was 2.10 ± 1.22 cm. A majority of the patients (78.9%) were White. Over one-half of these patients were neither current nor past smokers. Only 3% of the patient had a baseline stage IIIA or higher. About 49% of the patients underwent a mastectomy. Radiation therapy was used by 63.5% of the patients, and Tamoxifen users accounted for 78% of the study cohort. We found a statistically significant association between Her2 and breast cancer recurrence (HR = 1.33, log-ran p-value = 0.006). However, the HRs of breast cancer recurrence comparing Her2+ and Her2− patients decreased over time. We also investigate the effect of combined Her2, estrogen (ER), and progesterone (PR) on breast cancer recurrence and found that patients with Her2+/ER+/PR− had the highest risk of breast cancer recurrence. The hazard of recurrence for this group of patients was 85% higher than patients with Her2−/ER+/PR+. We also investigate the prognostic accuracies of Her2 in terms of time-dependent sensitivity and specificity. Using Her2 as the prognostic biomarker resulted in a specificity consistently over 80% from baseline up until 15 years post-baseline. The time-dependent sensitivity of Her2 was above 90% between baseline and 1.5 years. Then, the sensitivity dropped gradually to 40% from 1.5 years to 3 years post-baseline. For prognosis of breast cancer over 3 years from baseline, the sensitivity was between 30% and 40%. DISCUSSION/SIGNIFICANCE OF IMPACT: As a single biomarker and risk factor, Her2 was statistically significantly associated with the recurrence of breast cancer among patients in the LACE cohort. A composite biomarker by combining Her2, ER, and PR status was also significantly associated with the breast cancer recurrence. However, the HRs of breast cancer recurrence comparing Her2+ and Her2− patients decreased over time, implying that the Her2 status had a high impact on early recurrent breast tumors. Single biomarkers, usually, have very limited ability for prognosis of future events. However, we found that using HER2 as a single biomarker can give a relatively larger specificity consistently over 15 years of the study period. The sensitivity of Her2 is high for detecting early breast cancer recurrence. However, after 2.5 years from baseline, using Her2 for breast cancer recurrence detection is not reliable. Due to the relatively high accuracies of using Her2 status for prognosis of breast cancer recurrence, we conclude that Her2 should be considered in clinical studies related to prognosis of breast cancer recurrence. Future studies will investigate if prognostic accuracies can be improved by combining Her2 with baseline clinical risk factors such as age, tumor size and lymph nodes. In conclusion, our study has the clinical impact on prognosis (or early detection) of breast cancer recurrence among women with previously diagnosed and treated breast cancers.

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Determinants of depression among women from a large community engagement project

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OBJECTIVES/SPECIFIC AIMS: Depression is one of the leading causes of diseases and disability among women of all ages in the United States. Lack of resources to meet one's daily needs, access to health care, job opportunities, and drug use significantly contribute to depression among women. This paper aimed to explore the determinants of depression among women from a large community-based sample. METHODS/STUDY POPULATION: HealthStreet is a community engagement research initiative at the University of Florida that utilizes the community health worker (CHW) model to assess health concerns and conditions of community members and link them to available social and medical services and health research. From October 2011 through December 2016, CHWs assessed 8469 community members from various locations in the community such as grocery stores, bus stops, health fairs, laundromats, and others. Among these 8469 participants contacted and assessed by the CHWs, 4952 (58.5%) were women. RESULTS/ANTICIPATED RESULTS: Of the total 8469 participants, 4952 were women and 1839 (37.1%) reported ever having depression. Mean age of women who reported depression was 44.1 years (SD $\pm$ 14.4). Women who were current users of 3 or more drugs were 10 times more likely (95% CI: 5.73, 18.40; OR 10.27) to report depression compared with those who did not currently use any drugs. Those who were food insecure in the past 12 months (95% CI: 1.970, 2.576; OR 2.253) were twice more likely to report depression, while never married (95% CI: 0.576, 0.771; OR 0.666), and currently unemployed (95% CI: 0.535, 0.715; OR 0.619) women were less likely to report depression. Chronic health conditions such as hypertension (41.6% vs. 33.7%), diabetes (14% vs. 10.5%), and cancer (12.1% vs. 8.3%), and comorbid psychiatric symptoms such as anxiety (54.2% vs. 10.8%) and bipolar disorder (23.8% vs. 2.8%) were significantly higher ($p < 0.001$) among women with depression compared with their counterparts. Significantly more women without a history of depression had medical insurance (68.8% vs. 64.3%) as compared with women with depression. DISCUSSION/SIGNIFICANCE OF IMPACT: Depression was associated with food insecurity and drug use. The impact of drug use continues to be a major mental health concern among community-based women. Further, these findings emphasize the importance of community engagement programs such as HealthStreet, which utilizes the CHWs' model to link community members to social and medical services within the community, in improving the mental health of women.

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Among heart failure patients, cannabis use is an independent predictor of hospitalization and discharge against medical advice: Data from the 2012 Nationwide Emergency Department Sample (NEDS)

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OBJECTIVES/SPECIFIC AIMS: To assess the effect of cannabis on impaired judgment and health outcomes among heart failure patients in the emergency room. METHODS/STUDY POPULATION: Patients with heart failure presenting to the emergency room. Cannabis with confounders such as income level, insurance type, tobacco use, and age. Discharged against medical advice to assess impaired judgment. Hospitalization rates, length of stay, and death rate to assess health outcomes. Multivariate logistic regression to access the odds of each of these outcomes from cannabis RESULTS/ANTICIPATED RESULTS: Cannabis is associated with impaired outcome (increase in discharge against medical advice). Cannabis have poorer health outcome in terms of more hospitalizations from the emergency department. Cannabis also have better health outcome in terms of shorter length of stay and death rate among cannabis users Versus nonusers. DISCUSSION/SIGNIFICANCE OF IMPACT: This is crucial to inform health care providers to ensure better counseling of cannabis users. This result should also be considered to interpret other publications that shows better outcomes in patients taking cannabis. Cannabis users might only seem to have a better outcome because they tend to discharge against medical advice and thereby die outside the hospital, etc.

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Optimal study design for Diagnostic Accuracy Studies: Differential verification Versus partial verification

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OBJECTIVES/SPECIFIC AIMS: To compare the accuracy and precision for estimating the diagnostic accuracies (sensitivities and specificities) between differential verification (DV) and partial verification (PV) methods. Comparisons were made under scenarios with different values of design parameters including disease prevalence, proportion of verification for positive results, proportion of verification for negative result, sensitivity and specificity of the brass standard (BS) test in DV method. Through comparing 2 different verification methods under different scenarios, we give suggestions that which verification method is optimal under different design settings. METHODS/STUDY POPULATION: For both PV and DV methods, simulation studies were performed using statistical package R, version 3.1.3. We were primarily interested in studying how the unbiasedness and precision for estimation of diagnostic accuracies (sensitivity and specificity) of an index test change with the following design parameters: disease prevalence, proportion of verification for positive test results, the proportion of verification for negative test results, and the sensitivity and specificity of a BS test. We chose different values for each of the above parameters. For each estimation, we allowed values in only 1 parameter to change by fixing the other 2 parameters, so that the effect of each design parameter on the unbiasedness and precision of both sensitivity and specificity can be determined. For the DV method, we also developed an analytical method to estimate the sensitivity and specificity of an index test using a quadratic equation with a unique solution of the specificity and sensitivity. RESULTS/ANTICIPATED RESULTS: For rare disease with prevalence less than 1%, the PV method resulted in a less biased and more precise estimate of sensitivities and specificities of the index test. If the disease prevalence was between 1% and 10%, the DV method using a BS test with moderate or high sensitivity and specificity (sensitivity and specificity >90%) resulted in a less biased and more precise estimate of diagnostic accuracies of the index test. When the disease prevalence was greater than 10%, the PV method was superior when the BS test had sensitivity and specificity <80%, and the DV method was superior when the BS test had both sensitivity and specificity

>90%. When the proportion of verification of positive test results was <30% or >70%, the DV method yielded smaller bias for the estimated specificity than the PV method. However, the PV method generated a much smaller mean square error (MSE) for specificity than the DV method when the proportion of verification for positive test results was >50%. Although the disease prevalence was >10% and the proportion of verification of positive test results was <30%, the DV method resulted in a smaller MSE for specificity. DISCUSSION/SIGNIFICANCE OF IMPACT: Disease prevalence and proportions of verification for patients with positive and negative test results influence the accuracy of a new diagnostic test. If a new index test for a very rare disease is evaluated, the PV method should be used for assessing the performance of the index test. When a disease prevalence is >1%, the DV method will result in a less biased and more precise estimate of diagnostic accuracy of an index test, if the BS test itself used in the DV method has large specificity and specificity. One concern of using BS test for the DV method is the clinical cost. Depending on the disease type, the BS tests usually are imperfect, but may be less aggressive and/or less expensive than the gold standard test. Moreover, as all clinical examinations require professional personnel to perform, verification of the index test for relative large proportion of a large cohort of patients could become a burden on human resources. Thus, the future research of the optimal design method for a diagnostic accuracy study should be based on the comprehensive cost-effectiveness analysis.

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Serious cardiovascular morbidity and mortality in a cohort of adults with Fontan physiology

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OBJECTIVES/SPECIFIC AIMS: The morbidity and mortality in adults with single ventricular hearts who have undergone Fontan palliation is poorly defined. These patients have a high burden of arrhythmia, heart failure, and re-operation. We hypothesized that age and type of Fontan predict occurrence of arrhythmia. METHODS/STUDY POPULATION: In total, 205 patients aged 18 years who had undergone a Fontan procedure were identified. Those with incomplete data were excluded. Demographic, anatomic, pharmacologic, imaging, hemodynamic, and electrophysiologic data were collected. The χ^2 and Mann-Whitney U tests were used to test significance defined as $p < 0.05$. RESULTS/ANTICIPATED RESULTS: Of the 205 patients identified, 59 had been lost to follow-up. Of the 146 patients (77, 53% female) actively followed 18 (12%) had died at a median (IQR) age of 27 (21–34.3); in patients alive as of 10/2016 the median age was 26 years (22–34). Fontan types were lateral tunnel (LT) (n = 79, 54.1%), extracardiac (EC) (n = 32, 22%), right atrial to pulmonary artery (RV-PA) (n = 28, 19%), and Fontan with Bjork modification (n = 4, 2.7%). Systemic left ventricle (n = 96, 66%) was more common than systemic right ventricle (n = 43, 30%). Of the 146 patients, 101 (69%) had significant morbidity or mortality: 86 (59%) were diagnosed with arrhythmia, 18 (12%) died, and 11 (8%) underwent heart transplants. Frequent procedures included: Fontan revisions/cryoablation in 28 (19%), electrophysiology studies with ablation in 73 (50%), and pacemakers in 53 (36%). Of the arrhythmia diagnoses, 57 (64%) were atrial tachyarrhythmias. RV-PA Fontan procedures were associated with significantly more atrial arrhythmia than all other Fontan types (70% vs. 30%; $p < 0.01$). There was no statistical difference in occurrence of atrial arrhythmia in adults with LT Versus EC Fontans ($p = 0.3$). While patients who had undergone RV-PA and Bjork Fontans were older with median age 34 years, there was no significant difference in age between LT and EC (median 24.0 and 24.5). DISCUSSION/SIGNIFICANCE OF IMPACT: Adult survivors of the Fontan procedure suffer from significant morbidity and mortality. The single most prevalent morbidity is atrial arrhythmia. We conclude that RV-PA Fontans, now obsolete, have the highest prevalence of arrhythmia and that there is no difference in arrhythmia burden between LT and EC Fontans. Given the high prevalence of morbidity and mortality in this population, it is imperative that they be followed by cardiologists with expertise in congenital heart disease.

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Phenotypic characteristics of pediatric nonalcoholic fatty liver disease

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OBJECTIVES/SPECIFIC AIMS: The purpose of this study is to characterize children with nonalcoholic fatty liver disease (NAFLD) living in the Southeastern United States. METHODS/STUDY POPULATION: This retrospective electronic medical record chart review was conducted on a random sample of 206 children identified with NAFLD. Patients were included if they met the following criteria:

confirmed NAFLD through either an ultrasound or liver biopsy or clinical suspicion of fatty liver disease alongside elevated alanine aminotransferase (ALT) in the absence of other etiologies causing elevated transaminases. Patients were excluded if they had hepatitis or other documented liver disease. Data collected at initial presentation included age, gender, ethnicity, height, weight, body mass index (BMI), BMI percentile, blood pressure, HbA1c, aspartate aminotransferase (AST), ALT, γ-glutamyl transferase (GGT), total cholesterol, total triglycerides, low-density lipoprotein, and high-density lipoprotein. Statistical analysis: for descriptive statistics, frequency counts and percentages alongside means, standard deviation, range, min/max values for the continuous variables were calculated. RESULTS/ANTICIPATED RESULTS: This study included 206 children diagnosed with NAFLD. Subjects were primarily male (n = 136, 66%) and Caucasian (n = 133, 66%), followed by Hispanic (n = 42, 21%), Black (n = 25, 12%), and Asian (n = 2, 1%). Mean age at diagnosis was 12.3 ± 3.5 years. Mean weight (lbs), height (in), and BMI (kg/m^2) of subjects at diagnosis were 192 ± 77 lbs, 61.7 ± 6.6 in, 34.6 ± 9.7 kg/m^2, respectively. Patients had an average systolic blood pressure of 124 ± 15.4 mmHg and diastolic blood pressure of 69.6 ± 10.6 mmHg. Mean ALT was 91.8 ± 67.2 U/L, AST was 61 ± 38.8 U/L, and GGT was 55.1 ± 64.6 U/L. Mean HbA1c was $5.8 \pm 1.4\%$, cholesterol was 176 ± 36.3 mg/dL, triglycerides were 200 ± 134 mg/dL, low-density lipoprotein was 107.6 ± 32.1 mg/dL, and high-density lipoprotein was 39.9 ± 8.4 mg/dL. DISCUSSION/SIGNIFICANCE OF IMPACT: In addition to having significantly elevated liver enzymes, children with NAFLD had several derangements in their metabolic profile, most notably high triglyceride levels and HbA1c values in the prediabetic range. Although lifestyle modification is the gold standard treatment for NAFLD, pharmacotherapy may need to be included to address metabolic syndrome.

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Subjective cognitive complaints in mild traumatic brain injury and 6-month return to work prediction: A TRACK-TBI Study

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OBJECTIVES/SPECIFIC AIMS: About 75% of the estimated 2.5 million traumatic brain injuries (TBIs) diagnosed annually classify as mild TBI (mTBI); yet cognitive impairments associated with poor patient outcomes can persist for weeks to years. mTBI symptoms are difficult to measure objectively and often remain undiagnosed in the context of an unknown cognitive baseline. Formal neuropsychological exams hold limited utility due to their extensive resource burden. We aimed to define the clinical importance of a 4-question assessment of subjective cognitive complaints (SCC) in predicting return to work at 6 months following mTBI. METHODS/STUDY POPULATION: mTBI participants from the prospective Transforming Research and Clinical Knowledge in Traumatic Brain Injury Pilot Study were included. A self-report affirmation to at least 1 of 4 subjective cognitive symptoms yielded positive SCC. Regression analysis was used to determine factors associated with return to work by 6-months. RESULTS/ANTICIPATED RESULTS: Of 479 enrolled participants with mTBI, 271 (57%) had complete follow-up data. Of which, 156 (58%) had at least sheltered employment at enrollment. Thirty-four (22%) of workers had no return to work at 6-months. Demographics, prior education, presenting injury severity, work status, and post-traumatic stress disorder were associated with return to work. SCC was associated with lower odds of return to work by 6-months (OR = 0.11, $p = 0.01$). DISCUSSION/SIGNIFICANCE OF IMPACT: We suggest a concise 4-question assessment of SCC may be clinically relevant in estimating the likelihood of return to work by 6 months post-mTBI.

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