POPULATION: We hypothesize that ignoring guideline-based alerts may be driven by discordances between clinical guidelines' deterministic realities and clinician' perception of clinical reality. Until now this has been very difficult to measure using quantitative methods. We argue that advances in Large Language Models (LLM) provide an avenue for exploring this quantitatively. Here we present the method and preliminary results comparing the responses of BioBERTT from a carefully designed set of questions when the LLM is fine-tuned using either formal guidelines or transcripts of clinicians discussing guidelines and clinical care in the parallel domain. The formal "distance" between the LLM responses is evaluated using quantitative metrics like the Hamming Distance. RESULTS/ANTICIPATED RESULTS: We present a description of the architecture used to prove or disprove our hypothesis. We will present results obtained when training the architecture with data that could be used to test the limits of our hypothesis, by fine-tuning BioBERT with diverse synthetic clinical views, either in agreement or disagreement with the formal guidelines. Results comparing sepsis guideline text with transcripts of interviews with Emergency Department clinicians discussing care practices for sepsis in the ED transcripts will also be considered. Our current emphasis is on securing a wider range of transcripts of clinicians interviewed from different clinical specialties and different clinical settings. While here we focus on clinical guidelines, the framework supports any intervention in the Clinical Implementation stage. DISCUSSION/SIGNIFICANCE: Leveraging recent advances in LLMs, we develop a framework that can quantitatively measure the differences between guidelines and clinician perception of best practices. We demonstrated the functionality of this approach using synthetic data and initiated the collection of clinician transcripts to test the framework in real clinical situations.

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Machine Learning to Predict Fluid Responsiveness in Hypotensive Children

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OBJECTIVES/GOALS: Fluid boluses are administered to hypotensive, critically ill children but may not reverse hypotension, leading to delay of vasoactive infusion, end-organ damage, and mortality. We hypothesize that a machine learning-based model will predict which children will have sustained response to fluid bolus. METHODS/STUDY POPULATION: We will conduct a single-center retrospective observational cohort study of hypotensive critically ill children who received intravenous isotonic fluid of at least 10 ml/kg within 72 hours of pediatric intensive care unit admission between 2013 and 2023. We will extract physiologic variables from stored bedside monitors data and clinical variables from the EHR. Fluid responsive (FR) will be defined as a MAP increase by ^{3}10%. We will construct elastic net, random forest, and a long short-term memory models to predict FR. We will compare complicated course (multiple organ dysfunction on day 7 or death by day 28) between: 1) FRs and non-FRs, 2) predicted FRs and non-FRs, 3), FRs and non-FRs stratified by race/ethnicity, and 4) FRs and non-FRs stratified by sex as a biologic variable. RESULTS/ANTICIPATED RESULTS: We anticipate approximately 800 critically ill children will receive 2,000 intravenous isotonic fluid boluses, with a 60% rate of FR. We anticipate being able to complete all three models. We hypothesize that the model with the best performance will be the long short-term memory model and the easiest to interpret will be the tree-based random forest model. We hypothesize non-FRs will have a higher complicated course than FRs and that predicted non-FRs will have a higher rate of complicated course than FRs. Based on previous adult studies, we hypothesize that there will be a higher rate of complicated course in patients of black race and/or Hispanic ethnicity when compared to non-Hispanic white patients. We also hypothesize that there will be no difference in complicated course when comparing sex as a biologic variable. DISCUSSION/SIGNIFICANCE: We have a critical need for easily-deployed, real-time prediction of fluid response to personalize and improve resuscitation for children in shock. We anticipate the clinical application of such a model will decrease time with hypotension for critically ill children, leading to decreased morbidity and mortality.

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Clinical Informatics for Head and Cancer Patient Management*

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OBJECTIVES/GOALS: The management of head and neck cancers is complicated and allows for a variety of disparate approaches from providers. However, data from several hundred or thousands of patients is necessary to decipher the optimal decisions for populations of patients. And prospective trials would take years to accrue and often are financially not possible. METHODS/STUDY POPULATION: Instead, we collated the entire electronic medical record for all patients at our institution treated for head and neck cancers. We employed a variety of clinical informatics and natural language processing to gather text data into large data frames. We found key conclusions in the diagnostic, treatment, and surveillance of our patients. RESULTS/ANTICIPATED RESULTS: First, obtaining post-operative PET/CT changes in management in over one-third of patients, highlighting the utility of optimizing diagnostic imaging. Second, using a newer silicone-based cream instead of just a moisturizer decreased the absolute risk of grade 2+ radiation dermatitis by almost 15%. Lastly, we are deploying novel autosegmentation frameworks to better understand tissue decomposition in the head and neck to identify patients in need of further nutritional support while undergoing radiation therapy. DISCUSSION/SIGNIFICANCE: Collectively, we showcase the value and opportunity of mining oncological data for the improvement of patient care.

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Discovering Subgroups with Supervised Machine Learning Models for Heterogeneity of Treatment Effect Analysis

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OBJECTIVES/GOALS: The goal of the study is to provide insights into the use of machine learning methods as a means to predict heterogeneity of treatment effect (HTE) in participants of randomized clinical trials. METHODS/STUDY POPULATION: Using data

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