

on developing lung parenchyma, surfactant production, and abundance of Type II Pneumocytes Hypothesis 2: Modifiable Tracheal Occlusion will have lower levels of pulmonary hypertension than negative control animals, as measured by contrast-enhanced ultrasound (pulmonary artery velocity and washout time). **DISCUSSION/SIGNIFICANCE OF IMPACT:** This project will provide insight into the development of pulmonary hypertension in the CDH fetus. It will provide insight into the physiology of FETO, a novel therapy for congenital diaphragmatic hernias, and will demonstrate the utility of the EXTEND System for fetal treatments that are not possible in the maternal uterus.

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Treatment Interruptions and Early Discontinuation of Hormone Therapy in Hormone Receptor-Positive Breast Cancer Patients

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OBJECTIVES/SPECIFIC AIMS: (1) To evaluate the association of patient and clinical factors with adherence to adjuvant hormone therapy (HT). (2) To examine the association of HT-related symptoms and the extent of remediation with early discontinuation of hormone therapy. **METHODS/STUDY POPULATION:** Retrospective cohort study of risk factors for interruption and early discontinuation of adjuvant hormone therapy in hormone receptor-positive nonmetastatic breast cancer patients diagnosed between 2009 and 2015. This study will include incident hormone receptor-positive breast cancer patients who initiated their HT and were followed at Tufts MC until Dec 31, 2016. Primary data source is electronic medical records (EMRs) **RESULTS/ANTICIPATED RESULTS:** The primary outcome of this study is early discontinuation to HT, defined as the first treatment gap of greater than or equal to 180 days following the initiation of HT. Treatment interruption, defined as any patient- or provider-initiated treatment gap of ≥ 2 weeks, will be examined as the secondary endpoint. Any HT-related symptoms occurred during a follow-up interval will be captured and categorized into five major types (i.e., vasomotor, neuropsychological, gastrointestinal, gynecological, and musculoskeletal symptoms). Onset and duration of a HT-related symptom will be recorded. Severity of the symptoms will also be rated by clinical oncologists. Remediations in response to HT-related symptoms will be collected and categorized into two groups (pharmacological or non-pharmacological) and whether they were patient- or provider-initiated. Response to a remediation is defined as complete relief, partial relief, no relief, or with worsening symptoms. Response to a treatment change (i.e., HT switch or hold) was collected separately but using the same criteria. Analyses will be performed on the association between patient and clinical factors with rates of nonadherence (unplanned treatment interruption and/or early discontinuation) of hormone therapy, respectively. We also will explore whether patients with elevated symptoms and/or incomplete remediation will have earlier discontinuation of hormone therapy. **DISCUSSION/SIGNIFICANCE OF IMPACT:** Through formal chart review, we will establish a dataset that contains highly detailed information about treatment-emergent symptoms and remediations, which will enable us to quantitatively assess the impact of these treatment factors on adherence to hormone therapy for breast cancer. The in-depth analysis of risk factors associated with nonadherence to hormone therapy will inform development of interventions to improve cancer outcomes.

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Understanding barriers to and facilitators of a healthy lifestyle of Hispanic adults with end stage renal disease in hemodialysis: Intensive Development and Experiences in Advancement of Research and Increased Opportunities (IDEARIO)

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OBJECTIVES/SPECIFIC AIMS: Physical inactivity and mineral imbalances greatly contribute to morbidity and mortality in patients with end-stage renal disease (ESRD). Barriers for engaging in physical activity and adhering to the hemodialysis diet have been reported predominantly with white participants from countries other than Puerto Rico. Therefore, this study's aims were to explore the barriers and facilitators that Hispanic adults with end-stage renal disease encountered for engaging in physical activity and adhering to the hemodialysis diet. **METHODS/STUDY POPULATION:** Three focus groups were conducted among 19 adults living with ESRD who received services from a renal center in Puerto Rico. Sessions were recorded, transcribed, and coded first using inductive methods. **RESULTS/ANTICIPATED RESULTS:** The presence of fatigue, lack of acceptance of the renal condition, and lack of knowledge of appropriate exercises for patients in hemodialysis were the most frequently reported barriers to engage in physical activities. Cost of the renal diet, limited availability of the renal diet products, the restrictive nature and the lack of Puerto Rican taste of the renal diet, and inadequate educational materials were the most frequent barriers to adhere to the hemodialysis diet reported by the sample. The most commonly reported facilitators to engaging in physical activities were having a positive attitude, opportunities for group exercises, and listening to Hispanic music while exercising. Health benefits, family support, having financial resources, availability of community resources, and having willpower were the most commonly reported facilitators to adhere to the hemodialysis diet. **DISCUSSION/SIGNIFICANCE OF IMPACT:** We identified a number of culturally relevant individual, interpersonal, institutional, and community-related barriers and facilitators to physical activity and adherence to the hemodialysis diet in patients with ESRD living in Puerto Rico. Evidence-based solutions to overcome these barriers and strategies for enhancing these facilitators should be addressed in future studies aimed at increasing the level of physical activity and increasing adherence to the hemodialysis diet in patients with ESRD living in Puerto Rico.

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Understanding epicardial adipose biology by imaging, transcriptomic, and lipidomic profiling

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OBJECTIVES/SPECIFIC AIMS: The study aims to understand if pro inflammatory epicardial white adipose phenotype is positively associated with coronary atherosclerosis, while the brown adipose phenotype is negatively associated. Primary outcome is association between epicardial fat fraction and coronary atherosclerosis and cardiac function. Secondary outcome is transcriptomic and lipidomic profiling between epicardial, extra pericardial, and

subcutaneous depots and how these profiles correlate with fat fraction. **METHODS/STUDY POPULATION:** Recruited patients undergoing open-heart surgery provided informed consent at their second visit and underwent laboratory testing and imaging (cardiac magnetic resonance including water-fat imaging and coronary calcium computed tomography) prior to their surgery. Cardiac function such as cardiac chamber volume, mass, function, and strain, and depo-specific fat fraction were calculated from cardiac MR and Agatston calcium score and epicardial adipose volume from CT images. At the time of surgery, a tissue specimens from the epicardial, extrapericardial, and subcutaneous depots were obtained for transcriptomic and lipidomic analysis. Linear and logistic regression analyses adjusted for other variables were performed to evaluate significance level between variables. **RESULTS/ANTICIPATED RESULTS:** 37 subjects were enrolled in the study, 13 (35%) of which were women. Cardiac function and fat fraction was quantified in all patients, whereas tissue analyses were performed in 22 patients. Epicardial and extrapericardial fat fraction were independently associated with coronary atherosclerosis (p-value 0.01 and 0.04 respectively) Only epicardial fat fraction was negatively associated with global circumferential shortening of the left ventricle (0.03), while neither the extrapericardial fat fraction nor epicardial adipose volume were not (p =0.33 and 0.97 respectively) All three adipose depots have unique gene signatures with differentially expressed genes and pathways. RNA sequencing of epicardial, extrapericardial, and subcutaneous depots demonstrated tight clustering of epicardial and subcutaneous signatures based on PCA analysis (Figure 2). 19 lipid classes and 59 lipids showed differential expression between at least 2 of the fat depots (Figure 3). Hierarchical clustering of the lipids showed that epicardial and extrapericardial depots were more closely related than subcutaneous adipose. Plasmalogen phosphatidylcholines, with an ether-linked fatty acid at the sn-1 position of the lipid, were higher in subcutaneous fat while most other lipids were higher in epicardial fat per tissue weight, such as ceramides (p=0.002). **DISCUSSION/SIGNIFICANCE OF IMPACT:** Epicardial, extrapericardial, and subcutaneous adipose depots express different lipidome and transcriptome signatures and different pathways. GSEA analysis demonstrated enrichment of genes related to antigen presentation and B cell immunity in epicardial compared to subcutaneous adipose tissue. Epicardial fat fraction is associated with coronary atherosclerosis and decreased left ventricular global circumferential shortening as an early predictor of decreased left ventricular stroke volume. Epicardial fat fraction is also associated with ceramides which may play role in the development of coronary atherosclerosis and decreased cardiac function.

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US trends in diet and exercise counseling for patients with and without diabetes: The National Ambulatory Medical Care Surveys, 2005-2015

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OBJECTIVES/SPECIFIC AIMS: Type 2 diabetes (T2D) is costly and burdensome, but strong evidence exists that lifestyle change and weight loss can improve glycemic control and lower co-morbidities for patients with T2D. We used national data to examine whether the frequency of diet and/or physical activity counseling for patients with T2D in ambulatory settings has been responsive to

accumulation of evidence supporting lifestyle change. **METHODS/STUDY POPULATION:** We used National Ambulatory Medical Care Survey (NAMCS) data over the period 2005-2015 from 31,475 patients with provider-reported T2D. We built multivariate logistic regression models, adjusting for patient, provider, and practice level characteristics (i.e. patient demographics, physician specialty, site of care, and region), to assess changes over time in the provision of diet or exercise counseling during ambulatory care visits, as reported through provider/staff chart review. We also examined whether changes in counseling over time varied by key patient and provider characteristics. We used non-overlapping confidence intervals (CI) to assess for statistical significance. **RESULTS/ANTICIPATED RESULTS:** Proportions of patients with T2D who received diet or exercise counseling were no different over time: 30% in 2005 [95% CI: 25%-35%] and 25% in 2015 [95% CI: 18%-31%]. Adjusted models show Hispanic patients had higher likelihood of receiving diet or exercise counseling, compared to whites (OR: 1.38 [CI: 1.03-1.85] for diet; OR: 1.37 [CI: 1.01-1.85] for exercise), and younger age was associated with higher likelihood of diet or exercise counselling, compared to those over 75 (age 30-49, OR: 1.47 [CI:1.18-1.82] for diet OR: 1.63 [CI: 1.30-2.03] for exercise). Among provider and practice-level characteristics, metro area and type of provider were associated with higher odds of receiving any diet and/or exercise counseling with visits in a metro area (OR: 1.23 [CI: 1.03-1.48]) and with an advanced practice provider (OR: 1.77 [CI: 0.97-3.22]) having higher likelihood of receiving any diet or exercise counseling. **DISCUSSION/SIGNIFICANCE OF IMPACT:** Up to 30% of Americans with diabetes received any diet or exercise counseling in ambulatory visits, and this remained low over a decade. There were significant differences in counseling across patient, provider, and practice characteristics. Future studies are needed to better understand what interventions might improve counseling in ambulatory settings.

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Von Willebrand Factor is Localized in the Extravascular tissue of Patients with Juvenile Scleroderma

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OBJECTIVES/SPECIFIC AIMS: To further explore the role of vWF in the pathogenesis of scleroderma by identifying its location within the tissue of sample biopsies obtained as part of routine diagnosis with the use of immuno-histochemical staining. **METHODS/STUDY POPULATION:** We examined 8 skin biopsies from 2 patients with systemic sclerosis (SSc), 2 with localized scleroderma (LS) and 4 with JDM. Double immunofluorescence staining was performed in each tissue with antibodies against vWF and collagens type I and III. DAPI (4', 6-diamidino-2-phenylindole) was also used for counterstaining of inflammatory cells. Tissue staining patterns were compared between groups. **RESULTS/ANTICIPATED RESULTS:** Biopsies were obtained from the upper extremity of 7 females and the lower extremity of 1 male. Median age, symptom duration, and serum levels of vWF antigen around the time of biopsy was 8 years (IQR 4.5-11), 5.5 months (IQR 2.5-7), and 245% (IQR 203-302 for 7 patients), respectively. All but 1 biopsy was performed prior to initiation of immunosuppressive therapy. Immunofluorescence staining showed a superficial and deep perivascular inflammatory