

causes of SDY. Sequencing of genes associated with congenital arrhythmia susceptibility and familial cardiomyopathy reveals pathogenic variants in 30% of postmortem cases (often called “molecular autopsy”). However, better data are needed to determine the prevalence of phenotype and genotype abnormalities in surviving relatives. **METHODS/STUDY POPULATION:** A retrospective cohort study was performed at a tertiary pediatric center including all subjects with a family history of SDY. Cases were identified using ICD-9 codes (798.1 or .9, V17.41, V17.49, V19.8, V61.07), search of cardiology databases, and by recursive identification of all family members of a subject. Phenotype data was independently reviewed by a pediatric cardiologist. Genotype results were available when obtained by the original treating physician. **RESULTS/ANTICIPATED RESULTS:** Cardiac evaluations were performed in 279 subjects from 175 families, of whom 117 subjects (42%) were first-degree relatives of the proband. Mean age of the subject at time of evaluation was 9 years (SD 5.9). Most probands were over 18 years at the time of SDY: 1–4 years of age (9%); 5–12 (5%); 13–17 (16%); 18–24 (18%); 25–40 (42%). A final diagnosis was determined in 55 families (20%), and a variant in a gene potentially causative of SDY was discovered in 20/55 (36%) of those families. Variants were classified as 50% pathogenic/likely pathogenic, 50% variants of unknown significance. Cardiac testing (ECG, echo, EST, signal averaged ECG, cardiac MRI, or EP study) was abnormal in 124/279 subjects (44%). Among those with abnormal studies, 57/124 (46%) were from a family where a final diagnosis could be determined (LQT 43%, HCM 21%, ARVC 4%, other cardiomyopathy 19%, WPW 5%, CPVT 2%). However, 67/279 of total subjects (24%) had at least 1 abnormal study and a final diagnosis was not determined in the family. **DISCUSSION/SIGNIFICANCE OF IMPACT:** An abnormal phenotype is common among relatives referred for cardiac evaluation after SDY. While testing identifies a family diagnosis in 20% of families, many patients have abnormal cardiac testing and no clear diagnosis can be made. An improved postmortem protocol for phenotype testing in relatives of a SDY victim and improved postmortem genetic testing may lead to a higher diagnosis rate and improved risk determination in surviving family members.

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Association of medical and psychosocial risk factors with engagement in prenatal home visiting

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OBJECTIVES/SPECIFIC AIMS: The purpose of this study is to understand factors that are associated with identifying which eligible pregnant women in Baltimore City accept a referral for HV services. Taking into account demographic and obstetrical variables, we will examine the extent to which 13 medical and 14 psychosocial risk factors differentiate pregnant women who (1) accepted a HV referral, (2) could not be located, or (3) refused a HV referral. **METHODS/STUDY POPULATION:** In this observational study, we will use secondary data on 8172 pregnant women collected by Health Care Access Maryland (HCAM) between 2014 and 2016. HCAM is the single point of entry for all pregnant women in Baltimore City into HV. HV eligibility includes being a pregnant woman, residing in Baltimore City, being uninsured or receiving Medicaid, and being identified by a prenatal care provider who completed an assessment profile of the woman's medical and psychosocial risk (prenatal risk assessment). The outcome variable, HV engagement status (ie, accepted referral, could not be located, refused referral), will be based on HCAM discharge codes. Medical risk factors include BMI, hypertension, anemia, asthma, sickle cell, diabetes, vaginal bleeding, genetic risk, sexually transmitted disease, last dental visit >1 year ago, and taking prescription medications. Psychosocial risk factors include current pregnancy unintended; <1 year since last delivery; late entry to prenatal care (>20 wk gestation); mental, physical, or developmental disability; history of abuse or violence within past 6 months; tobacco use; alcohol use; illegal substance use within the past 6 months; resides in home built before 1978; homelessness; lack of social/emotional support; exposure to long-term stress; lack of transportation; and history of depression or mental illness. All risk factor variables are categorical (yes/no). Control variables will include demographics (eg, age, race, ethnicity, marital status, educational level) and OB history (eg, history of preterm labor, history of fetal or infant death). We will conduct descriptive statistics to characterize the sample and look for interrelatedness among the risk factors. Where there is a high level of inter-relatedness we will consider combining or omitting variables to reduce redundancy. We will use multinomial regression to examine which medical and psychological factors are associated with referral category. **RESULTS/ANTICIPATED RESULTS:** We hypothesize that (a) women with more medical risk factors will be more likely to accept a referral for HV services, (b) women with more psychosocial risk factors will be more likely to refuse HV or not be located, and (c) certain risk factors, such as depression/mental illness, history of abuse/violence, illegal substance use, homelessness,

and exposure to long-term stress will be the strongest predictors of not accepting HV referral and/or not being located. **DISCUSSION/SIGNIFICANCE OF IMPACT:** The translation of effective randomized control trials (RCTs) to successful implementation in community-based programs can be challenging. Community-based programs serving low-income communities typically lack the same resources available to recruit and retain participants in RCTs. And, exclusion criteria applied in RCTs are often not applied in real world implementation which can open program to participants with more complex social and medical characteristics. Findings from this study will inform the translation of evidence-based HV programs into real world settings through an enhanced understanding of the characteristics of women who are not engaged by HV programs. This will inform development of improved outreach methods that may more effectively engage at-risk women for prenatal HV services.

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Sleep apnea is associated with increased risk for sudden unexpected death in epilepsy (SUDEP)

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OBJECTIVES/SPECIFIC AIMS: To assess the association between probable OSA and the sudden unexpected death in epilepsy (SUDEP-7) risk profiling index in monitored adult inpatients with epilepsy. **METHODS/STUDY POPULATION:** We analyzed 49 consecutive adults (>18 years) with refractory epilepsy admitted to our inpatient epilepsy monitoring unit. The SUDEP-7 inventory was performed for all subjects. Probable OSA was identified using overnight oximetry, the Sleep Apnea Sleep Disorder Questionnaire (SA-SDQ), and STOP-BANG inventory. **RESULTS/ANTICIPATED RESULTS:** Thirty-nine percent of participants screened positive for probable sleep apnea. Patients with high SUDEP-7 scores were more likely to have a positive screen for OSA. **DISCUSSION/SIGNIFICANCE OF IMPACT:** OSA is an independent risk factor for sudden cardiac death. OSA may be a hitherto unrecognized contributor to sudden death risk in epilepsy. Further studies determining the relationship between OSA, neural circulatory control and SUDEP are warranted.

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Accuracies of using Her2 for prognosis of breast cancer recurrence in Life After Cancer Epidemiology (LACE) Study

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OBJECTIVES/SPECIFIC AIMS: The goal of the study is to evaluate the prognostic importance and accuracies of a biomarker, human epidermal receptor 2 (Her2), for breast cancer recurrence in a cohort study, namely Lifetime after Cancer Epidemiology (LACE). We specifically interested in the role that Her2 plays in prognosis of breast tumor recurrence for women after a previously diagnosed and treated breast cancer. **METHODS/STUDY POPULATION:** The study cohort includes 2267 women enrolled in LACE who had previously diagnosed breast cancer. Patients were enrolled from each of the 2 LACE registries in California and Utah. The main endpoint of the study is the right-censored time to breast cancer recurrence. Patients' enrollments were, on average, 2 years after diagnosis of the first breast cancer. The patients' characteristics at baseline were obtained through self-administered questionnaires. Cox proportional hazard model with time-varying covariates was used to relate the Her2 status (Her2+ and Her2-) to the primary end point (time to breast cancer recurrence). Hazard ratios (HRs) and their 95% confidence interval comparing Her2+ and Her2- arms were estimated. Time-dependent sensitivity and specificity were used to investigate the performance of using Her2 for classifying patients into high and low risk (Her2+ is classified as hi risk and Her2- as low risk) of future breast cancer recurrence at time points after baseline. The time-dependent sensitivity was calculated as the proportion of patients being classified as high risk of recurrence who had breast cancer recurrence before a series of pre-specified time points after baseline, and the time-dependent specificity was calculated as the proportion of subjects being classified as low risk of recurrence who did not have breast cancer recurrence at the same time points. **RESULTS/ANTICIPATED RESULTS:** The average patient follow-up time was 9.8 years, and 18% of the women got positive Her2 test results at baseline. Among 2267 patients in the study cohort, 2031 had records on their Her2 status, among whom 326 (16.1%) patients were Her2+ and 1705 (83.9%) were Her2-. The mean tumor size among the 2031 patient

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