

**OBJECTIVES:** To illustrate the relationships among sensitivity/specificity, disease prevalence and PPV/NPV, and demonstrate the impact on model results when disease prevalence is not considered. **METHODS:** Using the literature on the sensitivity and specificity of single-photon emission computed tomography (SPECT) and positron emission tomography (PET) for detecting coronary artery disease as an example, we derive the PPV/NPV taking prevalence into account. Then we derive the rate of FN and FP from the reported mean sensitivity/specificity as well as from the varying PPV/NPV. **RESULTS:** Mean sensitivity and specificity for PET were 0.9 and 0.83, with associated FN and FP of 0.1 and 0.17. When using PPV/NPV to derive FN and FP, FN ranged from 0.05 to 0.22 when prevalence varied from 0.3 to 0.7, while FP ranged from 0.31 to 0.07. Sensitivity and specificity for SPECT were reported as 0.85 and 0.72, with associated FN and FP of 0.15 and 0.28. Using PPV/NPV and a prevalence range from 0.3 to 0.7, FN varied from 0.08 to 0.33 and FP varied from 0.43 to 0.12. **CONCLUSIONS:** Models results can be significantly biased if prevalence is not taken into account when deriving FN and FP for economic models of diagnostic accuracy.

#### PMD41

##### SELECTING A SECONDARY DATA SOURCE FOR A LOW-VOLUME PROCEDURE IN A SPECIALTY POPULATION: A STUDY USING INPATIENT PEDIATRIC COLONOSCOPY

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**OBJECTIVES:** The objective of this study was to compare estimates from survey and claims data sources for a low-volume procedure within a specialty population (specifically, the annual number of inpatient colonoscopies performed in the United States (US) pediatric population with private insurance) to better understand the considerations when choosing a data source. **METHODS:** A retrospective analysis of US health insurance claims and national survey data was performed using Thomson Reuters MarketScan® Commercial Claims and Encounters Database (MarketScan®), the National Hospital Discharge Survey (NHDS), and the National Healthcare Cost and Utilization Project Kids' Inpatient Database (KID). Estimates among the privately-insured were obtained overall and by age (0 to 17 years), using ICD-9-CM procedure code 45.23 for calendar year 2007 in MarketScan® and NHDS and 2006 in KID (2007 data not available). **RESULTS:** The overall, annual estimate of inpatient, privately-insured pediatric colonoscopies was similar between NHDS and MarketScan®; however, NHDS estimates were not statistically reliable and differed dramatically from the prior year (overall estimate was 5.6 times higher than 2006). The overall estimate from MarketScan® was approximately 4.3 times higher than KID with estimates by age also higher; 2.8 times for age <1 to 4.2 times for age range 15-17. The KID database reported that approximately 50% of colonoscopies were performed in pediatric hospitals. **CONCLUSIONS:** The estimates were markedly different between MarketScan® and KID, and were not statistically reliable in NHDS. Low representation of pediatric hospitals that perform a large number of colonoscopies in this population possibly led to inconsistent or underestimated projections in NHDS and KID, respectively. Researchers should be informed about the frequency of the procedure of interest and representativeness of the population in the data when selecting a data source. Further research is warranted with other low-volume procedures performed in specialty populations to substantiate these findings.

#### Surgery – Clinical Outcomes Studies

#### PSU1

##### FREQUENCIES, COSTS AND COMPLICATIONS OF CATHETER ABLATIONS FOR PEDIATRIC TACHYCARDIA: RESULTS FROM A NATIONAL PEDIATRIC INPATIENT DATABASE (YEARS 2000-2006)

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**OBJECTIVES:** Over the last two decades, catheter ablation (CA) has revolutionized the treatment of pediatric tachycardia by providing a relatively safe alternative to open-heart surgery or lifelong pharmacotherapy. Despite its high success rate, however, CA has some risk of major complications, such as complete or second-degree atrioventricular block, and a higher risk of minor complications, such as hematoma. No study to date has estimated national frequencies and costs for CA and its complications in children. The objectives were to 1) determine the frequency of CA; 2) determine the extent of major and minor complications associated with CA; 3) estimate the average cost and length of stay (LOS) for children undergoing CA; and 4) predict the likelihood of major complications based on patient and hospital characteristics. **METHODS:** Data were obtained from the Kids' Inpatient Database (KID) for the years 2000, 2003, and 2006. Discharges were selected if CA (ICD-9 code 37.34) was listed as a primary or secondary procedure. Costs were computed using the KID cost-to-charge ratios. Logistic regression was used to predict the odds of major complications. **RESULTS:** In 2000, there were 1977 pediatric CAs; in 2003, there were 2049; and, in 2006, 2254. CAs involving children 0-11 months old increased 2.8 fold between 2000 and 2006. The percentage of visits involving CA complications ranged from 5.56% in 2000 to 7.72% in 2006. In 2006, the mean cost and mean LOS for visits with CA were \$19,425 (±\$1,022) and 2.39 (±0.2) days, respectively. The odds of major complications from CA for atrial tachycardia were twice (p<0.01) that of supraventricular tachycardia. **CONCLUSIONS:** In 2006, the national inpatient cost of CA and its complications totaled \$43,783,950. Since major complications are significantly more likely in young children (up to 6 years old), caution is required as more such procedures are performed in this age group.

#### PSU2

##### USING ELECTRONIC MEDICAL RECORDS TO IDENTIFY POTENTIAL PREDICTORS FOR BARIATRIC SURGERY SUCCESS

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**OBJECTIVES:** Bariatric surgery for the treatment of obesity and its underlying comorbid conditions is a well-tolerated and safe procedure. While a surgical approach is becoming the recommended method of treatment for morbid obesity, not all patients experience significant improvement. The objectives of this study were to utilize the GE Centricity electronic medical records (EMR) database to perform a retrospective cohort analysis on weight loss over time in patients with a record of having laparoscopic gastric banding or bypass surgery to identify predictors of weight loss following bariatric surgery. **METHODS:** Analyzable patient records were drawn from the GE Centricity database from January 1990 through March 2010. To be eligible for inclusion, patients had a recorded CPT Procedure Code of 43644/43645 or 43770; ≥18 years of age; and a valid recorded BMI within 6 months prior to procedure and at least one time point post surgery. Univariate and multivariable analyses were performed using SAS version 9.2. **RESULTS:** There were some notable pre-surgery differences between bypass and band cohorts, including age, weight, BMI, selected comorbid conditions and use of antidepressants. Patients with pre-op BMI values of less than 30 did not experience sustained weight loss, on average, regardless of surgery type. Patients with pre-surgery BMI values of 30 to less than 35 fared better with banding (20+ % BMI loss) than with bypass (5% BMI gain) at 2+ years post surgery. Finally, patients with pre-surgery BMI values of 35 and above had greater success, on the whole, with bypass surgery. **CONCLUSIONS:** The percent BMI loss over time by four cohorts of pre-surgery BMI show a trend that may be useful in predicting treatment success as defined by weight loss. This analysis of EMRs demonstrates potential clinical benefits when evaluating laparoscopic gastric bypass and banding in a real world setting.

#### PSU3

##### LONG-TERM CLINICAL EFFECTIVENESS AND STABILITY OF LASIK AND SURFACE ABLATION IN KOREA: A SYSTEMATIC REVIEW APPROACH

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**OBJECTIVES:** This study is aimed to provide evidence for clinical effectiveness and stability after Laser in situ keratomileusis (LASIK) and surface ablation surgery (LASEK: Laser-Assisted Subepithelial Keratectomy, PRK: photorefractive keratectomy) for myopia in Korea. **METHODS:** We searched electronic database including Ovid-Medline, EMBASE, the Cochrane Library and Korean domestic database such as Kmbase, Korea Med, NDSL, Kisti, KISS, and KJO (Journal of The Korean Ophthalmological Society). Two independent reviewers extracted data and assessed the quality using MINORS (Methodological index for Non-Randomized Studies). The changes of UCVA (uncorrected visual acuity) and manifest refractive from pre-surgery were estimated using the random-effect model. Cochrane-Q-statistic and I<sup>2</sup>-statistic were used to assess heterogeneity. Subgroup analyses were performed by length of follow-up (from 24 month to 84 month) and myopia degree under -6D (diopter) and over -6D. **RESULTS:** Fifteen observational studies were included for meta analysis and all study patients were Korean. After LASIK surgery, compare to before surgery, UCVA was improved 0.5 decimal in high myopia group (95% CI: 0.20-0.70). According to subgroup analysis in high myopia group, the group of -6D~-10D UCVA was improved 0.63 decimal, the group of over -10D was improved 0.27 decimal. Also, after surface ablation surgery, UCVA change in high myopia group (over -6D) was 0.83 decimal and in mild myopia group (under -6D) was 0.61 decimal. In addition to UCVA change was decreased over follow up time. However, after surface ablation surgery manifest refractive change was 7.45 diopter in high myopia and 4.00 diopter in mild myopia group. Also, over follow up time, refractive change was decreased. **CONCLUSIONS:** This study provides the evidence that UCVA was decreased according to over time and in high myopia group. Also, Refractive change was fallen down in compliance with over time, but increased in high myopia group. Our study is the first one to evaluate clinical effectiveness and stability of LASIK and surface ablation surgery in Korea through systematic review.

#### PSU4

##### SURGEON'S VOLUME-OUTCOMES RELATIONSHIP FOR LOBECTOMIES AND WEDGE RESECTIONS FOR CANCER USING VIDEO-ASSISTED THORACOSCOPIC TECHNIQUES

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**OBJECTIVES:** This study quantifies the benefits of surgeon's volume on outcomes in lung surgery: lobectomies and wedge resections. The goal of this analysis is to analyze the effect of technique-specific experience (VATS) on cost, utilization and adverse events. **METHODS:** This study utilizes the Premier hospital database which contains clinical and utilization information on patients receiving care in over 600 US hospitals. Eligible patients were those of any age undergoing lobectomy or wedge resection using VATS for cancer treatment. Volume measures use addi-

tional data for patients undergoing lobectomy or wedge resection using open thoracotomy. Our measure of volume represents the aggregate experience level of the surgeon per six month window. Multivariable logistic regression analyses were estimated for the binary outcome - adverse events. Ordinary Least Squares (OLS) regression was used for continuous outcomes: hospital costs, surgery time, length of stay, and number of adverse events. In addition, the following explanatory variables were included: patient demographics, diagnosis, comorbid conditions, patient severity index and hospital characteristics. **RESULTS:** Of 7137 patients in the database with elective, inpatient resections for lung cancer, a total of 2698 patients underwent lobectomy (n=716) or wedge resection (n=1982) using VATS. More than 70% of these procedures were performed by thoracic surgeons (n=1896). A positive volume-outcome relationship appeared as follows: The relationship is stronger for cost and utilization outcomes versus adverse events, for thoracic surgeons versus other surgeons, and for VATS lobectomy procedures versus VATS wedge resection procedures. Finally, we find that while there was a reduction in cost and resource utilization associated with greater experience with VATS, these outcomes were not strongly linked with greater experience with open procedures. **CONCLUSIONS:** There is a reduction in cost and resource utilization associated with greater experience with VATS. Greater experience with open procedures does not correlate with better VATS outcomes.

#### PSU5

##### LONG-TERM CLINICAL SAFETY OF LASIK AND SURFACE ABLATION IN SOUTH KOREA THROUGH LINKAGE OF RETROSPECTIVE COHORT AND NATIONWIDE CLAIMS DATABASE

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**OBJECTIVES:** To assess the long-term safety of Laser in situ keratomileusis (LASIK) and surface ablation surgery for myopia in South Korea. **METHODS:** A retrospective cohort for patients who had a LASIK or surface ablation surgery in 6 hospitals during 2002-2005 were constructed based on chart reviews and linked to Health Insurance Review and Assessment (HIRA) claims database during 2005-2009. A total of 2,422 patients (4,688 eyes) were linked using anonymized identifier after excluding patients with a history of eye disease, diabetes, hyperopia, or different surgery methods for both eyes. The frequency of eye disease such as cataract, glaucoma, retinal detachment, corneal opacity, and keratoconus during 3-8 years after surgery and the pre-surgery characteristics including age, UCVA (uncorrected visual acuity), manifest refractive (MR) of patients with eye disease were analyzed. **RESULTS:** There were 1,637 LASIK patients and 785 surface ablation patients. The eye disease after LASIK were cataract (0.2%) and corneal opacity (0.9%) during 3-4 years and cataract (0.1%), glaucoma (0.2%), retinal detachment (0.4%) and corneal opacity (0.7%) during 4-5 years. The retinal detachment (0.3%) and corneal opacity (1.3%) were observed during 7-8 years while no keratoconus was identified during 3-8 year follow-up. The pre-surgery MR (mean±SD) were -6.98±1.41 Diopter (D), -7.46±2.87 D, -6.13±2.67 D, -6.23±2.62 D in patients with cataract, glaucoma, retinal detachment, and corneal opacity, respectively. The incidence of eye disease after surface ablation was similar to LASIK. **CONCLUSIONS:** The linkage of clinical baseline database and nationwide claims database can make up for loss to follow-up in retrospective cohort study. Although it is difficult to explain the causality of surgery, we could ascertain there was no serious eye disease after surgery.

#### Surgery - Cost Studies

#### PSU6

##### ANALYSIS OF FACTORS INFLUENCING INPATIENT MORTALITY AND COSTS AMONG PEDIATRIC HEART TRANSPLANTATION RECIPIENTS

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**OBJECTIVES:** To assess the relationship of patient, payer, and hospital characteristics with cost and mortality in pediatric heart transplant recipients. **METHODS:** Data from the 1997, 2000, 2003, and 2006 Agency for Healthcare Research and Quality (AHRQ) Healthcare Cost and Utilization Project (HCUP) Kids' Inpatient Database (KID) were utilized. Pediatric patients aged 0-17 years receiving heart transplants were included. Logistic regression and generalized linear models were used for the analyses. Inpatient mortality and inflation-adjusted costs were the outcomes of interest. Patient demographics and clinical characteristics were the primary independent variables of interest, with payer and hospital characteristics used as control variables. Weighting procedures were utilized to yield nationally representative results. **RESULTS:** Overall, 1154 patients received heart transplants during the study timeframe. The average was 6.5 (±6.1) years. Mean inpatient hospital costs were \$206,895 (±150,504). Inpatient mortality was 7.2%. Children >1 year were significantly less likely to die during hospitalization than those <1 year (p<0.05). Hemorrhage (OR=4.11, p=0.005) and renal failure (OR=6.45, p=0.001) were complications associated with mortality. Mortality was also significantly associated with higher number diagnoses and higher income and inversely related with West region and more recent transplants. Mortality cases incurred 1.68 times higher costs than those routinely discharged (p<0.001). Sepsis (exp(b)=1.18, p=0.04), respiratory disease (exp(b)=1.08, p=0.021), hemorrhage (exp(b)=1.22, p<0.001) and renal failure (exp(b)=1.15, p=0.003) were complications associated with higher costs. Higher costs were also significantly associated with medium hospital bedside, age >1 year, admission from another facility, longer lengths of stay, West region, more recent transplants and higher patient income, with lower costs for trans-

plants occurring in a children's unit of a general hospital. **CONCLUSIONS:** Multiple patient and hospital characteristics appear to significantly predict inpatient mortality and costs in pediatric heart transplant recipients.

#### PSU7

##### A DISCRETE EVENT SIMULATION MODEL TO ESTIMATE THE LONG TERM OUTCOMES OF BARIATRIC SURGERY IN MEXICO

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**OBJECTIVES:** Estimate the return of investment (ROI) on bariatric surgery vs. conventional, non-surgical approach as treatment for morbid obesity from the Mexican public health system perspective in the long term. **METHODS:** The individual experience of a morbidly-obese patient was assessed using a discrete event simulation model built in Arena™. Patients were created with unique, randomly assigned clinical and epidemiologic characteristics, cloned and sent to either bariatric surgery (BS) or conventional treatment - pharmacologic treatment of associated comorbidities and lifestyle modifications (control arm). Evaluated comorbidities were type-2 diabetes, hypertension and hypercholesterolemia. Preoperative prevalences and up-to year 2 recovery rates were taken from published meta-analyses. 2- and 10-year prevalences were derived from incidence and recovery rates shown in SOS study; in-between prevalences were interpolated assuming exponential growth, thus allowing clinical state worsening in both arms. Additional assumptions include infrastructure restrictions, no perioperative complications and short term mortality. 5% of patients in control group were allowed to have surgery after year 5. Considered costs included the bariatric procedure and comorbidity-specific pharmacologic treatment, taken from public health institution's DRGs. Simulation was run with 150 patients for 10 years and 10 iterations using a 4.5% annual discount rate. Results are shown in years and 2010 inflation-adjusted MXP. 95% confidence intervals were estimated. **RESULTS:** 10-year accumulated cost for a BS patient was \$125,902 (\$125,041-\$126,763), and \$259,413 (\$258,098 - \$260,728) for a control patient. ROI on BS was achieved on year 6.94 (6.88-7.00). Cost differences are due to the reduced resource utilization after surgery resulting from resolution of comorbidities. **CONCLUSIONS:** Investment in BS offsets its cost and is recouped within a reasonable time, thus allowing institutions to reduce the burden imposed by morbid obesity. Long-run data for other associated comorbidities is needed, as their inclusion in the analysis could decrease ROI.

#### PSU8

##### PATTERNS OF ACUTE CLOPIDOGREL USE AND INPATIENT COSTS IN ACUTE CORONARY SYNDROME PATIENTS UNDERGOING CORONARY ARTERY BYPASS GRAFTING

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**OBJECTIVES:** Treatment guidelines stipulate that clopidogrel should be interrupted ≥5 days prior to elective coronary artery bypass grafting (CABG) to reduce the risk of bleeding. However, if urgent CABG is indicated, experienced surgeons may perform CABG in <5 days. This study is the first to describe patterns of acute clopidogrel use and inpatient costs among acute coronary syndrome (ACS) patients undergoing CABG, which will help decision makers understand the relative benefits/costs of antiplatelet therapies in real-world practices. **METHODS:** The study used the MarketScan® Commercial, Medicare, and Hospital Drug Databases, comprising administrative healthcare data for over 63 million individuals. ACS episodes, defined as hospitalizations for ACS (primary ICD-9-CM diagnosis 410.xx, 411.1x), occurring between 1/1/2005-6/30/2009 were identified from patients aged ≥18 years. Outcomes included costs and lengths of stay (LOS) of ACS episodes with CABG and, among clopidogrel-treated patients, number of days between the day CABG was performed and the last clopidogrel dose administered. Analyses were descriptive. **RESULTS:** 160,168 ACS episodes were identified; mean patient age = 63.5 years. CABG episodes comprised 9.3% (14,896/160,168) of ACS episodes. The mean LOS was 9.8 [SD 6.8] days per CABG episode. Mean inpatient costs were \$71,140 [SD \$68,012] per CABG episode. Among clopidogrel-treated patients with inpatient drug data who underwent CABG (n=8,101), the mean days between the day CABG was performed and the last dose of clopidogrel administered was 3.3 [SD 2.6] days and the majority (62.1%) underwent surgery within 2-3 days after their last clopidogrel dose. The mean incremental increase in inpatient costs associated with 1 extra LOS day was \$1,950. **CONCLUSIONS:** Data suggest that surgeons commonly perform CABG within <5 days after clopidogrel administration. However, among patients for whom urgent CABG is not indicated, withholding CABG may only minimally affect inpatient costs and must be considered in the broader context of patient management.

#### PSU9

##### ECONOMIC EVALUATION OF THE CURRENT TREND TOWARDS MORE UNCEMENTED FIXATION IN PRIMARY HIP ARTHROPLASTIES AND THE POTENTIAL IMPACT OF CHANGES OF THE DEVELOPMENT IN ENGLAND AND WALES

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**OBJECTIVES:** The purpose of the study was to quantify the potential effect of the current trend towards more uncemented primary total hip arthroplasties (THAs) in terms of hospital costs and number of revisions over a 10 year period (2011 to 2021) in England and Wales. In addition the potential impact of changes of this development was evaluated. **METHODS:** Registry data from the National Joint Registry for England and Wales from 2004 to 2009 was used to predict the numbers of THAs and