A pilot randomized controlled trial of precision care for smoking cessation in the Southern Community Cohort Study
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OBJECTIVES/GOALS: Precision care may engage smokers and providers in treatment but is understood in the community. We piloted guideline-based care (GBC) alone or with Respiragene, a lung cancer polygenic risk score (PRS, 1-10), or metabolism-informed choice of medication using the nicotine metabolite ratio (NMR). METHODS/STUDY POPULATION: Daily smokers (n=58) with stored biospecimens in the Southern Community Cohort Study were randomized 1:1:1 to GBC, PRS, or NMR, counseled to quit smoking, and co-selected FDA-approved cessation medication (nicotine replacement, varenicline) with a tobacco counselor. In PRS, precision motivational counseling was guided by PRS (i.e., lung cancer risk 10-40-fold that of never-smokers). In NMR, precision medication recommendations consisted of varenicline for faster metabolizers (NMR≥0.31) and nicotine replacement for slow metabolizers (NMR<0.31). Feasibility was defined as achieving at least 50% provider engagement (med prescription) and at least 50% patient engagement (self-reported med use).
RESULTS/ANTICIPATED RESULTS: Participants were median age 59, 72% female, 81% Black, 60% with incomes <$15,000; median cigarettes/day was 15 (IQR 8-20) and 52% reported time-to-first cigarette <5 minutes, illustrating moderate nicotine dependence. Providers confirmed medication prescriptions for 40% of patients (32% GBC, 50% PRS, 37% NMR) and 83% of patients reported using medication (prescribed or unprescribed) during the study (90% GBC, 80% PRS, 79% NMR). At 6-month follow-up, 27% (n=15) reported cessation (39% GBC, 16% PRS, 26% NMR). Among persistent smokers, 46% reported smoking at least 50% fewer cigarettes/day compared to baseline (45% GBC, 38% PRS, 57% NMR). Small sample size precluded statistical comparisons. DISCUSSION/SIGNIFICANCE OF IMPACT: Precision interventions to quit smoking are feasible for community smokers, who engaged at high rates. However, only 40% of providers supported patients’ quit attempts with medication prescriptions. Future research should test strategies to raise provider engagement in precision smoking treatment.

Black Bone MRI from the Lab to Clinical Practice: Eliminating Radiation Exposure in Reconstructive Surgery Patients
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OBJECTIVES/GOALS: Virtual surgical planning and 3D printing enable streamlined surgeries and increased complexity. These technologies, however, require CT scans and radiation exposure. This project’s goal is to optimize and demonstrate the accuracy of Black Bone MRI for surgical planning in reconstructive surgery. METHODS/STUDY POPULATION: Four common craniofacial surgeries were planned and performed on cadaver specimens (maxillary advancement, orbital floor reconstruction with patient-specific implants, cranial vault reconstruction, and fibular free flap reconstruction of the mandible). For each surgical procedure, ten cadaver heads were used. Five of each surgery were planned and 3D printed guides were created utilizing Black Bone MRI versus five with CT scans. Following mock surgeries, all specimens underwent a post-operative CT scan. 3d reconstruction was performed and surgical accuracy compared to the plan was assessed using GeoMagic Wrap, assessing average post-operative deviation from plan. RESULTS/ANTICIPATED RESULTS: In all surgeries, guides created from Black Bone MRI demonstrated high accuracy to surgical plan. Average osteotomy (cut) deviation from plan was not statistically significantly different when Black Bone MRI was used compared to CT scans.
OBJECTIVES/GOALS: To compare the opioid drug requirements amongst those individuals with high levels of catecholamines in blood and acute post-procedural pain, by ICD9/10 codes (experimental) to those with normal levels of catecholamines and acute post-procedural pain (AP-PP) only (controls)

METHODS/STUDY POPULATION: In collaboration with both the Informatics and the Biostatistics Departments at CTSI and under the auspices of the IRB at the University of Rochester, we completed the collection of ~8,000 electronic health records (EHRs) of adults 18 years and older with surgical appointments at Strong Memorial Hospital (SMH), who met inclusion criteria, from January 2006 to September 2019 and received Fentanyl therapy for AP-PP management. Subjects were categorized in a two-arm-matched case-control fashion. A ratio of 1(Experimental):1(Control) was utilized. Analytic comparisons were completed using normal distribution statistical methods with p > 0.1 for significance.

RESULTS/ANTICIPATED RESULTS: After removal of duplicates and exclusion of EHRs, a total of 17 subjects met inclusion criteria for the experimental group. We matched controls (n = 17) with experimental subjects for age, gender and surgical procedure for accurately compare opioid requirements in the postoperative recovery. Mean age of subjects was 69(+/−10.1235) years old. Most of subjects were females (70%). Mean Fentanyl requirement was significantly different in the experimental group 466.17(625.621)mcg compared to 215.58(353.323)mcg in the controls (p value 0.07832)

DISCUSSION/SIGNIFICANCE OF IMPACT: It is suggested that healthy individuals with genetic variations in pain pathways including the COMT and MAOA rendered individuals with higher levels of catecholamines in the body driving abnormal responses to pain sensitivity. We emulate this genetic variation for clinical purposes using ICD10/9 codes of those with conditions related to higher catecholamine levels in the body. Based on our preliminary results, we suggest that COMT and MAOA genetic variations could impact opioid drug use and the current opioid dependency and epidemics in the U.S. This study will address remarkable questions and identify strategies about this topic.