requests, PharmGKB (www.pharmgkb.org) and the disease association database (<http://geneticassociationdb.nih.gov/>). To be considered, a polymorphism had to be associated with disease in two independent populations and it had to have a reported minor allele frequency in a Caucasian population of at least 0.20. The final assay was developed on the Sequenom platform and all individuals within the PMRP cohort were analyzed. Probability of identity for the panel was calculated and each polymorphism was tested for Hardy Weinberg equilibrium. The allele frequencies found in our population of 20,000 were compared to reported allele frequencies. The allele frequencies in the PMRP population were compared between males and females and between different age categories. **Results:** From a list of 116 potential polymorphisms we developed a single assay of 36 medically relevant somatic polymorphisms with at least one polymorphism on each chromosome and a single sex marker. The probability of identity for the assay was 6.132×10^{-15} and the sibling probability of identity was 3.077×10^{-8} . Three polymorphisms differed from previously reported allele frequencies by more than 10%. In our population, four polymorphisms were different in males and females and four polymorphisms varied in allele frequencies between age groups. Furthermore, the chosen polymorphisms have been used in two studies and as preliminary data in several other studies. **Conclusions:** We were able to create a DNA panel of 36 medically relevant polymorphisms that successfully tested DNA quality, increased the knowledge of population wide allele frequencies, and is useful to investigators for candidate gene studies.

PS2-13:

Genetic and Environmental Risk Factors for Prescription Opioid Dependence in the Healthcare Setting

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Background: Research on the genetics of opioid addiction among illicit drug users is difficult given challenges to case ascertainment and selection of an appropriate control group. To address this limitation, we tested a model by studying prescription opioid users. **Methods:** We undertook a case-control, candidate-gene study of opioid-dependent users and nondependent users among Geisinger Clinic outpatients. Electronic health record (EHR) data were reviewed for patients who were prescribed opioids. Patients were selected for a phone interview if they had five or more prescription orders for opioids in the prior 12 months for non-cancer pain. Cases were identified based on the Diagnostic and Statistical Manual of Mental Disorder, Version IV (DSM-IV) criteria for opioid dependence. A modified Composite International Diagnostic Interview (CIDI) was used to obtain data on dependence status and history. Data were also gathered on detailed drug, psychological, and environmental exposures. Altogether, 703 patients completed the CIDI; 512 of these patients (73%) provided DNA for genotyping and completed the NEO Five-factor Personality Inventory. **Findings:** Altogether 37.4% (95% CI = 33.8–41.1) of patients met DSM-IV criteria for lifetime opioid dependence and 30.7% (95% CI = 27.3–34.3) met criteria for current dependence. Significant predictors of opioid dependence included younger age, unemployment, psychotropic medication use, as well as history of PTSD, anxiety, depression, alcohol abuse, anti-social personality, illicit drug use, trauma exposure, and substance abuse treatment (all P -values < 0.001). Preliminary Genetic analyses suggested that opioid dependence was associated with dopamine receptors D2 and D3 and the COMT genes. Gene by environment (G x E) interactions were also detected related to opioid dependence and exposure to mental trauma. **Conclusion:** The prevalence of drug dependence is high among pain patients on long-term opioid therapy in the outpatient setting. This disorder is associated with a history of other mental health conditions, employment status, psychotropic medication use, illicit drug use, and exposure to mental trauma. Genetic analyses suggested associations with genes related to neurocognitive processes associated with impulse control and reward regulation. Several G x E interactions were also detected.

Health Economics

C-C2-01:

Financial Assessment of a Comprehensive Cardiac Care Program for Patients With Occlusive Coronary Artery Disease

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Background: While early and aggressive comprehensive cardiac care (CCC) programs in patients with coronary artery disease (CAD) have been associated with improvements in clinical outcomes, information on the financial outcomes of such programs are limited. The purpose of this investigation was to assess the financial impact of a CCC program on total healthcare expenditures after an initial coronary event. **Methods:** This was a matched, retrospective cohort analysis of the Kaiser Permanente Colorado (KPCO), a group model HMO, nurseand pharmacist-managed CCC program that was designed to provide evidence-based lifestyle and medication support at the earliest opportunity after a coronary event. Patients with an incident occlusive CAD event between January 1999 and June 2004 were categorized into intervention and comparator groups, respectively, by enrollment or never enrollment (No CCC) into the CCC. Patients were matched 1:1 on chronic disease score (CDS) and 180-day pre-coronary event (baseline) total healthcare expenditures. Pharmacy and medical utilization events were extracted from electronic administrative and claims databases. Utilization events were collected after the initial coronary event until death, health plan termination, three years, or December 31, 2005, whichever came first (follow up). Expenditure estimates from the KPCO Decision Support System (in 2007 dollars) were applied to utilization events. An intervention cost of \$1/follow-up-day was applied to all CCC patients. Expenditures/day were modeled with adjustment for matching variables, patient characteristics, baseline expenditures, and intra-correlations of matched patients. **Results:** 628 CCC patients were matched to 628 No CCC patients. Patients in the No CCC group were slightly older, more likely to be female, and to have had a myocardial infarction. Mean/median baseline expenditures and CDS were equivalent. During follow-up, 12 and 98 cardiac-related deaths occurred in and mean/median total healthcare expenditures/day were \$57/\$30 and \$159/\$45 for the CCC and No CCC groups, respectively (both $P < 0.001$). After adjustment, CCC patients were associated with -\$103/day lower total healthcare expenditures ($P < 0.001$; adjusted R-square=0.71 with log-transformed expenditures). **Conclusions:** Comprehensive and aggressive implementation of secondary cardiac prevention strategies with close monitoring and follow-up of CAD patients is associated with reduced healthcare expenditures.

C-C2-02:

Validation and Uses of the ACG-DX Predictive Modeling and Risk Adjustment Tool in an Israeli HMO

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Background: With an ever increasing population of HMO members with chronic disease and continuing economic pressures to provide good medical care as efficiently as possible, there is a need for methods to stratify populations by health status and their future risk for using limited healthcare resources. **Methods:** We used the ACG-DX program developed at Johns Hopkins University for validation testing on an Israeli PPO population. This program uses same year data to provide a risk adjustment analysis for that year and predict high-users (top 5%) for the following year. The Maccabi Healthcare Services has an extensive demographic and medical database keyed by a unique identifier for each member. We provided age and gender data as well as all diagnoses for year 2006 and total cost for years 2006 and 2007 for each member as input to the ACG-DX program. We truncated total costs over the 99.9% for both pharmacy and total costs. The explanatory value for costs in 2006 (R^2) and positive predictive value for total costs in 2007 were calculated for the entire population of 1.7 million subscribers. The R^2 results were compared to results based on American data and reference values (ref.) generated by the

program. **Results:** The R^2 explanatory power for same year costs for age 65 and over was 18.7% for total cost (ref. 16%) and 45.5% for pharmacy cost (ref.10%). For those under age 65, the values were 20.5% (ref. 21%) for total cost and 39.1% (ref. 29%) for pharmacy cost. In predicting which members would be in the high (top 5%) cost bracket, we correctly identified 33,479 members (based on 2006 data) as being at risk for high total cost out of the 85,059 members who did have a high total cost in 2007. The positive predictive value was 39.4%. **Conclusions:** We have validated the ACG-DX tool for an Israeli population for both risk management and predictive modeling. This tool can be now used for a large variety of managerial and medical uses, including population, disease and case management, budget allocation and provider payment as well as improving health care equity and quality assurance.

C-C2-03:

Incidence-based Costs of Multiple HAART Switches Among HIV-infected Patients in an HMO

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Background: Highly active antiretroviral therapy (HAART) or combination antiretroviral (ARV) therapy is associated with reduced morbidity and mortality. Yet, many HIV-infected patients endure incomplete HIV suppression from HAART or combination ARV therapy, increasing cost and limiting effectiveness. Little is known about the direct healthcare costs of HIV+ patients requiring multiple HAART regimen switches because of incomplete HIV suppression. In an HMO-based population of HIV+ patients, we examined resource and cost implications of multiple relative to single (or no) HAART switches starting from first HAART regimen. **Methods:** Retrospective analysis of HIV+ patients of the Northern California and Northwest regions of Kaiser Permanente during 2004. Continuous active 12-month membership and minimum 12 months of continuous HAART. Cases on third or later HAART regimen; controls on 1st or 2nd regimen. Regimen switch is combination change of two or more additions of ARV drugs to an existing HAART regimen. Cost categories drugs, outpatient, inpatient, lab, and radiology. Patients followed from first HAART regimen to death, disenrollment, or end of study up to 60 months. **Results:** 287 cases (19% female); 1,645 controls (12% female) followed from 1st regimen. Mean total per-patient follow-up costs were \$105,132 (cases) vs. \$70,004 (controls). Mean pharmacy costs were \$70,672 (cases) vs. \$49,668 (controls) ($P < .04$). Of cases mean pharmacy costs, 85% were antiretroviral-based (90% for controls). Mean dispenses of both ARV and non-ARV drugs were higher for cases (80 vs. 60 for antiretrovirals, 64 vs. 60 for non-antiretrovirals). Mean outpatient costs were \$13,100 (cases) vs. \$8,952 (controls) ($P < .0001$). Mean ER and mean non-specialty visits were both higher among cases ($P < .03$). Fourteen percent of cases had at least one inpatient stay vs. 10% of controls. Inpatient costs per patient with at least one stay were \$101,396 (cases) vs. \$72,000 (controls) (not significant). Mean radiology costs were \$1,412 (cases) vs. \$956 (controls) ($P = .05$); mean lab costs were \$4,728 (cases) vs. \$3,472 (controls) ($P < .0001$). **Conclusions:** HIV-infected patients on a third or later HAART regimen incurred costs in total and across most categories that greatly exceeded costs of similar patients on earlier regimens. Working to ensure success with initial HAART regimens appears to lower total cost of HIV care.

PS2-12:

How to Move From Belief to Proof? Economic Evaluation of Care Programs for Chronically Ill

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Worldwide, care programs for chronically ill are implemented without evidence that these programs make worthwhile use of scarce resources. Generally, these programs aim to improve quality of care and mitigate healthcare costs. They seek to identify chronic conditions more quickly, treat them more effectively and thereby slow the disease progression. This is

pursued through a combination of 1) more effective team care and planned interactions; 2) self-management support; 3) integrated decision support; 4) electronic patient registries and other supportive information technology. Although some positive results with regard to quality of care are shown, published evidence on cost-effectiveness remains largely inconclusive. Previous research also demonstrates that this uncertainty around cost-effectiveness of chronic care programs is not simply due to heterogeneity in programs. Rather, ignorance of the relation between healthcare structures, program-design and outcomes might be the cause. Hence, we hypothesized that the decision uncertainty around cost-effectiveness of chronic care programs decreases when parameters reflecting healthcare structure and program design are explicitly included in the economic evaluation of such programs. To test this hypothesis, the relation between structure parameters, program design and cost-effectiveness is investigated in a comparative international study including programs for adults with diabetes, heart failure, depression, asthma or Chronic Obstructive Pulmonary Disease. Subsequently, a decisionanalytic model is developed to estimate the short and long-term cost-effectiveness of programs for a given healthcare structure. Dependent on the remaining uncertainty around program cost-effectiveness, stakeholders can decide if these should be further implemented or that more information is required. Additionally, it is determined how the cost-effectiveness of programs can be maximized by adjustments in their design. With tools to better estimate the cost-effectiveness of chronic care programs in a given setting, and optimize their design accordingly, we will be able to improve care for the chronically ill in a systematic and cost-effective way. An outline of this advanced cost-effectiveness model and its potential application to case studies will be presented at the conference.

PS2-34:

Implementation Cost Analysis of Telephone and Internet-based Interventions for the Maintenance of Weight Loss

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Objectives: The Weight Loss Maintenance Trial (WLM) was a multi-center, randomized trial comparing two weight loss maintenance interventions, a telephone-based personal contact program (PC) with monthly contacts primarily by phone and an Internet-based program (IT), to a self-directed control group, among overweight or obese individuals at high cardiovascular risk. This presentation describes the implementation costs of both interventions as well as the development costs of the IT program. **Methods:** Intervention costs were micro-costed using both internal and external measurement sources. Length of trial participation was 30 months. IT development costs were assessed over the 36 months of development. Primary analytic perspective was that of a healthcare system considering adoption of an extant intervention, rather than development of its own intervention. Uni-variate and multivariate sensitivity analyses were performed. **Results:** 30-month implementation costs for 342 PC participants were \$558.3K (\$1,632 per participant), and for 348 IT participants were \$223.3K (\$653 per participant). Under all plausible scenarios, IT implementation costs were below PC implementation costs. Total estimated IT development costs over 36 months were \$879.4K (\$2,527 per IT participant). **Conclusions:** When hosted in a facility with substantial resources devoted to and expertise in website delivery, costs of implementing and maintaining a Web-based intervention for the maintenance of weight loss are substantially less than similar costs of a conventional intervention using a combination of phone and in-person contacts. In such a situation, per-participant website cost remains less than the personal contact intervention, even including development costs. If future trials demonstrate the effectiveness of these or similar interventions in maintaining initial weight loss, our results can be used to inform the economic evaluations that will assess the true value for money produced by their implementation.