

### Evaluating the Association of Age with Acuity and Severity of Illness at Initial Clinical Presentation in Patients with Leukemia and Lymphoma

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**OBJECTIVES/GOALS:** Adolescent and young adult (AYA) patients, diagnosed with cancer between 15 and 39 years of age, often have worse outcomes compared to younger children and older adults. We will characterize age differences in acuity and severity of illness at initial presentation, as a measure for health outcomes, in patients with new diagnoses of leukemia or lymphoma. **METHODS/STUDY POPULATION:** We will perform a single institution-based, retrospective analysis of a cohort of pediatric oncology patients at Children's Healthcare of Atlanta (CHOA) who were diagnosed with leukemia or lymphoma from 2010 to 2018. Data will be abstracted from the CHOA medical record and cancer registry. We will construct a severity score, with one point for 1) admission to the Intensive Care Unit (ICU), 2) ICU-level requirements at admission, 3) stage IV or metastatic disease, and 4) white blood cell count over 100,000/microliter. We will associate this score with age at presentation using logistic regression models among patients overall and stratified by disease type. All regression models will adjust for confounders (e.g., health insurance, race and ethnicity, and local-area social vulnerability level). **RESULTS/ANTICIPATED RESULTS:** Previous literature has shown increased cancer incidence and mortality in AYAs compared to younger children. Therefore, we hypothesize that AYA patients with a new diagnosis of leukemia or lymphoma will have a higher acuity and severity of illness at presentation than younger patients. We conducted a pilot study analyzing acuity and severity of illness by age, race, ethnicity, and insurance status. Bivariate comparisons suggested patients aged 10 and older were as likely as those younger to have a severity score of more than 0 at diagnosis (OR=0.661, 95% CI 0.43-1.01). However, this result was collapsed across all hematologic malignancies, did not encompass the entire cohort, and did not address possible confounders; we anticipate our estimates will be different taking these factors into account. **DISCUSSION/SIGNIFICANCE:** Our work will be the first steps in creating a validated tool to understand disease acuity and severity. By using this tool to characterize presentation by disease type and age, we will identify unmet needs prior to an initial diagnosis of cancer. Our findings inform strategies toward narrowing age disparities in outcomes for AYA hematologic cancers.

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### Examining the Feasibility and Acceptability of Data-Driven Outreach Using Geographic Information Systems to Address Racial Disparities in Fatal Opioid Overdose

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**OBJECTIVES/GOALS:** This project examines the initial feasibility, acceptability, and appropriateness of using population-health data and geospatial information systems (GIS) technology to guide opioid overdose prevention in a Black community facing increasing racial

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inequities in fatal overdose since 2016. **METHODS/STUDY POPULATION:** We applied a mixed-methods approach, using GIS to examine hot spots of fatal opioid overdose among Black, adult decedents in St. Louis City and County, Missouri, derived from cause-of-death data from the Medical Examiner's Offices from 2016-2021 (N = 1,612). Hot spot analysis was conducted using the Getis-Ord  $G_i^*$  statistic. We then conducted a focus group with community-based providers in Black neighborhoods (N = 8) to assess the acceptability and appropriateness of mapping overdose data and to determine the utility of GIS for guiding decision-making in outreach activities aimed at overdose prevention. The focus group was recorded and transcribed for analysis to extract themes. **RESULTS/ANTICIPATED RESULTS:** Among 340 census tracts in the St. Louis region, 41 were statistically significant hot spots, indicating high clustering of fatal overdose. All hot spots were clustered together in North St. Louis, an area characterized by high racial and income segregation. Focus group participants reported potential pitfalls of GIS, including data inaccuracy for Black individuals and unwanted attention in hot spot areas (e.g., increased policing). Potential benefits included improved care coordination between organizations, assessing effectiveness of outreach interventions, and improving community-level awareness. Hyper-local neighborhood rather than regional maps were perceived as useful for outreach. **DISCUSSION/SIGNIFICANCE:** Artifacts of structural racism that drive Black opioid overdose deaths limit the utility of GIS to guide outreach in communities facing this systemic disinvestment. However, neighborhood-level GIS may serve as a tool for communities to build awareness and collaboration toward overdose prevention.

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### Explaining Research to Children and Adolescents

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**OBJECTIVES/GOALS:** By establishing a youth-centric web-app as a central hub of information and inspiration in an attempt to engage a young demographic, this project aims to increase community awareness and reduce misconceptions surrounding clinical trials, in hopes of fairly representing marginalized communities among future clinical trial participants. **METHODS/STUDY POPULATION:** We designed a children's web-app to host a collection of child-friendly educational materials (such as picture books, games, and age-appropriate articles about advances in clinical research) explaining clinical research and its process. An emphasis was put on ensuring the web-app and its contents were understandable and appealing to children. The effectiveness of this tool will be tested through a focus group study. Children ages 7-10 will be given a preliminary survey measuring their knowledge and opinions about clinical research, and then given time to explore the web-app. Afterwards, they will be given a secondary survey to gauge their acquired knowledge from the website and asked about their opinion on the design and usability of the web-app and its materials, as well as how likely they were to revisit the site. **RESULTS/ANTICIPATED RESULTS:** We anticipate a very positive response from the children regarding the design and usability of the web-app and its materials. By using an

adolescent-focused design methodology at every step of the design process, we will ensure that all materials are attractive and engaging to our younger target audience. Exposing children to accessible information about clinical trials at a young age allows us to build their trust in the research process prior to the possible internalization and acceptance of cultural misconceptions. Over time, we hope to see a change in attitudes toward clinical research as well as increased participation, whether from under-represented groups or a younger demographic, and positively contribute to T3 and onwards in the translational continuum. **DISCUSSION/SIGNIFICANCE:** In a rapidly changing world, the best approach to making change is through targeting the younger demographic, the leaders of tomorrow. Our project will allow adolescents to foster a more well-rounded opinion of clinical research, increasing their participation and better paving a more positively received future for translational science as a whole.

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### Exploring facility level differences in medication-based treatment of OUD

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**OBJECTIVES/GOALS:** Medications to treat opioid use disorder (mOUD) are available and can save lives, but are underutilized. We hypothesize that the rate of prescribing varies by treatment facility and these differences will shed light on barriers and facilitators to mOUD utilization. **METHODS/STUDY POPULATION:** We performed an exploratory analysis in MD Clone, a platform which generates non-identifiable synthesized data based on real patient data in the electronic health record (EHR) of St. Louis based hospitals. Our query included adults aged 18-70 with an OUD diagnosis using ICD-9 of -10 codes (opioid abuse, opioid dependence, opioid poisoning, opioid withdrawal) occurring between 2013 and 2022 along with prescriptions for buprenorphine, methadone, or naloxone within 7 days of the condition being entered in the record. We compared the rate of medication prescription within 7 days across settings and facilities where the patients were seen. We propose to replicate this analysis in actual patient records from the EHR following IRB approval. **RESULTS/ANTICIPATED RESULTS:** Our synthetic data comprised 24600 patient diagnoses. After filtering for patients seen in the ER or inpatient 16235 patients remained in the data set. Of these, 4376 fell into one of the categories that clearly warrant treatment with medication. Out of 4376 patients with a qualifying OUD related condition, only 815 (18.6%) received a prescription for any of the medications. Rates of prescribing within facilities varied between 67.2% of eligible patients receiving a prescription at a rural location to 0% at some urban centers. We anticipate similar findings from analysis of patient records obtained from the EHR. We will extend our analysis to explore factors which may be driving the wide difference in prescribing to better understand barriers and facilitators to mOUD utilization. **DISCUSSION/SIGNIFICANCE:** We identify under-utilization with differences across facilities in prescribing mOUD based on preliminary work in synthetic data. If true, this represents a gap in care and opportunity for intervention. By replicating the MD Clone results in patient data from the EHR we will confirm this finding and increase acceptability to clinicians.

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### Exploring stress and inflammation in young children with type 1 diabetes

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**OBJECTIVES/GOALS:** The purpose of this mixed methods project was to gain a comprehensive understanding and generate data on factors, including stress and inflammatory biomarkers, that may negatively impact glycemic levels in children aged 8-12 years with type 1 diabetes (T1D) from underrepresented backgrounds. **METHODS/STUDY POPULATION:** This study employed a two-phase sequential QUAN -> qual mixed methods design. Children and their parents were recruited from a pediatric endocrinology clinic in the southeastern United States. In phase 1 (n=34), we used quantitative methods to measure perceived stress, diabetes distress, cortisol, inflammation (IL-1b, IL-2; IL-6; IL-8; TNF-a; CRP), and glycemic level (HbA1c). Both children and their parent/guardian completed surveys, and children provided salivary and blood samples to measure cortisol and inflammatory markers. Phase 2 qualitative interviews in a subset (n=20) of children and parent/guardians from phase 1 are ongoing; preliminary findings will be included in the presentation. **RESULTS/ANTICIPATED RESULTS:** Mean age of children was 10.47 (sd=1.44), 67.6% were male, and 41.2% were black. HbA1c ranged from 6.8%-15% and only 2 (5.8%) children met ADA recommendations for HbA1c of 7% or less. HbA1c was associated with child reports of perceived stress (r = .403, p < .05), but not parent reports of child perceived stress (r = -.011, p > .05). Parent reports of perceived stress and diabetes distress in children were not significantly associated with child self-report of perceived stress (r = .11, p > .05) or diabetes distress (r = .018, p > .05). Exploratory models with PROCESS suggest that cortisol slope and IL-8 moderate the relationship between child's perceived stress and glycemic control. **DISCUSSION/SIGNIFICANCE:** Stressors are emerging that are unique to this population and may help highlight disparities in care. While the study is ongoing, findings may help health professionals identify and mitigate stressors in children with T1D to help maintain optimal glycemic levels.

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### Exploring the role of maternal exposure to violence in post-partum weight retention among WIC program participants in Puerto Rico

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**OBJECTIVES/GOALS:** Evaluate if exposure to violence is associated with post-partum weight retention among WIC participants, which can lead to overweight/obesity due to metabolic adaptations