliance was 87% for the first 3 months and reduced afterwards to 66,2%. Documented reasons for deviations were health problems (15,7%), travelling (9%), and others (2,1%). Ergometer training during infection periods correlated significantly with higher exhaustion (p = .001) measured by the Borg-Scale (2,65 ± 1,21). A part of 18% were noncompliant regarding the training protocols. Even after three years heart transplant patients are compliant with a home ergometer training program. Training protocols have shown significant improvements due to patients' self-assessments regarding physical limits, resulting in adapted behavior during infection periods. Mean physical endurance capacity improved more than 45%. No significant correlations have been found for BMI and active exercising.

Relationship Between Patient Beliefs About Medication and Self-reported Medication Adherence Six Months After Discharge for Acute Coronary Syndromes

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OBJECTIVES: To describe patients' beliefs about medication six months after discharge for acute coronary syndrome (ACS) and to determine the relationship between self-reported medication adherence and patients' medication beliefs. **METHODS:** All patients discharged with the diagnosis of ACS during a six-month period from a university affiliated hospital were administered a telephone survey six months after discharge. The survey included the Belief

About Medication Questionnaire (BMQ), the Morisky Adherence Scale (MAS), and items about patient demographics, social support, number of medications, and health status. The BMQ has 18 items that generate four scales: Specific-Necessity (SN), Specific-Concerns (SC), General-Harm (GH), and General-Overuse (GO). The MAS is a four-item scale providing a single score. Both questionnaires use 5 response options per item. Lower BMQ-scale scores indicate stronger beliefs. Lower MAS scores indicate better adherence. Bivariate correlation between independent variables and MAS were conducted using Pearson's rho. Linear regression with step-wise backward elimination was used to determine the set of independent variables with the strongest association to the MAS. A $p \leq 0.05$ was considered significant for all analyses. RESULTS: To date, 208 patients have been interviewed. The mean age was 64.9 ± 13.0 years with 60.6% male, 95.7% Caucasian, 57.3% with some or more college education, 87.9% lived with \geq one other person, and 42% indicated excellent or very good health. The mean BMQ scale scores were: SN = $2.2 (\pm 0.7)$, SC = $3.3 (\pm 0.8)$, GO = $3.3 (\pm 0.7)$, and GH = $3.8 (\pm 0.5)$. The mean MAS was $1.3 (\pm 0.4)$, with 51.8% indicating nonadherence (score > 1). The MAS was significantly correlated with the BMQ-SN ($r = 0.16$, $p = 0.02$), BMQ-GH ($r = -0.16$, $p = 0.03$), and heart-related health status ($r = 0.21$, $p = 0.003$). The final regression model had an $R^2 = 0.09$ and included heart-related health status and SN as significant predictor variables. CONCLUSION: Patients with stronger belief of the necessity of medication and perception of worse heart-related health status report higher adherence with cardiac medication. Determining beliefs about medication may be helpful in developing interventions aimed at improving adherence.

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Low Adherence to Prescribed Antihypertension Medication and Poorer Quality of Life in Elderly Hypertensive Patients

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Background: Patient adherence to medication is a critical factor in controlling blood pressure and reducing cardiovascular events in hypertensive patients. Objective: To determine the association between medication adherence and quality of life in elderly hypertensive patients. Methods: A race-stratified, randomly selected sample of elderly patients (> 65 years) in a managed care organization (MCO) was administered the Morisky medication adherence scale for hypertension and the SF 36. Pharmacy fill rates were determined for all respondents using the MCO's pharmacy database. Results: Overall, 113 of 177 patients (64%) with valid contact information completed the survey. Low adherers to their anti-hypertensive medication, as categorized using the Morisky scale, reported substantially poorer quality of life compared to those categorized as high adherers. For example, mean SF-36 scale scores for persons categorized as having low versus high adherence, were 49 versus 69, respectively, for vitality ($p = 0.03$) and 72 versus 85, respectively, for mental health ($p = 0.08$). Poorer physical functioning was also present for patients with low versus high anti-hypertensive medication adherence (51 versus 61, respectively), although this was not statistically significant ($p = 0.35$). Compared to their counterparts with high pharmacy fill rates, poorer quality of life was observed for patients with low fill rates. Conclusion: Poorer medication adherence was associated with lower quality of life in this managed care setting. Future studies are needed to confirm these associations and to determine the causal nature of the association between low medication adherence and reduced quality of life.

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Prevalence Of The Metabolic Syndrome Phenotype In A General French Population Of Adolescents (Fleurbaix-Laventie Ville Sante Study) In Comparison With NHANES III' Data .

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Aims: To estimate the prevalence of the metabolic syndrome among a general population of French adolescents using the same criteria as those used for adolescents in the NHANES III (Cook et al; Arch Pediatr Adolesc Med; 2003). Methods: The criteria for the metabolic syndrome in adult were specified by NCEP's Adult Treatment Panel (ATP) III. A recent analysis of the NHANES III study proposed an adaptation of these criteria for adolescents. Using the same criteria, we classified participants with a waist circumference \geq 90th percentile value for age and sex as having abdominal obesity. Hypertension was defined as recommended by the updated Task Force report on management of hypertension in childhood (\geq 90th percentile). Abnormal plasma lipids concentrations were defined as HDL cholesterol < 40 mg/dL and triglycerides (TG) > 110 mg/dL. Elevated fasting glucose (FG) level was defined as a value ≥ 110 mg/dL. Participants were male and female adolescents aged 12 to 19 years recruited in the general population to participate in a longitudinal epidemiologic study of the determinants of changes in adiposity (N = 360). Results: The prevalences of individual risk factors were: 11.3% for WC, 10.0% for TG, 4.7% for HDL, 10.6% for hypertension and 1.2% for FG. Only 0.8% presented a metabolic syndrome (at least 3 risk factors). In adolescents 12-19 years old of the NHANES III study, the prevalence of the metabolic syndrome was 4.2%. Major differences were in lipids. In NHANES III population, 23.4% of adolescents presented TG greater than or equal to 110 mg/dL and 23.3% presented HDL cholesterol less than or equal to 40 mg/dL versus respectively 10.0% and 4.7% in our sample. Conclusions: In a general population sample of French adolescents with a prevalence of overweight (IOTF definition) of 10%, the metabolic syndrome was very rare (0.8%). The major difference with NHANES III adolescents' data was in prevalence of overweight (27.3%) and lipids anomalies (HDL and TG).

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Health Coaching Experience In Two Towns Of Northern France: " Fleurbaix and Laventie Ville Santé "

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Aims: It is well established that food and nutrition are involved in an essential way in the development and clinical expression of illnesses (particularly cardiovascular disease). A program to induce responsible health behaviour was thus implemented. This program was made in collaboration with population, school system, medical doctors and town implication. Methods: In two towns of Northern France, we proposed to the population a personal checkup based on 7 health aspects: body weight, physical activity, fruits and vegetables intake, calcium intake, blood cholesterol, high blood pressure and smoke habits. Information was obtained by self-administered questionnaire or clinical examination. Each person received a "Health Passport" with his results. If one or several results didn't satisfied the French recommendation, a health coaching was proposed. A dietician visited them and planned a follow-up by phone. Time between phone call was suited to the health aspects. For example, for fruits and vegetables consumption, follow-up was quarterly. Follow-up for weight control was monthly. Advice was given to the family to take into account the familial aspect of well-balanced diet or behaviour. To prevent childhood obesity, each year during 5 years, 900 children aged 2 to 12 years old was weighted and measured at school to report BMI on corpulence curves by sex and age in the "Health passport". Results: 3 000 persons were included in this experience. Today, data of 917 children, 105 adolescents, 915 adults and 152 elderly persons were analysed. The most common anomalies were overweight or obesity, sedentarity and no well-balanced diet. Among person who presented at least one anomaly, 95% accepted visit at home and follow-up. Conclusions: This program is well accepted by general population. It's an appropriate approach of familial behaviour. We will measure effect on each anomaly after 4 years of follow-up.

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Telemedicine and Clinical Case Management Improve Congestive Heart Failure Outcomes Through Compliance with Established Treatment Guidelines

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Introduction Over 5 million Americans have congestive heart failure (CHF) with 500,000 new cases diagnosed each year. CHF patients can control their condition through a combination of weight management, proper drug therapy and lifestyle changes. A study of CHF patients was conducted to determine if daily patient monitoring via telemedicine, combined with case management, would improve the patients' adherence to best practice treatment guidelines. Method A total of 43 patients suffering from acute symptomatic heart failure were selected at random and actively managed for 12 months. Each patient's physician established a specific treatment plan based upon best practice guidelines. The patients received equipment that transmitted daily weight, blood pressure, and pulse readings to a central monitoring center. Nurses at the center reviewed the data within minutes of receipt. Unscheduled telephone contact was made to assess the patient if any measurements were outside of defined parameters. Routine scheduled telephone assessments were conducted at least weekly to record the patient's condition and assess if they were adhering to their physician's treatment plan. Patients were counseled about compliance at each contact. Nurses also adjusted medicine dosages within the treatment guidelines. Results Preliminary outcomes showed a decrease of more than 86 percent in inpatient hospital admissions and a decrease of more than 87 percent in emergency room visits. ACE Inhibitors use increased by more than 9 percent. Similarly, Beta-Blocker use increased by more than 4 percent. The patients that returned the Kansas City Cardiomyopathy (KCC) questionnaires before and after the trial period displayed an increase of over 8 percent on their Overall Summary scores and over 9 percent on their Clinical Summary scores. Conclusion Combining telemedicine with physician-directed case management can improve the quality of life for CHF patients, increase their compliance with treatment plans, and reduce the use of health care resources.

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Does Short-Term Effectiveness Predict Long-Term Adherence with Statin Therapy?

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Background: Previous studies have examined patient and provider characteristics associated with adherence to statin therapy; characteristics of the regimen have not been well studied. Objective: To determine whether the extent of low-density lipoprotein cholesterol (LDL-C) reduction in the first 3 months of statin therapy is associated with subsequent adherence. Methods: This retrospective study used administrative data from a Southeastern US HMO. The study population consisted of subjects who started statin therapy between October 1999 and August 2001, were enrolled for ≥ 12 months prior and ≥ 6 months after treatment initiation, and had ≥ 1 LDL-C test in the year prior to and 4-12 weeks after initiation of therapy (n = 10,078). Patients were followed until they disenrolled or accumulated 36 months of follow-up. The study period was divided into 3-month intervals, during which patients were considered "adherent" if statin therapy was filled $\geq 80\%$ of the time. We used a generalized linear model for repeated measures to study the association between percent change in LDL-C at 4-12 weeks and adherence in subsequent intervals. Other potential predictors of long-term adherence included demographic, clinical and health services use variables. Results: Adherence decreased significantly over time; 59%, 40%, 34% and 21% of subjects were adherent at 3, 6, 12 and 36 months, respectively. Mean LDL-C reduction at 12 weeks was 28.8% (SD = 19.8%). The relative LDL-C reduction at 12 weeks was significantly and

independently associated with long-term adherence: compared to subjects in the first quartile of LDL-C reduction, those in quartiles 2, 3, and 4 were more likely to be adherent in any subsequent interval (adjusted odds ratio [95% confidence interval], 1.29 [1.14, 1.44]; 1.32 [1.17, 1.48]; and 1.19 [1.06, 1.35], respectively). Other independent predictors of long-term adherence included adherence during the initial 3 months of therapy age, and recent history of coronary revascularization. **Conclusion:** Greater LDL-C reduction during the first 3 months of statin therapy is associated with long-term adherence. Lipid-lowering potential of the initial regimen should be a consideration when prescribing statin therapy because it may affect adherence.

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Correlates of Compliance with Dyslipidemia Treatment Recommendations among Adults in the United States: Findings from the 1999–2000 National Health and Nutrition Examination Survey

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Background: Non-compliance with dyslipidemia therapy is well documented in the literature. Identifying correlates of non-compliance is important for improving cardiovascular health outcomes in dyslipidemic patients. **Methods:** We examined the correlates of self-reported compliance with physician-recommended treatments for dyslipidemia in 4,880 respondents age ≥ 20 years in the 1999–2000 National Health and Nutrition Examination Survey. Demographic and clinical variables were screened for unadjusted association with compliance (χ^2 p-value ≤ 0.2): recency of cholesterol test (<1 year, 1–2 years, >2 years); regular source of health care (physician office, clinic, outpatient hospital, none); health care utilization (number inpatient stays in the past year); clinical history (coronary heart disease, heart attack, angina, stroke, diabetes, congestive heart failure, number of comorbidities); and demographic variables (gender, age, race, education, country of birth). We used SUDAAN[®] for weighted multivariate logistic regression of compliance on the screened variables. **Results:** Among adults that reported a physician recommendation for dyslipidemia drug therapy, 74.5% (weighted; 441 of 570 sample cases) reported that they were taking the medication. Respondents that had a cholesterol test within the past year were significantly more likely to be compliant (compared to >2 years; odds ratio [OR] 5.80, 95% confidence interval [CI] 1.84–18.27) as were adults whose regular source of care was a physician's office, compared to no regular source of care. Among adults that reported a physician recommendation for one or more therapeutic lifestyle changes for lowering cholesterol (reducing weight, eating less fat, and exercising more), 63.2% (weighted; 664 of 1,020 sample cases) reported that they were undertaking all recommended changes. Respondents that had a cholesterol test within the past year were significantly more likely to be compliant (OR 2.53, 95% CI 1.44–4.46), along with "other" race (vs. white), and age 75+ (vs. 20–34). **Conclusion:** Adherence to guidelines recommending close followup monitoring for patients with dyslipidemia may increase patient compliance with lipid-lowering therapy.

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Effects of Self-Efficacy Enhanced Cardiac Rehabilitation in Post Myocardial Infarction Patients

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BACKGROUND It has been shown that exercise-based cardiac rehabilitation (CR) can reduce the risk of recurrent myocardial infarction (MI) and mortality in patients with a previous MI. Traditional exercise-based CR programs have been implemented recently in Korea, with this being the first study focused on strategies to enhance adherence to recommended life style changes. The purpose of this study was to determine if a self-efficacy enhancing CR program (SEE-CR) has an effect on exercise capacity, exercise self-efficacy, and exercise adherence in MI patients. **METHODS** In order to improve exercise capacity and exercise adherence, an 8-week SEE-CR program was implemented. The SEE-CR consisted of endurance training (3 supervised sessions per week, average intensity 65% of VO_{2peak}), the enhancement of self-efficacy (education session, goal setting, modeling, and physiologic feedback), and social support (weekly telephone follow up, multidisciplinary counseling, and group therapy). After matching for gender, age, and left ventricular ejection fraction, the study subjects were consecutively assigned to either a CR group (n=19) or a control (C) group (n=19) 3 weeks post MI. C group participants were instructed on a home-based exercise program and not contacted during the 8 weeks. At baseline and after 8 weeks, exercise capacity was evaluated by a cardiopulmonary treadmill exercise test and self-efficacy by the Cardiac Exercise Self-Efficacy (CESE) Scale. Exercise adherence was assessed through session attendance and self-report, using an investigator developed questionnaire that rated adherence on a scale of 0 to 10. **RESULTS** After the 8-week SEE-CR program, significant improvements were observed in VO_{2peak} (p=.014), anaerobic threshold (p=.044) and exercise duration (p=.009) in the CR group compared to the C group. The CESE score for the CR group was significantly higher than that of C group (p=.049). Attendance for the CR group was 86.2%. The exercise adherence questionnaire revealed a better mean score in the CR group than the C group (9.89 \pm 0.3 vs. 7.63 \pm 3.00, p=.015). **CONCLUSION** Implementing the described strategies to enhance self-efficacy in a Korean CR program for post MI patients might lead to improved adherence to the exercise recommendations.

Predictors of Medication-Taking Behavior in Attendees of Health-Related Educational Programs

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PURPOSE: A self-reported 4-item survey tool has been developed and validated which classifies medication-taking behavior as high (better), medium or low (worse). The purpose of this study was to determine associations between medication adherence category and common demographic and health-related characteristics. **METHODS:** Data were collected from attendees who volunteered to complete a survey during healthcare education programs for consumers and healthcare providers. Results were analyzed using standard database and statistical software. Continuous data are reported as mean and standard deviation. Binary logistic regression with odds ratios (OR) and 95% confidence intervals (CI) describes associations between adherence category and survey variables. **RESULTS:** The sample included 1082 respondents: 73% female, 72% with some college education and 22% healthcare professionals; mean age of 54.3 \pm 15.8 years. Backward stepwise regression, maintaining variables with a significance of p<0.05, identified increasing age (OR 1.04; 95% CI 1.02 to 1.05), current health status of "well" (OR 2.0; 95% CI 1.1 to 3.7), and the presence of diabetes mellitus (OR 3.1; 95% CI 1.3 to 7.8) or cardiovascular disease (OR 2.2; 95% CI 1.4 to 3.4) as significant predictors of "medium" or "high" adherence category. Current health status of "poor" (OR 0.08; 95% CI 0.03 to 0.25) was predictive of not being categorized as medium or high adherence. The following were not predictive of adherence category when adjusted for other variables: gender, number of chronic medications, educational level, and classification as a healthcare professional. Individual items of the adherence survey were reported as follows: forgetting to take medicine (49%), stopping medicine when feeling worse (29%), stopping medicine when feeling better (20%) and occasional carelessness in taking medicines (14%). **CONCLUSION:** Several patient characteristics are predictive of reasonably good medication adherence, including the presence of cardiovascular disease or diabetes, good current health status, and older age. Poor health status, however, is associated with lower adherence, and classification as a healthcare professional did not predict higher or lower adherence compared to the lay public.

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Factors Affecting Compliance in the Northern Manhattan Stroke Study (NOMASS)

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Objective: To assess self-reported medication compliance in a stroke population and to determine whether baseline cognition or depression were related to compliance behavior. **Methods:** As part of the NOMASS, we prospectively followed a cohort of community based stroke survivors. Baseline questions on pre-stroke memory and depression were assessed. At 1-year follow-up we documented outcomes and collected medical and behavioral data. We assessed compliance with a series of questions about medication adherence. **Results** At baseline there were 655 ischemic stroke cases; 55% women; 17% white, 27% black, 54% Hispanic; mean age 69 \pm 12 yrs. At one-year, 107 were dead and 527 were seen in person; 474 responded to compliance questions. Over 13% of stroke patients reported that they stopped medication because they felt better. Among HTN patients, reasons for medication discontinuation included a sense of good health (16% vs 11%) and medication cost (8% vs 0.5%, p<0.04). HTN patients were also more likely to report medication discontinuation due to: 1) Medications ran out and were not renewed on time (11% vs 1%, p<0.03); 2) Too many medications to take (5% vs. 1%, p<0.06) and; 3) Patient forgot to take the medications (11% vs 6%, p<0.08). Patients were classified as non-compliant if they answered "sometimes" or "frequently" to any of the compliance questions: 17% were classified as medication non-compliers. In multivariate logistic regression baseline depression was a predictor of noncompliance at 1 year (OR 2.0 p<0.04), self-reported history of memory problems was not a significant predictor (OR 0.6, p= 0.19) after controlling for gender and race/ethnicity. **Conclusion:** We find that a sense of well-being and underlying socio-demographic conditions, particularly economics, may be barriers to optimal medication compliance in an ethnically-diverse, community-based population of stroke patients. Moreover, we find depressive symptoms to be associated with medication compliance 1-year post stroke.

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The Impact of Beta-Blockers and Lipid Lowering Agent Use on Risk Adjusted Six-Month Mortality in Post-CABG Veteran Patients

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Background: The AHA guidelines call for the use of both beta-blockers and lipid lowering agents (LLAs) for appropriate sub-populations of ischemic heart disease patients. In this analysis, we sought to determine the impact of receiving prescriptions for these key ischemic heart disease medications on six-month mortality for post-CABG veterans. **Methods:** Using the Continuous Improvement in Cardiac Surgery Program data along with VA Pharmacy Benefits Management data, medication use rates were calculated for 8,917 non-emergent post-CABG veteran patients surviving CABG hospitalization from April 2000 through March 2002. Univariate comparisons of six-month mortality were made between those patients who received beta-blockers and/or LLAs within six-months of discharge, and those that did not. Logistic regression models were developed to determine the impact of receiving beta-blockers and/or LLAs on risk-adjusted six-month rates of mortality. **Results:** Univariate results for unadjusted six-month mortality rates for patients who received beta blockers and/or LLAs

within six months of surgery compared to those that did not are as follows: beta blockers: 1.2 vs. 8.8 ($p=0.0001$); LLAs 0.91 vs. 6.7 ($p=0.001$). Patients that received beta blockers or LLAs had a significantly lower mortality rate compared to those that did not. The results of beta blocker therapy and LLAs on six-month mortality following risk adjustment are: beta blockers ($OR=0.24$, $CI=0.18-0.33$); LLAs ($OR=0.21$, $CI=0.15-0.29$). After risk adjustment, the impact of beta-blocker therapy or LLA therapy on six-month mortality following CABG surgery remained significant. **Conclusion:** Receiving beta-blockers or LLAs within six months of discharge significantly reduces the rate of six-month mortality for non-emergent post-CABG veteran patients. Additional data on ischemic heart disease, medication compliance rates and combined medication interactions that impact these same outcomes are being evaluated.

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Evaluation of Medication Adherence Assessment in Statin Clinical Trials

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Clinical trials with statins demonstrate reductions in cardiovascular morbidity and mortality. These trials included long treatment periods. Adherence to statins may wane with long-term therapy. Therefore, on-trial statin adherence may be a confounder affecting endpoints in outcomes studies. The objective of this evaluation was to determine the extent and analysis of patient adherence to statin therapy in clinical trials. Trials evaluating atorvastatin, simvastatin, pravastatin, and rosuvastatin were reviewed. Trials included were published between 1990 and 2003, were conducted for one or more years, and were failure-and-switch studies evaluating different statins or a comparative trial between two or more statins or placebo. Studies were reviewed to determine assessment of patient adherence to therapy, if adherence rates were reported, and if adherence was included as a variable in the endpoint analysis. Twelve studies were selected for review. Adherence was reported in seven studies. Three of these do not report the actual adherence rates observed, and three do not report how compliance was defined. Tablet count was the most common method of assessing compliance, used in four of the trials. Most studies reported continuation of therapy as a measure of compliance; six studies reporting statin continuation or discontinuation rates at the end of the trial. Patient non-compliance was an exclusion criteria at study entry in only two trials. In all of the trials, patients identified as non-adherent remained in the trial and their results were used in the analysis. Therefore, these trial results are likely to underestimate the impact of statin therapy in the most adherent cohort. In trials that measured adherence, most did not report differences in outcomes relative to differences in adherence rates. Five studies included a discussion of adherence, however only one trial evaluated potential improvement in outcomes related to optimal adherence. We conclude that adherence is not routinely assessed by investigators of large scale, long-term trials evaluating statin therapy. Most of the trials do not report compliance rates, do not adequately define compliance in the methodology section, and do not evaluate the impact of patient adherence on study outcomes.

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Benefits of and Barriers to Medication and Dietary Compliance in Heart Failure

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Background: Noncompliance with medications and dietary sodium restrictions is a major problem that contributes to poor health outcomes among patients with heart failure (HF). **Objectives:** 1) determine the most frequent perceived benefits of and barriers to compliance with medication and dietary sodium restrictions among two samples of HF patients; 2) test the relationships between the benefits of and barriers to compliance; and 3) determine predictor variables of benefits of and barriers to compliance. **Theoretical Framework:** Health Belief Model **Methods:** Two convenience samples comprised of 101 HF outpatients (study 1) and 205 hospitalized HF patients (study 2) completed the Beliefs about Medication Compliance Scale and the Beliefs about Dietary Compliance Scale. Patients in study 1 completed the questionnaires once. Patients in study 2 completed the scales 3 times: baseline, 12 and 52 weeks after baseline. **Results:** The most frequently identified benefits of medication compliance were decreased chance of hospitalization, reduced worry, and reduced swelling. The most frequently reported barriers to medication compliance were interrupted night sleep and difficulty when away from home. The most frequently reported benefits of dietary sodium restrictions were that salty foods keep the heart healthy and reduce swelling. The most frequently reported barrier to dietary sodium restrictions was poor taste. All patients identified benefits and barriers that could be improved by behavioral change interventions. Benefits and barriers were low to moderately correlated. Few significant predictors of benefits of or barriers to medication or dietary compliance were noted in the multiple regression analysis. Results from the 2 samples consisting of a total of 306 patients were consistent and few differences were noted in responses over time. **Conclusions:** Patients reported many barriers to compliance that would be amenable to tailored interventions designed to enhance compliance with medication and diet. Benefits to compliance could also be strengthened by tailored interventions to further increase compliance. Future studies are needed to determine other variables that may improve these beliefs about compliance.

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Cardiovascular Goal Attainment and Assessment of Risk Behaviors for Medication Adherence

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Purpose: Nonadherence to medical therapy is a major health concern and presents a great barrier to the attainment of optimal patient outcomes. An estimated 30–50% of hypertensive

patients and 50–79% of hyperlipidemic patients withdraw from their prescribed medication regimen within 1 year. The purpose of this study was to determine if self-reported medication-taking behavior (MTB) impacts blood pressure (BP) and lipid goal attainment. **Methods:** Seven primary care and cardiology medical practices located in KY, MI, OH, and PA participated in the study. Patients with a diagnosis of hypertension (HTN) and/or hyperlipidemia were identified consecutively. Patients completed a questionnaire including a 4-item validated adherence scale relating to his or her MTB as an estimate of medication adherence. A nurse recorded BP from the visit, most recent cholesterol values, and current medications for the management of BP/lipids. **Results:** A total of 372 patients were included in the analysis. The mean age was 61 years (range 26–89, 45% female) and the mean number of medications prescribed for each patient was 6.6 (range 0–26). Hyperlipidemia was diagnosed in 322 patients, HTN in 325 patients and both diseases in 275 patients. Over 65% of the patients had either CHD or a CHD risk equivalent and 10.7% had 2 or more risk factors for CHD. Based on JNC VII guidelines, 49.8% ($n=160$) of hypertensive patients with documented BP achieved BP goal and 61.2% ($n=208$) of patients with documented LDL-C were at NCEP ATP III goal for LDL-C. MTB was high in 54.3% and medium/low in 45.7% of patients. In addition, 35 patients (9.5%) stated they skip doses or took less medication to save money. NCEP ATP III LDL-C goal attainment occurred in 66.3% and 55.5% of patients in the high and medium/low MTB categories, respectively ($p=0.044$). JNC VII goal attainment for BP occurred in 50.6% and 49.3% of patients in the high and medium/low MTB categories, respectively ($p=NS$). **Conclusions:** Significant numbers of patients in this analysis were at risk for being nonadherent to medications. These patients were less likely to achieve LDL-C goal. Clinicians must be aware of the high prevalence of medication nonadherence and its potential impact on achieving treatment goals in the management of high cholesterol and BP.

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The Influence of Ethnocultural Affiliation and Gender on Coronary Heart Disease Risk Management

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Ethnocultural affiliation and gender influence people's beliefs, understanding, appreciation of, and ultimately their choices about making lifestyle changes associated with CHD risk. To develop appropriate strategies and health policy aimed at improving people's ability to make lifestyle changes associated with CHD risk, the influence of ethnocultural affiliation and gender as fundamental foci, must be understood. Our objectives were to describe and explain: (1) the process that people undergo when faced with making lifestyle changes related to their CHD risk, and (2) how ethnocultural affiliation and gender influence that process. A series of grounded theory studies were thus undertaken with men and women ($n=10$ each) from 7 ethnocultural groups (Euro-Celtic, French, Aboriginal, Chinese, South Asian), and who had a diagnosis of CHD. Since place of residence also shapes culture, urban and rural living Euro-Celtic and French Canadians were studied. Participants engaged in audio-recorded interviews. Interview transcripts and field notes were the principle data sources. In the pre-event phase, participants had varying degrees of acknowledgement and comprehension regarding CHD risk factors. The severity of impact of the CHD event, interpretation of healthcare providers' messages regarding their illness and the healthcare experience, played prominent roles in how people viewed their health following their event. The ability to acquire health information (including language, education, economic status); beliefs regarding religion, luck and fatalism; the nature and perceived importance of work/employment; life goals/future orientation; family constellations; age; and most importantly gender differentially influenced (based on ethnocultural affiliation) people's decisions about managing their CHD risk in both process and outcome. Despite ethnocultural affiliation, women encounter particular hazards to making beneficial choices about their CHD risk. In our next phase of study, we will use this work to develop, refine and test decision models that will represent and have the capacity to predict the ethnocultural- and gender-based decisions and behavioral outcomes of people faced with making decisions about managing their CHD risk.

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Exercise after Cardiac Events: Predicting Maintenance

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A convenience sample of 118 patients (74 men, 44 women) who completed cardiac rehabilitation (CR) were followed for one year. Measures of exercise frequency, amount (# hours exercised), exercise session duration, and intensity (# hours exercised in target heart rate zone) were obtained using portable wristwatch heart rate monitors worn during exercise. Data on a set of candidate predictor demographic, physical, psychosocial, and cognitive/behavioral variables were collected in an interview near the end of CR. Results indicated that during the 12th month after CR 58% of subjects did no exercise, and the mean amount of time exercised was 4.4 hours. Predictors of exercise frequency were depressed mood, efficacy for adherence, fitness, and race ($F=5.20$, $p<.01$). Predictors of amount of exercise twelve months after CR were muscle and joint pain limiting movement, depressed mood, efficacy for adhering to an exercise regimen, fitness (measured by 6-Minute Walk Test), abdominal girth, race, and retirement status ($F=4.99$, $p<.01$). Predictors of session duration were motivation, depressed mood, and marital status. Predictors of exercise intensity were muscle and joint pain limiting exercise, fitness, and New York Heart Association Class ($F=5.41$, $p<.01$). These data indicate that interventions addressing depressed mood, self-efficacy, muscle and joint pain, and fitness may be key to improving long term exercise following cardiac events.

P61 The COACH Program: From Clinical Trials to Clinical Practice

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Background: Multiple studies have shown that there is a failure to apply evidence-based medicine in clinical practice – the ‘treatment gap’. The COACH (Coaching patients On Achieving Cardiovascular Health) Program is a training program for patients with coronary heart disease (CHD) whereby a health professional coach trains patients to aggressively pursue the target levels for their coronary risk factors while working in partnership with their own doctor(s). We have recently shown in two randomized controlled trials that The COACH Program can substantially reduce the treatment gap (JCE 2002; 55: 245–52, Arch Intern Med 2003;163: 2775–83). We are now applying this strategy to the management of patients with CHD in routine practice. **Methods:** Cardiac coaches were appointed to St. Vincent's Hospital Melbourne (SVHM), Austin Health (AUSTIN) and The Royal Melbourne Hospital (RMH) in January 2003. The patients with CHD are coached according to National Heart Foundation of Australia risk factor targets. The success of coaching is measured by the proportion of eligible patients enrolled and by the achievement of risk factor targets in these patients. **Results:** The number of patients enrolled from January 13, 2003 to December 31, 2003 is 975: 318 SVHM, 355 AUSTIN, 302 RMH. The proportion of males is 75%, females 25 %, median age 60 years. Evaluation showed that the coaches had recruited 46% of the eligible patients. An additional 20% of patients were ineligible. The impact of coaching was measured in 336 patients in whom full 6 month follow-up data was available. Results in these 336 patients indicate that 68% achieved total cholesterol < 4.5 mmol/L, 77% achieved blood pressure < 140/90 mmHg, 20% achieved BMI < 25 kg/m², 60% achieved fasting glucose < 6.1 mmol/L, 91% were not smoking, 92% walked regularly for exercise, 93% were taking aspirin, 93% were taking a statin and 72% were taking a beta blocker. **Conclusions:** We have shown that coaching can enrol a large number of patients who have been hospitalized with CHD and achieve good coronary risk factor status and adherence to cardiovascular medications. The COACH Program has the potential to reduce deaths and recurrent adverse events by 20%.

P62 A Study of the Relationship Between Adherence to Treatment Protocol and Weight Loss

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Introduction: Obesity has been linked to a host of chronic disorders associated with heart disease. However, studies have demonstrated numerous benefits to cardiovascular health with as little as 10% reduction in weight. Weight loss treatment results in short-term success but is followed by high rates of recidivism. This study focused on the use of a lacto-ovo-vegetarian (LOV) eating plan as a dietary strategy and on the role of treatment preference to promote long-term weight loss. Preference was crossed with two treatment options: standard behavioral treatment and standard behavioral treatment + lacto-ovo-vegetarian eating plan. **Purpose:** This study examined the relationship between adherence to treatment protocol (session attendance, restricted calorie goal, recorded exercise, and daily diary completion) and weight loss at six months. **Methods:** Data were obtained from attendance records and weekly diaries. Weight loss was the difference between weight at baseline and at 6 months. Data from the four treatment groups were combined for this analysis. **Results:** The first recruitment cohort (N=55) had a mean age of 43.8±0.9, was predominantly female (90.4%), White (82.7%), married (67.3%), and employed (90.2%) with 15.4±2.4 years of formal education. Results revealed a mean attendance of 76% at the weekly sessions. Moderate levels of adherence were observed for maintaining the restricted calorie goal (72%) and completing the daily diary (74%), with relatively poor adherence to the exercise goal (46%). Mean weight loss was 13.4“ 9.5 pounds. There were moderate but statistically significant positive relationships between adherence to the four components of the treatment protocol and weight loss. The predictor variables were significantly related to weight loss: attendance (P < 0.01), adherence to the calorie goal (P < 0.01), frequency of exercise (P < 0.05), and daily diary completion (P < 0.01). The presentation will include the second recruitment cohort (n = 67) for a total sample of 122. **Conclusions:** Adherence to treatment protocol played a significant role in weight loss in this study. Facilitating improved adherence to all aspects of the treatment protocol, especially to exercise, may lead to improved weight loss and reduced cardiovascular risk.

P63 Effects of Home-Based Cardiac Exercise Program on the Exercise Tolerance, Serum Lipid Values and Self-Efficacy of Coronary Patients

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Exercise-based cardiac rehabilitation (CR) improves exercise capacity and reduces cardiac risk factors. Despite the beneficial effects of exercise-based CR there was an absence of organized CR programs in Turkey until recently, when home based cardiac exercise programs (HBCEP) were introduced. The purpose of this pilot study was to examine the feasibility of patients following a HBCEP and to examine the effects of the program on exercise tolerance, serum lipids, and self-efficacy in post acute coronary event patients in Turkey. **Methods:** Self-efficacy theory provided the framework for this study's intervention. Sixty patients were randomly assigned to usual care (Control Group, n = 30) and the intervention (HBCEP, n = 30). The Phase II HBCEP included three 45–60 minute sessions a week, for 12 weeks, and the enhancement of self-efficacy through educational sessions, the use of goal setting, modeling,

and physiological feedback strategies. The control group was instructed about home exercise and risk factor modification but there was no supervision provided. Both groups were comparable in medical regimen, exercise capacity, and other measured variables pre-intervention. At baseline and after 12 weeks, exercise capacity was evaluated by exercise testing using the Bruce Protocol, self-efficacy was measured with the Cardiac Exercise Self Efficacy Index (CESEI), and serum lipid values were measured post 12-hour fast. **Results:** Mean age of participants was 53.7 ± 11.4 years, 91.6% were male, and 98.3% were married. The mean adherence to exercising at least 3 times per week in the HBCEP Group was 91% while the Control Group reported only 15%. The mean CESEI score for the Control Group was 60.60 ± 1.65 while the HBCEP Group mean score was 77.66 ± 1.81, p < .001. At the completion of the 12-week exercise program, the exercise capacity (p < .001), total cholesterol (p = .004), triglycerides (p = .048), HDL cholesterol (p = .001), and LDL cholesterol (p = .039) of the HBCEP Group were significantly improved compared to the Control Group. **Conclusion:** These results suggest that a first-time HBCEP in Turkey can be successful in having patients adhere to a prescribed exercise program and reduce risk factors. Enhanced self-efficacy may have mediated the improved behavioral outcomes.

P64 Appointment Attendance is not Associated with Medication Adherence in Hypertensive African Americans

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Appointment attendance is often used as a proxy for medication adherence in clinical trials. Little evidence supports this approach in African Americans. Using a cross sectional design, we determined whether appointment attendance was associated with medication adherence in hypertensive African American patients followed in a primary care practice. Participants were enrolled in a RCT designed to improve medication adherence. Appointment attendance was defined as the percentage of appointments broken during the 12 months before enrollment in the trial. Patients who broke at least 30% of their appointments were categorized as nonattenders. The Moritsky questionnaire assessed medication adherence; those who answered yes to any of the following questions were categorized as nonadherent: Do you forget to take your medication? Are you careless about taking your medication? Do you stop taking your medication when you feel well or feel worse? Using a significance level of p<0.05, the association between appointment attendance and medication adherence was determined with Chisquare, the proportion of broken appointments between adherent and nonadherent patients was compared with t-tests, and concordance between the constructs was assessed with kappa. Among the 99 patients enrolled, mean age was 52 yrs, 93% were women, 14% were married, 64% were unemployed, 87% had Medicaid, 73% graduated high school, and mean BP was 141/86 mmHg. The median appointment was 11 (range 1–34); mean proportion of broken appointments was 23%, with 32% categorized as nonattenders. Sixty-nine percent of patients were nonadherent with BP medications. There was no association between appointment attendance and medication adherence (****c7 NEEDS TO BE ADDED TO TIMES NEW ROMAN FONT****=0.25, p=0.6); concordance between nonattenders and nonadherents was poor (kappa=0.04, p=0.5). The difference in mean proportion of broken appointments between nonadherent and adherent patients was -1.6% (CI:-1.1–0.08). Thus, there is no association between appointment attendance and medication adherence in hypertensive African Americans; these constructs should be evaluated independently in future trials.

P65 In Pursuit Of Perfection: Interventions To Exceed Acute Myocardial Infarction (AMI) Performance Indicators

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Adherence to AMI core measures has been used to assess quality of care, report process outcomes, and more recently, form the basis for financial incentives to hospitals for exceeding thresholds. Despite participating in the first ACC AMI Guidelines Applied in Practice (GAP) project in Southeastern Michigan and adaptation of the GAP methodology, high adherence rates to AMI care indicators has not been sustained at our hospital. We implemented the following initiatives to optimize adherence to AMI core measures: 1) automatic ASA and Beta Blocker Rx (unless contraindicated) on standardized AMI admit orders, 2) high expectations of the ED to institute orders, 3) daily printout of positive troponins for patient targeting, 4) assurance of AMI therapies, via review by a Pharm.D, 5) AMI care nurse practitioners, empowered to correct therapeutic deficiencies and assure tool use, 6) monthly adherence rates reviewed by a multidisciplinary committee, 7) engaged primary nurses to care processes, and 8) a GAP AMI discharge document. We compared adherence rates to AMI core measures in the sixth month period (1/03–6/03) before and after full deployment of the initiatives; (assessed by monthly Corporate Quality audit of AMI charts using JCAHO tools: data for 09/03–11/03 only available at this time): However, even with our intense, focused, high level efforts, perfect adherence rates have not yet been achieved. The possible reasons for only moderate trends in our data may be: 1) the 3 month period between 09/03–11/03 may be too short of a study period, 2) issues in documentation and medication prescribing by physicians, and 3) the last 5–10% increase in ASA and Beta Blocker upon arrival and discharge are the most difficult to attain. We feel that in order to optimize adherence rates to AMI care indicators, an engaged health care provider collaborative, adoption and utilization of AMI GAP-like tools, and a comprehensive, systematic approach to quality improvement needs to be implemented.

| CORE MEASURE | 01/01/03 - 06/30/03 | 09/01/03 - 11/30/03 |
|---------------------------|---------------------|---------------------|
| Aspirin at arrival | 90% | 91% |
| Beta Blocker at arrival | 89% | 93% |
| ACEI for LVSD | 83% | 84% |
| Aspirin at discharge | 94% | 93% |
| Beta Blocker at discharge | 93% | 94% |

Measuring Cardiovascular Specialists' Adherence to Evidence-Based Care in the PPO Setting

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Background: The Hawaii Medical Service Association's Physician Quality and Service Recognition (PQSR) program is a quality-based compensation model that rewards physicians for providing high quality care. In this program, HMSA has developed specific indicators using administrative data to measure the quality of care provided by cardiologists. **Objectives:** To provide a case study example of a managed care intervention aimed at improving patient care at the physician level and to explore preliminary outcomes of this performance-based financial incentive program. **Methods:** Four evidence-based process measures (indicators) of quality of cardiovascular care are used to rate cardiologists in a PPO environment: 1) ACE inhibitor use in CHF, 2) Compliance with antihypertensive therapy, 3) Compliance with lipid lowering agents, and 4) Lipid panel following CVA. Four additional indicators were implemented in 2002: 1) Hepatic enzyme monitoring for statin use, 2) Treatment of coronary artery disease: beta blockers, 3) Treatment of coronary artery disease: ACE/ARB, 4) Treatment of coronary artery disease: lipid lowering drugs. For each indicator, physicians are rated by their percentage of eligible patients who receive medical care meeting evidence-based criteria. **Results:** Mean baseline scores for indicators ranged between 29% and 78%, with 29% of physicians' eligible patients meeting criteria for lipid panel following stroke, and 78% meeting criteria for compliance with anti-hypertensive agents at baseline (1998). Initial results suggest progressive improvement over time in many of these indicators, such as use of ACE inhibitor in CHF, which displayed considerable and sustained improvements in weighted mean scores as well as cumulative distribution functions between 1998 and 2003 (from 41% in 1998 to 71% in 2003). HMSA has also seen increased participation by cardiologists in the program since its inception. **Conclusions:** The PQSR program is an innovative approach to improving the delivery of quality health care to patients. Early findings reveal a promising performance-based compensation model that may positively affect quality of medical care, and also suggest an effective model for measuring quality of care of cardiologists in a PPO environment.

Economic Evaluation of a Compliance Program in Patients with Statin Therapy – Design of the ORBITAL Study and Preliminary Results of a Cost-of-Illness Analysis

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Objectives: Despite the effectiveness of statin therapy in patients with hypercholesterolemia in both primary and secondary prevention of cardiovascular diseases, patient compliance remains inadequate. The primary objective of the ORBITAL Study is to evaluate the impact of a compliance-enhancing program in patients receiving statin therapy on long-term disease-related outcomes and costs. Here are the design of the study and results of a cost-of-illness analysis in a subsample of patients. **Methods:** Approximately 8000 patients eligible for statin therapy (Joint European Guidelines) have been enrolled nationwide in primary care practices in Germany. Patients have been randomised into an intervention group (12-month rosuvastatin plus compliance program) and a control group (12-month rosuvastatin alone). The compliance program was developed based on previous studies, expert advice, and pilot testing, and includes a start package with a video and an information brochure, followed by mailings and telephone calls. The 12-month intervention period is followed by a 24-month observational period. For the present cost-of-illness analysis, patients were asked retrospectively about their medical resource use and employment status in the six months preceding enrolment. **Results:** The first 2500 patients (mean age 61 ± 11 years, 44% female) were included in the analysis. Out of these patients, 32% were employed at the time of inclusion, 19% had a history of myocardial infarction, 8% a history of stroke, 61% had hypertension and 28% diabetes. Disease-related direct costs amounted to a mean of 1052 Euros \pm 2293 per patient, indirect costs to a mean of 1495 Euros \pm 4124. Overall, disease-related early retirement was responsible for almost half of the total costs (47%), followed by costs for hospital visits (17%), medication (16%), workdays lost (12%), physician visits (4%), outpatient therapy (2%) and rehabilitation (2%). **Conclusions:** Indirect costs due to a loss of productivity contributed markedly to the disease-related costs in patients with hypercholesterolemia. The considerable economic burden of hypercholesterolemia indicates the need to assess long-term (cost-)effectiveness of health care programs in patients with the disorder.

Poster Presentations

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