

5.3% to 10.6% in Whites, and from 1.0 % to 2.7% in Hispanics but only modestly in Blacks from 1.5% to 2.3%. In logistic regression models predicting participation, the most important predictors of participation were having at least one physical examination (OR 1.46, 95%-CI 1.34-1.59) in Whites and long-term membership in Hispanics (OR 1.38, 95%-CI 1.11-1.69). None of the restrictions significantly predicted participation in Blacks (p for interaction with race <0.001). **Conclusions:** The application of restrictions based on longer membership and regular physical examinations may increase recruitment of non-Hispanic White and Hispanic men for biobank participation.

**Keywords:** Biobank; Racial disparities

doi:10.3121/cmr.2014.1250.ps2-15

PS2-16:

### **Racial Disparities in Biobank Participation among Women in Southern California**

Corinna Koebnick<sup>1</sup>; Galina Inzhakova<sup>1</sup>; Darios Getahun<sup>1</sup>; Mary Helen Black<sup>1</sup>; Steven Jacobsen<sup>1</sup>; Miki Nguyen<sup>1</sup>

<sup>1</sup>Kaiser Permanente Southern California

**Background/Aims:** The aim of this study is to identify predictors of participation in women of different racial groups to optimize future recruitment efforts. **Methods:** We randomly selected and assessed predictors of participation on Kaiser Permanente Southern California adult female members (n = 107,378) between November 2012 and June 2013. Women were asked to provide a saliva sample for a research biobank. Potential predictors of participation were age, long-term membership (= 5 years), no significant gaps in health care coverage (<3 month in last 3 years), physical examination within the last 3 years and neighborhood education and income.

**Results:** The overall participation among women was 6.8%. Restricting recruitment to women with = 5 years of membership, no major gaps in health care coverage, and at least one physical examination within the last 3 years improved participation in Whites (from 7.1% to 14.3) and Hispanics (from 2.5% to 5.0%) but only modestly in Blacks (from 2.0% to 3.6%). In logistic regression models predicting participation, the strongest predictors in Whites and Hispanics were having a physical examination (OR 1.25, 95%-CI 1.17-1.33 in Whites and 1.45, 1.28-1.65 in Hispanics) and long-term membership (OR 1.19, 95%-CI 1.12-1.27 in Whites and 1.32, 1.16-1.50 in Hispanics). None of the restrictions significantly predicted participation in Blacks (p for interaction with race <0.001). **Conclusions:** Applying restrictions based on regular physical examinations and longer membership may potentially increase participation of non-Hispanic White and Hispanic women in a research biorepository.

**Keywords:** Biobank; Racial disparities

doi:10.3121/cmr.2014.1250.ps2-16

## **Health Informatics**

B1-1:

### **Predictive Modeling to Identify Patients at Risk for Index Hospitalization**

Ted Palen<sup>1</sup>; Heather Tavel<sup>1</sup>; James Brill<sup>2</sup>; Jennifer Bajaj<sup>2</sup>

<sup>1</sup>Kaiser Permanente Colorado; <sup>2</sup>Colorado Permanente Medical Group

**Background/Aims:** Preventable hospital readmissions are the focus of many performance metrics. However, little attention has been given to preventing index admissions. The likelihood of hospitalization (LOH) is a statistical model (Verisk Analytics®) which uses patient historical clinical data and logistic regression to predict the likelihood of admission in the next six months. One of our goals was to test the accuracy of the LOH model to predict hospitalizations. The second goal was to identify possible common intervenable causes for the hospitalization. **Methods:** We obtained the list of patients with LOH scores in the top 1% calculated as of July 1, 2012. We then retrospectively identified which of these patients had hospitalizations in the following 6 months. We censored patients who had hospitalizations related to trauma and pregnancy. We performed chart reviews on a subset of the hospitalized patients and classified reasons for the admission into intervenable or non-intervenable causes. **Results:** Of the patients in the top 1% of LOH (N = 1460; mean LOH = 0.47), 412 (28.2%) were hospitalized within 6

months of the LOH calculation date. The average age and percent female for hospitalized and non-hospitalized patients was 74.1 years, 57.8% and 73.4 years, 60.0%, respectively (not significant). 324 of the hospitalized patients had no emergency department visits in the prior 6 months. Fifty percent of hospitalizations occurred within 33 days of the LOH calculation date. We performed chart reviews on 134 (32.5%) of the hospitalized patients. Twenty-eight patients (20.9%) were classified with intervenable causes for the admission, 19 (67.9%) of which were related to system issues such as inadequate follow-up after procedures or medication adjustments.

**Conclusions:** Identifying patients with intervenable causes for hospitalizations may significantly decrease unnecessary admissions. Risking algorithms may have utility in developing strategies to identify these patients. Risk of Hospitalization (RHO2) uses near real-time clinical data from the electronic medical to calculate risk scores. Future studies will compare the performance characteristics of LOH to RHO2 to identify overlapping cohorts of patients. If RHO2 performs as well as LOH, we will use the near-real time clinical data in RHO2 to flag patients with intervenable causes of hospitalization at the point-of-care.

**Keywords:** Predictive modeling; Risk profiling

doi:10.3121/cmr.2014.1250.b1-1

B1-3:

### **Improving Surgical Case Duration Accuracy with Advanced Predictive Modeling**

Ronald Dravenstott<sup>1</sup>; Eric Reich<sup>1</sup>; Steven Strongwater<sup>1</sup>; Priyantha Devapriya<sup>1</sup>

<sup>1</sup>Geisinger Health System Clinical Innovations

**Background/Aims:** The Operating Room (OR) is a large source of revenue and one of the most costly departments in a hospital. Scheduling surgeries into an OR is complicated by the inherent uncertainty associated with each surgery. The case length of a surgery at Geisinger is predicted using a moving average of the 10 previous procedures performed by a given surgeon. A process capability analysis was performed to gauge the ability of each surgical procedure to be within ± 15 minutes of scheduled time. This analysis demonstrated a low process capability across all surgeries. This research aims to create a process to better predict the surgical case length by leveraging the Electronic Health Records, which can enable more efficient scheduling and use of the ORs. **Methods:** Based on a literature review and the results of an internally conducted survey of OR staff, a dataset was constructed with 135 predictors. A test dataset was randomly separated from the training dataset for validation. Predictive models were developed using Stepwise Linear Regression (LR) and Artificial Neural Networks (ANNs). Multilayer Perceptron ANNs with 2 hidden layers using a sigmoid transfer function and Delta Bar Delta learning algorithm tended to perform the best. The final model contains the 39 most sensitive predictor variables from the ANN model and the LR model. **Results:** In all cases, the predictive models significantly improved the case duration accuracy. The ANN models outperformed the LR models on 3 of the 5 high-volume procedures. The greatest improvement over the baseline occurred for the ANN model for Arthroplasty Total Hip, where case duration accuracy improved from 32.1% (80 of 249 test cases) to 59.0% (147 of 249 test cases) for an improvement of 83.7% (improving to 59.0% from 32.1%). **Conclusions:** The ANN and LR models can be used to significantly enhance the predictability of surgical schedules. Even with the significantly enhanced predictability of surgical case lengths, the 5 investigated high-volume surgeries are still not necessarily process capable with respect to ± 15 minute specification limit.

**Keywords:** Predictive modeling; Operating room

doi:10.3121/cmr.2014.1250.b1-3

B1-4:

### **eCare for Moods (TM), A Patient-centered, Web-delivered Self-management and Care Management Program for Recurrent Depression: Results from Randomized Trial**

Enid Hunkeler<sup>1</sup>; William Hargreaves<sup>2</sup>; Bruce Fireman<sup>1</sup>; Yvonne Porterfield<sup>1</sup>; Gregory Simon<sup>3</sup>

<sup>1</sup>Kaiser Permanente Northern California; <sup>2</sup>University of California San Francisco; <sup>3</sup>Group Health Research Institute