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Understanding the association between alcohol use and neighborhood-level factors among sexual minority groups

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OBJECTIVES/GOALS: Sexual minority populations report a disproportionately high prevalence of alcohol use, often attributed to coping with bi/homonegativity and systemic inequities across various social domains. This study aims to explore alcohol use patterns and associated neighborhood and individual factors among sexual minority populations (SMPs) using data from the NIH All of US dataset. METHODS/STUDY POPULATION: Alcohol use was assessed using the AUDIT-C (Alcohol Use Disorders Identification Test—Consumption) scale across a sample of 9,454 gay, 15,284 bisexual, 5,267 lesbian, and 349,748 straight participants. The AUDIT-C measured hazardous alcohol use, and logistic regression models were employed to examine its association with neighborhood-level factors (e.g., socioeconomic status, alcohol outlet density) and individual-level factors (e.g., age, race/ethnicity, income, and education) among SMPs. Interaction terms assessed how these relationships varied by sexual orientation. Sensitivity analyses were conducted to assess the robustness of the findings, including stratified analyses by gender identity and the exclusion of extreme outliers in alcohol use reporting. RESULTS/ANTICIPATED RESULTS: Our analyses revealed that gay participants had the highest AUDIT-C scores (mean = 3.60, SD = 2.27), followed by bisexual (mean = 3.35, SD = 2.21), other SMPs (mean = 3.18, SD = 2.19), lesbian (mean = 3.04, SD = 2.08), and straight individuals (mean = 3.05, SD = 2.06). Alcohol use was positively associated with neighborhood disorder (β = 0.12, 95% CI = 0.07, 0.17), housing insecurity (β = 0.14, 95% CI = 0.03, 0.25), and male gender (β = 0.98, 95% CI = 0.96, 1.00). In contrast, neighborhood density (β = -0.11, 95% CI = -0.15, -0.07), food insecurity (β = -0.14, 95% CI = -0.20, -0.08), being Black, and identifying as bisexual were negatively associated with alcohol use. Sensitivity analyses determined no significant differences among specfic supgroups. DISCUSSION/SIGNIFICANCE OF IMPACT: This study highlights important differences in alcohol use across SMPs and emphasizes the influence of neighborhood-level stressors (e.g., disorder and housing insecurity). These findings underscore the need for addressing social and environmental determinants of alcohol use in SMPs to mitigate the negative impacts of alcohol consumption.

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Using a large language model to create lay summaries of clinical study descriptions

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OBJECTIVES/GOALS: We assessed the feasibility of using a large language model (LLM) to create lay language descriptions of study protocols for recruitment, which has the potential to improve accessibility and transparency of clinical studies and enable participants to make informed decisions. METHODS/STUDY POPULATION: All studies from a clinical research recruitment platform were included, which features human-written lay descriptions and titles for study recruitment. Corresponding protocol summaries in the IRB system were extracted and translated into lay language using a LLM (gpt-35-turbo-0613). A subset was used to develop prompt variations through an iterative process. Prompt strategies evaluated include chain-of-thought and few-shot prompting techniques. LLM-generated and human-written descriptions were compared for readability using Flesch–Kincaid and Simple Measure of Gobbledygook (SMOG) reading grade levels and information completeness using Word Movers' Distance (WMD). RESULTS/ANTICIPATED RESULTS: A total of 55 study descriptions were included – 10 were used to develop prompts and 45 were used for evaluation. The final LLM instructions included multistep prompts. The LLM was first instructed to produce a two- to three-sentence long description without using scientific jargon and included two pairs of examples. The LLM was then asked to shorten the description and finally to provide an engaging title. LLM-generated and human-written summaries were similar in length (median (IQR) 328 (278.5–360.5) vs. 342 (203–532.5) characters, respectively). LLM-generated summaries had lower Flesch-Kincaid grade level (5.15 vs. 8.28, p DISCUSSION/SIGNIFICANCE OF IMPACT: An LLM can be used to generate lay language summaries that are readable at a lower grade level while maintaining semantic similarity. This approach can be used to improve the drafting of summaries for recruitment, thereby improving accessibility to potential participants. Future work includes human evaluation and implementation into practice.

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Impact of social determinants of health on diabetes and obesity in the DMV (DC, Maryland, Virginia) area

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OBJECTIVES/GOALS: Both diabetes and obesity are major health issues in the USA. Though much focus is given on the impact of lifestyle modifications to control diabetes and obesity, more information needs to be established about the association of social determinants of health and them. This study explores these associations, focusing on the DMV area. METHODS/STUDY POPULATION: The data for this study were collected for 158 counties which cover two states Maryland and Virginia, and Washington DC from PolicyMap. PolicyMap is a geography information system (GIS) that aggregates different types of data from different sources for research purposes. County-level data on public health related to different SDoH like median age, and percentages proportions of different ethnicity (Hispanic or Latino), percentages of different race, and nativity (foreign born), gender (ratio of male to female), access to primary healthcare, social vulnerability index (SVI), and median household income was used in this study. Statistical methods like multiple regression, one way ANOVA, and Pearson's correlation coefficients were used to determine which factors are associated with these two conditions. RESULTS/ANTICIPATED RESULTS: For both diabetes prevalence and obesity, multiple linear regression model with backward elimination was used to select variables which associated with them. The backward elimination process selected the set of factors for which the adjusted R square was the highest. In both cases, median household income, median age of population, social vulnerability level, percentage of white population, and percentage of foreign-born population were found to be significant at 5% level of significant. Pearson's

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correlation coefficients showed significant positive relationship between factors like obesity and diabetes, median age and access to health care, and negative relationship between obesity and foreign born. Income, healthcare access, and white population were found to be significantly different SVIs from ANOVA. DISCUSSION/SIGNIFICANCE OF IMPACT: This research study found that some SDoH affect diabetes and obesity in the same direction. The association is positive for median age and negative for income, SVI, percentage of white population, and foreign born. The associations were found between actionable and non-actionable factors like percentage of white population with access to health care.

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Leveraging large language models to communicate translational science benefits at Weill Cornell Medicine Clinical and Translational Science Center

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OBJECTIVES/GOALS: This Weill Cornell Clinical and Translational Science Collaborative (CTSC) project evaluates whether large language models (LLMs) can generate accurate summaries of translational science benefits using the Translational Science Benefits Model (TSBM) framework, aiming to identify optimal LLMs and prompting strategies via expert review. METHODS/STUDY POPULATION: We are using prompt engineering to train multiple LLMs to generate one-page impact profiles based on the TSBM framework. LLMs will be selected via benchmarks, focusing on models excelling in information extraction. Leading LLMs (e.g., Llama 3.2, ChatGPT 4.0, Gemini 1.5 Pro, and Claude) and other high-performing models will be considered. Initial work has utilized Gemini 1.5 Pro. Models use data from CTSC-supported projects in WebCAMP, our local instantiation of a translational research activity tracking system used by >20 CTSA hubs, and manuscripts from the Overton database cited in policy documents. Human experts will evaluate the quality and accuracy of LLM-generated profiles. RESULTS/ANTICIPATED RESULTS: Preliminary results using Gemini 1.5 Pro indicate that LLMs can generate coherent and informative impact profiles encompassing diverse areas within the TSBM. Face validity appears satisfactory, suggesting the outputs align with expectations. We anticipate that further exploration with other LLMs and expert validation will reveal strengths and weaknesses of the LLM approach, including the potential for naccuracies ("hallucinations"), informing further refinement of models and prompting strategies. Analysis of manuscripts cited in policy will provide valuable insights into communicating policy-relevant benefits effectively, and benchmark comparisons will identify optimal LLMs for this use case. DISCUSSION/SIGNIFICANCE OF IMPACT: This project demonstrates LLMs' potential for streamlining and enhancing impact reporting in translational science, enabling broader dissemination of research outcomes and promoting better understanding among stakeholders. Future work will integrate LLM-based reporting into research infrastructure.

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Using the Delphi method to strategize about health AI

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OBJECTIVES/GOALS: Our goal was to determine whether a consensus exists around 1) what the main barriers to innovation in Health artificial intelligence (AI) are 2) where there are gaps in education and training in Health AI and 3) where in their workflows organizations should implement AI to see the most immediate impact on productivity. METHODS/STUDY POPULATION: We employed a three-round Delphi method survey to stakeholders with health and/or engineering expertise. The first round was open-ended to generate responses to the three research questions. The second round asked participants to rank the responses and provide feedback as to their reasoning. The third round provided aggregated results and feedback and asked participants to re-rank the responses. Participants were attendees at a conference that brought people with health and/or engineering backgrounds together to discuss innovation in Health AI. 55 people in total participated across the three rounds. RESULTS/ANTICIPATED RESULTS: Consensus emerged on all three questions: lack of trust was seen as the single greatest barrier to innovation, experience with implementation as the greatest gap in training, and automating health documentation as the point of most immediate impact. Consensus also emerged as to which of the 10–15 responses to each question were top priorities, which were somewhat significant, and which were not that important. Some of the rankings (such as implementation) seemed to reflect hot topics of discussion at the conference, but others (such as documentation) only emerged as significant in the surveys. DISCUSSION/SIGNIFICANCE OF IMPACT: We successfully employed the Delphi method to discover what stakeholders think about three important questions in Health AI. Interestingly, although we polled experts from both health and engineering backgrounds, their answers converged on all three questions.

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National trends in interventional clinical trial participation by race, gender, and age: Insights from EHR data on over 130 million patients

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OBJECTIVES/GOALS: To investigate interventional clinical trial participation overall and by race, gender, and age. METHODS/STUDY POPULATION: We used Epic Cosmos, an aggregated, de-identified EHR platform including over 270 million patients, to examine overall clinical trial participation and the race, gender,

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