

in Latin America. Secondary objectives include: To determine if there is an association between maternal colonization with GBS and stillbirth or preterm birth in Latin America. To determine the effect of cesarean section (CS) on the incidence of neonatal sepsis with GBS in mothers colonized with GBS. METHODS/STUDY POPULATION: Study Population: Pregnant women who received prenatal care at sites that utilize the Perinatal Information System (SIP) from 1989 through 2015, and were screened for GBS between 35 and 37 weeks of gestation. Maternal exclusion criteria included spontaneous abortion, stillbirth before 35 weeks, and lack of screening for GBS. Methods: Estimated prevalence (and 95% confidence interval) of maternal GBS colonization for the entire data set, by region, and by country. The prevalence data for each country further stratified by maternal age, ethnicity, education, civil status and habitation. Descriptive statistics calculated for each clinical prenatal and clinical perinatal health indicator as well as for each clinical history variable for GBS colonized and non-GBS colonized women. Odds ratios will be calculated for each demographic and clinical risk factor. Fisher's exact tests will be used to test hypotheses about the relationship between maternal GBS colonization and specific perinatal outcomes such as stillbirth or preterm birth. We will use multiple logistic regression models to test the hypotheses about the relationships between demographic variables, maternal GBS colonization and perinatal outcomes. RESULTS/ANTICIPATED RESULTS: Preliminary results: 712,061 records included in database. 98,852 records with data for GBS screening. 0.906% White, 7.4% Mixed, 0.6% Black, 0.3% Native Indian, 0.1% Other. GBS prevalence among screened women, 17.5% There was a significant association between maternal GBS colonization and ethnicity ( $X^2(4, N=97006)=569.901, p<0.01$ )

- o Prevalence rates by ethnicity: 20.5% Black, 18.4% White, 15.2% Native Indian, 8.8% Mixed, 3.3% Other. There was a significant association between maternal GBS colonization and age ( $X^2(4, N=98655)=119.901, p<0.01$ )
- o Prevalence rates by age group: Age  $\leq 20$  - 15.2%. Age 21-34 - 17.8%. Age  $\geq 35$  - 19.6%

Anticipated results: GBS positive mothers will have an increased burden of stillbirth and preterm birth compared to GBS negative mothers. Neonates born to GBS colonized mothers who deliver via cesarean section will have a decreased incidence of sepsis compared to neonates born to GBS colonized mothers who deliver vaginally

DISCUSSION/SIGNIFICANCE OF IMPACT: There have been no comprehensive studies to date that use the CLAP data to characterize the epidemiology of maternal GBS colonization and GBS disease and the burden of neonatal GBS disease in Latin America. Taking advantage of this unique database, this is the first region-wide study using systematically collected data. Our preliminary analysis indicates that GBS colonization status among pregnant women in Latin America is 17.5%, which is greater than previously reported. While there is evidence that maternal carriage of GBS is associated with stillbirth, this will be the first study to quantify the burden of GBS-associated stillbirth in Latin America. Additionally, previous work has been inconclusive in regards to maternal colonization with GBS and its association with preterm birth. This will be the largest study to evaluate the association of maternal GBS carriage with preterm birth. Findings from this study have the potential to inform public health policy and interventions by identifying the prevalence and risk factors.

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### Early Electrographic Seizure Detection by Neuro ICU Nurses via Bedside Real-Time Quantitative EEG

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OBJECTIVES/SPECIFIC AIMS: 1. Determine positive predictive value, negative predictive value, sensitivity, and specificity of Neuro ICU nurse interpretation of real-time bedside qEEG. 2. Determine difference in time to detection of first seizure between Neuro ICU nurse qEEG interpretation and EEG fellow reads of cEEG. 3. Determine what qualities of seizures make detection by neuro ICU nurses more or less likely – e.g. duration of seizures, type of seizures, spatial extent of seizures. METHODS/STUDY POPULATION: Recruit neuro ICU nurses taking care of 150 patients admitted to the Neuro ICU at Duke University Hospital who are initiated on cEEG monitoring. Nurses will be consented for their participation in the study. Neuro ICU nurses will evaluate the qEE RESULTS/ANTICIPATED RESULTS: From literature estimates of a 20% seizure prevalence in critical care settings, we hope to have 30 patients with seizures and 120 without. Based on prior study in the Duke Neuro ICU, we hypothesize that Neuro ICU nurses will have sensitivity and DISCUSSION/SIGNIFICANCE OF IMPACT: This is the first prospective study of neuro ICU nurse interpretation of real-time bedside qEEG in patients with unknown NCSE/NCS presence. If nurse sensitivity, specificity, and positive predictive value are clinically useful, which we deem would be so at a sensitivity of 70% or greater, with acceptable false alarm rate, nurse readings of qEEG could significantly decrease the time to treatment of seizures in the Neuro ICU patient population, and perhaps could improve patient outcomes.

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### Effect modification between kidney function and adiposity in the association with central and peripheral insulin sensitivity among Nondiabetic patients with moderate Chronic Kidney Disease and Healthy Controls

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OBJECTIVES/SPECIFIC AIMS: The main aim of this study was to investigate the interaction between glomerular filtration rate (GFR) and body mass index (as well as serum leptin) as determinants of peripheral and central insulin sensitivity (IS). METHODS/STUDY POPULATION: This was a cross-sectional investigation of 140 nondiabetic participants – 56 with CKD (GFR = 15-59 ml/min/1.73m<sup>2</sup>) and 94 with normal GFR ( $\geq 60$  ml/min/1.73m<sup>2</sup>) – recruited as part of the relationship of insulin sensitivity in kidney disease and vascular health (RISKD) study. Peripheral (skeletal muscle) and central (hepatic) IS were assessed with the hyperinsulinemic euglycemic glucose clamp (HEGC) and homeostasis assessment of insulin resistance (HOMA-IR) respectively. Creatinine-based estimated GFR (eGFR) was obtained using the CKD-EPI equation and body mass index (BMI) was computed from baseline weight and height measurements. Linear regression models with robust standard errors (to relax homoscedasticity assumptions) and interaction terms were used to investigate GFR and BMI as predictors of HEGC-derived insulin sensitivity index (ISI) and HOMA-IR. RESULTS/ANTICIPATED

**RESULTS:** The mean (SD) age was 53.9 (14.5) years; 50.7% were female and 36.7% were African-American. Compared to controls, CKD patients had significantly lower mean (SD) ISI [5.4 (3.2) vs. 3.1 (1.6),  $p < 0.0001$ ]. Log ISI was positively correlated ( $r = 0.39$ ,  $p < 0.0001$ ) with eGFR and inversely correlated ( $-0.30$ ,  $p < 0.0001$ ) with BMI and log leptin ( $-0.42$ ,  $p < 0.0001$ ). In multivariable models adjusted for age, sex and race, a 10 ml/min/1.73m<sup>2</sup> lower eGFR was associated with a greater decrease in ISI among non-obese (0.48; 95% CI:  $-0.25$ ,  $-0.70$ ) compared to obese participants ( $-0.18$ ; 95% CI:  $-0.02$ ,  $-0.35$ ) ( $p$ -interaction = 0.04). Patients with low eGFR (in particular, the lower margin of the CKD stage 3 range, 30ml/min) had lower ISI even with BMI within normal range (Figure 1a). At higher eGFR, BMI had a greater impact on ISI.  $P$ -interaction = 0.046, for differential BMI effects at lower vs. higher eGFR. Log HOMA-IR was inversely correlated with eGFR ( $r = -0.49$ ,  $p < 0.0001$ ) and positively correlated with BMI ( $r = 0.52$ ,  $p < 0.0001$ ) and log leptin (0.46,  $p < 0.0001$ ). HOMA-IR was lower for persons with higher GFR compared to lower GFR, at any BMI value. For example, at a BMI of 30 and a GFR of 120, HOMA-IR was 1.2 compared to 4.8 at a GFR of 30 (Figure 1b). Also, persons with high GFR had low HOMA-IR even with BMI in the obese range. BMI had a greater effect on HOMA-IR at lower eGFR.  $P$ -interaction = 0.005, for differential BMI effects at lower vs. higher eGFR. Similar findings were obtained when using log leptin in lieu of BMI in models for ISI and HOMA-IR. **DISCUSSION/SIGNIFICANCE OF IMPACT:** Measures of adiposity (BMI and leptin) and GFR were independently predictive of insulin sensitivity (IS) but the magnitude of the effect of BMI (or leptin) on IS varied significantly across GFR levels and type of IS (peripheral versus central). The effect of BMI on central IS (HOMA-IR) was more pronounced at lower GFR with small changes in BMI translating into greater variations in IS. Conversely, at low GFR, peripheral IS (ISI) is less affected by BMI. Persons with GFR at the lower margin of the CKD stage 3 range were significantly insulin resistant (low ISI) regardless of their BMI. More studies are required to further elucidate these interaction patterns for central and peripheral IS.

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### Effect of Long-Term NSAID Use on Opioid Abuse and Health Outcomes among Breast Cancer Patients

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**OBJECTIVES/SPECIFIC AIMS:** Cancer related pain presents a significant risk for opioid abuse among cancer survivors and contributes to the current opioid crisis. Nearly 90% of breast cancer patients have been reported to have cancer-related pain requiring treatment. Opioids, in combination with NSAIDs, have been widely used for pain management in this population despite the risk of abuse. Long-term NSAID use due to their antineoplastic and neuroprotective effects may offer additional protective effects against opioid abuse. Here, we assess the relationship between NSAID use and opioid abuse among breast cancer patients. **METHODS/STUDY POPULATION:** Using ICD-9-CM codes, we identified and selected women aged >18 years with breast cancer from the National Inpatient Sample (NIS). Our primary predictor was a history of long-term NSAID use. Opioid

abuse was the primary outcome of interest. Secondary outcomes were inpatient mortality and length of stay. Multivariable regression models were employed in assessing the association between predictors and outcomes while adjusting for relevant covariates. **RESULTS/ANTICIPATED RESULTS:** Among 170,644 women with breast cancer, 7,838 (4.6%) reported a history of long-term NSAID use. Patients with a history of long-term NSAID use had lower odds of opioid abuse (aOR 0.53; 95% CI [0.32-0.88]) and in-hospital mortality (aOR 0.52; 95% CI [0.45-0.60]) and were likely to have shorter hospital stay (7.12 vs. 8.11 days) compared to women with no history of long-term NSAID use. **DISCUSSION/SIGNIFICANCE OF IMPACT:** Long-term NSAID use may offer a protective effect against opioid abuse and improve in-hospital outcomes translating to better quality of life and healthcare utilization indices among breast cancer patients.

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### Effect of OSAS on Insulin Sensitivity and Cardiovascular Risk in PCOS Adolescents

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**OBJECTIVES/SPECIFIC AIMS:** This study seeks to evaluate the role of PCOS in insulin resistance and sleep apnea in adolescents. **METHODS/STUDY POPULATION:** 37 adolescent patients 13-21 with PCOS (27 obese, 11 lean), along with 8 controls ages 18-21 were recruited. Subjects underwent a hyperinsulinemic euglycemic clamp study and a proportion of the PCOS subjects also underwent polysomnography. Baseline parameters were compared and M/I (index of insulin sensitivity), and GIR were compared. **RESULTS/ANTICIPATED RESULTS:** M/I was only statistically significantly different between obese PCOS subjects vs control (0.056 vs 0.17,  $p=0.0061$ ). GIR was higher in the obese PCOS group compared to the lean PCOS group (2.48 vs 6.79,  $p=0.0001$ ). There were no differences in GIR between the lean PCOS subjects and control (6.79 vs 9.08,  $p=0.30$ ). 21 obese PCOS subjects and 10 lean PCOS underwent polysomnography. None of the lean PCOS subjects had obstructive sleep apnea (OSA). 8 of the obese subjects had OSA. **DISCUSSION/SIGNIFICANCE OF IMPACT:** More studies are needed to assess insulin sensitivity and sleep apnea in adolescents with lean PCOS. Our study did not find more insulin resistance in adolescents with PCOS compared to lean controls apart from what would be expected from obesity. Of adolescent obese subjects with PCOS, OSA seems quite prevalent and providers should consider screening and referral for these patients.

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### Effectiveness of Shared Decision-Making for Diabetes Prevention: 12-month Results from the Prediabetes Informed Decision and Education (PRIDE) Randomized Trial

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**OBJECTIVES/SPECIFIC AIMS:** Intensive lifestyle change (e.g., the Diabetes Prevention Program) and metformin reduce type 2 diabetes risk among patients with prediabetes. However, real-world uptake