

and enrollment, along with details on the program content, timeline, and short- and long-term program evaluation metrics (both quantitative and qualitative). The CUBE program was well-received by students participating in summers 2022 and 2023, where improved attitudes towards statistics were demonstrated, and 7 of the total 9 participants (78%) over the past two summers expressed interest in pursuing a graduate degree in biostatistics or a career in quantitative research. Of these 7 students, 1 is currently enrolled in a biostatistics graduate program in the United States. DISCUSSION/SIGNIFICANCE: Results can be used to offer recommendations to leaders in the field on how to establish similar programs seeking to provide a pipeline for equity and diversity in the practice of collaborative biostatistics and health data science.

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### Parental Occupation and Orthopaedic Surgery Residency Applicants: Implications on Educational Debt, Scholarships, Medical School Ranking, and Resulting Match Rates

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OBJECTIVES/GOALS: Parental SES may influence the trajectory of students applying to orthopaedic surgery residency, perpetuating opportunistic disparities. Thus, we sought to examine the relationship between parental occupation/education and applicant match rate, education financing, and medical school background. METHODS/STUDY POPULATION: Data from the Association of American Medical Colleges (AAMC) documented parental occupation and education levels of 10,697 orthopedics applicants from 2011 to 2021. Parental occupations were categorized into physician vs non-physician, healthcare vs non-healthcare, working class vs non-working class, and STEM (Science, Technology, Engineering, Mathematics, Medicine) vs non-STEM. Parental education levels spanned from no college degree to doctorate degrees and were used as a proxy for SES. Outcomes analyzed included match success, premedical and medical school debt, total educational debt, scholarships, and representation from top 40 research medical schools as determined by NIH funding. RESULTS/ANTICIPATED RESULTS: Physician parent applicants (20.1%) had better match rates (75.5% vs. 73.5%), lower debts, lesser scholarships, and higher top 40 school representation. Healthcare parent applicants (37.0%) had similar match rates, less debt and scholarships. Working class parent applicants (6.0%) had more debt and scholarships. STEM parent applicants (48.6%) had higher match rates, lesser debts and scholarships, and higher top 40 representation. Applicants with parents without college degrees had lower match rates (68.6% vs 74.5%), more debt and scholarships. Doctorate parent applicants had better match success (75.9% vs 72.9%), lesser debts, and higher top 40 school representation (34.9% vs 29.6%). DISCUSSION/SIGNIFICANCE: Parental SES was associated with substantial variation in applicant financial burden and educational pedigree. Notably, applicants with parents lacking degrees had lower match rates, underscoring the need for supportive strategies to ensure equitable opportunities for aspiring orthopaedic surgeons.

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### Perceived Barriers to the Recruitment and Retention of Underrepresented Racial and Ethnic Groups (URGs) in Clinical Research

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OBJECTIVES/GOALS: The inclusion of underrepresented racial and ethnic groups (URGs) in clinical research is critical for ethical and scientific reasons. This initiative aimed to assess the perspectives, barriers, needs, and recommendations encountered by research teams when enrolling and retaining URGs in clinical research. METHODS/STUDY POPULATION: An anonymous, web-based survey comprised of quantitative and qualitative questions was administered to individuals involved in clinical research at an academic medical center. The survey assessed three main domains: 1. Research teams' perceptions and experiences with enrolling URGs in clinical research, 2. Factors that discourage URGs from participating in clinical research, and 3. Research teams' overall willingness to support URG enrollment. Demographics were also collected. The survey was reviewed by experts in clinical research, research ethics, and diversity, equity, inclusion, and accessibility (DEIA). The assessment was piloted among research professionals and edits were made accordingly prior to official dissemination. Data were analyzed using descriptive statistics. RESULTS/ANTICIPATED RESULTS: There was a total of 63 responses. A majority of respondents have more success enrolling patients whose primary language is the same as their own and that time arranging for an interpreter has negatively impacted enrollment efforts. Approximately half of the respondents believe that the race and/or ethnicity of the potential study participant influences enrollment success. Factors discouraging URGs from participating in clinical research include unavailability for follow-up visits due to transportation issues, distrust in doctors and/or researchers, fear of unknown side effects, and unavailability of medical interpreters. Respondents report that they are not discouraged from enrolling URGs and would utilize resources related to encouraging the inclusion of URGs. DISCUSSION/SIGNIFICANCE: Language appears more influential than ethnicity or race when it comes to enrolling and retaining URGs. Additionally, it appears that enrolling is a bigger challenge than retaining. Major themes that emerge with respect to retaining enrolled participants include the inability to attend follow-up visits and the lack of incentives/compensation.

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### Gender-Diverse Inclusion: The Language of Sex and Gender in PrEP Clinical Trials

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OBJECTIVES/GOALS: To construct an assessment scale capable of evaluating a trial's gender literacy or the extent to which biologically assigned "sex" is understood as separate from culturally defined and personally embodied "gender". This scale in tandem with a policy brief will outline recommendations for inclusive medical

nomenclature in the clinical space. **METHODS/STUDY POPULATION:** Using clinicaltrials.gov, inclusion/exclusion criteria was recorded for PrEP interventional trials (i.e., Truvada, Descovy). To evaluate these trials, an assessment scale for “gender literacy” is necessary. This scale relies on the fact that sex and gender are distinct elements to one’s identity and ought to be reported as such. As a form of content analysis, where literary information (eligibility criteria) is evaluated based on set rubric, this scale will require validation through inter-coder agreement. Evaluated in a group of 5 college-age students, this scale was used on selected PrEP clinical trials to verify if there was high agreement in the scores given. After validation, the dataset from clinicaltrials.gov underwent evaluation using the proposed assessment scale for gender literacy. **RESULTS/ANTICIPATED RESULTS:** The student coders had a Kalpa of 0.4 in the first round of grading. After retraining, their Kalpa increased to 0.68. The grading involved a subjective language rating (LIR), evaluating the usage of inclusive language, and a numerical score (GR) for the demographics of inclusion in a trial. After this inter-coder agreement validation, 216 active PrEP clinical trials (as of March 2023) were downloaded from clinicaltrials.gov. Grading of these trials showed that cisgender males represented 40% of participants, while 28% represented both transgender men and women, and less than 1% represented non-binary individuals. Moreover, more than half of the trials (52%) exhibited cisgender-oriented language or made no reference to gender identity. **DISCUSSION/SIGNIFICANCE:** It is a scientific imperative for clinical trials to have representative participant bases in order to derive data that is generalizable to afflicted populations. Especially for PrEP clinical trials, where gender-diverse individuals need visibility, trial design must be carefully crafted so as not to exclude through dated or exclusionary language.

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### Transforming Health Equity with an Innovative Social Determinants of Health Platform: Application of HOUSES Index to Colorectal Cancer Screening

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**OBJECTIVES/GOALS:** To tackle population-level health disparities, quality dashboards can leverage individual socioeconomic status (SES) measures, which are not always readily accessible. This study aimed to assess the feasibility of a population health management strategy for colorectal cancer (CRC) screening rates using the HOUSES index and heatmap analysis. **METHODS/STUDY POPULATION:** We applied the 2019 Minnesota Community Measurement data for optimal CRC screening to eligible Mayo Clinic Midwest panel patients. SES was defined by HOUSES index, a validated SES measure based on publicly available property data for

the U.S. population. We first assessed the association of suboptimal CRC screening rate with HOUSES index adjusting for age, sex, race/ethnicity, comorbidity, and Zip-code level deprivation by using a mixed effects logistic regression model. We then assessed changes in ranking for performance of individual clinics (i.e., % of patients with optimal CRC screening rate) before and after adjusting for HOUSES index. Geographical hotspots of high proportions of low SES AND high proportions of suboptimal CRC screening were superimposed to identify target population for outreach. **RESULTS/ANTICIPATED RESULTS:** A total of 58,382 adults from 41 clinics were eligible for CRC screening assessment in 2019 (53% Female). Patients with lower SES defined by HOUSES quartile 1-3 have significantly lower CRC screening compared to those with highest SES (HOUSES quartile 4) (adj. OR [95% CI]: 0.52 [0.50-0.56] for Q1, 0.66 [0.62-0.70] for Q2, and 0.81 [0.76-0.85] for Q3). Ranking of 26 out of 41 (63%) clinics went down after adjusting for HOUSES index suggesting disproportionately higher proportion of underserved patients with suboptimal CRC screening. We were able to successfully identify hotspots of suboptimal CRC (area with greater than 130% of expected value) and overlay with higher proportion of underserved population (HOUSES Q1), which can be used for data-driven targeted interventions such as mobile health clinics. **DISCUSSION/SIGNIFICANCE:** HOUSES index and associated heatmap analysis can contribute to advancing health equity. This approach can aid health care organizations in meeting the newly established standards by The Joint Commission, which have elevated health equity to a national safety priority.

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### A pragmatic approach to portable neuroimaging utilized in clinical research

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**OBJECTIVES/GOALS:** The aim of this paper is to raise awareness of the limitations of the current pMRI training paradigm and to recommend a standardization of skills to expand diversity among field-based neuroimaging technicians. **METHODS/STUDY POPULATION:** Currently, there are seven international brain research initiatives. The goal is to establish and understand the cultural values a society holds and how the outcomes of research may be adopted into societal practice. We must also consider the benefits of early detection amongst minoritized communities in neuroscience research. Neuroimaging in remote settings can allow patients to advocate more accurately for timely medical care which can lead to better health outcomes. According to the Journal of Neurological Sciences, neuroscience accounts for 9% of total medical publications. **RESULTS/ANTICIPATED RESULTS:** Neuroimaging research continues to evolve in terms of resolution and portability. T By harnessing diverse data, we are able to utilize advanced neuroimaging techniques and software technology to recognize trends amongst subgroups of individuals who were previously considered geographically inaccessible. **DISCUSSION/SIGNIFICANCE:** Despite the excitement and promise of portable neuroimaging devices, there is a fundamental need to establish standardized training procedures that can be accessed by individuals of all socioeconomic backgrounds.