

community. OBJECTIVES/GOALS: REDCap is a clinical research data collection platform that is primarily used as intended. However, little is known about its more novel uses, specifically in clinical decision support in patient care and in clinical research management. Thus, the purpose of this review is to examine peer reviewed literature identifying and describing such novel uses. METHODS/STUDY POPULATION: A systematic search was conducted in both PubMed and Google Scholar using the equation ((REDCap) OR ('Research Electronic Data Capture')) AND ((Clinical Trial Management) OR (Clinical Research)). Articles were screened by title, then abstract, and then were reviewed in full if they met inclusion criteria. Articles were included if they had potential relevance to the topic of REDCap or if they mentioned activities related to fields of clinical and translational science including operational support in areas such as clinical research management. Articles were excluded if they focused on common clinical research activities relating to data collection software such as survey administration, database building or data collection for clinical trials, registries, and cohort studies. RESULTS/ANTICIPATED RESULTS: The initial search yielded 390 results, of which 40 underwent an abstract review; only 8 of these underwent full text review. Of these, 5 discussed uses of REDCap in the context of operational support in clinical research management; 3 were related to clinical decision support in patient care. For the 5 articles focused on operational support in clinical research management, topics include e-consenting procedures, collection and storage of protected health information (PHI), patient recruitment and tracking stakeholder engagement. The 3 articles about clinical decision support discuss REDCap tools for generating risk predictions for post-surgical clinical outcomes, generating recommendations and STI test orders, and increasing efficiency in hand-offs to enhance care of surgical oncology patients. DISCUSSION/SIGNIFICANCE OF FINDINGS: Considering that only a small percentage of peer reviewed research reports out on novel uses of REDCap, there is a need for the REDCap consortium to do further work to fulfill its mission to adopt, innovate, and suggest novel uses of REDCap, thus expanding the understanding of its functionalities and therefore its utility in the research community.

41250

### Machine Learning to Identify Predictors of Iatrogenic Injury Using Empirical Bayes Estimates: A Cohort Study of Pressure Injury Prevention

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ABSTRACT IMPACT: A machine learning approach using electronic health records can combine descriptive, population-level factors of pressure injury outcomes. OBJECTIVES/GOALS: Pressure injuries cause 60,000 deaths and cost \$26 billion annually in the US, but prevention is laborious. We used clinical data to develop a machine learning algorithm for predicting pressure injury risk and prescribe the timing of intervention to help clinicians balance competing priorities. METHODS/STUDY POPULATION: We obtained 94,745 electronic health records with 7,000 predictors to calibrate a predictive algorithm of pressure injury risk. Machine learning was used to mine features predicting changes in pressure injury risk; random forests outperformed neural networks, boosting and bagging in feature selection. These features were fit to multilevel ordered logistic regression to create an algorithm that generated empirical Bayes estimates informing a decision-rule for follow-up based on individual risk trajectories over time. We

used cross-validation to verify predictive validity, and constrained optimization to select a best-fit algorithm that reduced the time required to trigger patient follow-up. RESULTS/ANTICIPATED RESULTS: The algorithm significantly improved prediction of pressure injury risk ( $p < 0.001$ ) with an area under the ROC curve of 0.60 compared to the Braden Scale, a traditional clinician instrument of pressure injury risk. At a specificity of 0.50, the model achieved a sensitivity of 0.63 within 2.5 patient-days. Machine learning identified categorical increases in risk when patients were prescribed vasopressors (OR=16.4,  $p < 0.001$ ), beta-blockers (OR=4.8,  $p < 0.001$ ), erythropoietin stimulating agents (OR=3.0,  $p < 0.001$ ), or were ordered a urinalysis screen (OR=9.1,  $p < 0.001$ ), lipid panel (OR=5.7,  $p < 0.001$ ) or pre-albumin panel (OR=2.0,  $p < 0.001$ ). DISCUSSION/SIGNIFICANCE OF FINDINGS: This algorithm could help hospitals conserve resources within a critical period of patient vulnerability for pressure injury not reimbursed by Medicare. Savings generated by this approach could justify investment in machine learning to develop electronic warning systems for many iatrogenic injuries.

67409

### Quantifying Unmeasured Confounding in Relationship between Treatment Intensity and Outcomes among Older Patients with Hodgkin Lymphoma (HL) using Surveillance, Epidemiology and End Results (SEER)-Medicare Data

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ABSTRACT IMPACT: E-values can help quantify the amount of unmeasured confounding necessary to fully explain away a relationship between treatment and outcomes in observational data. OBJECTIVES/GOALS: Older patients with HL have worse outcomes than younger patients, which may reflect treatment choice (e.g., fewer chemotherapy cycles). We studied the relationship between treatment intensity and 3-year overall survival (OS) in SEER-Medicare. We calculated an E-value to quantify the unmeasured confounding needed to explain away any relationship. METHODS/STUDY POPULATION: This retrospective cohort study of SEER-Medicare data from 1999-2016 included 1131 patients diagnosed with advanced stage HL at age  $\geq 65$  years. Treatment was categorized as: (1) full chemotherapy regimens ('full regimen',  $n=689$ ); (2) partial chemotherapy regimen ('partial regimen',  $n=175$ ); (3) single chemotherapy agent or radiotherapy ('single agent/RT',  $n=102$ ), or (4) no treatment ( $n=165$ ). A multivariable Cox regression model estimated the relationship between treatment and 3-year OS, adjusting for disease and patient factors. An E-value was computed to quantify the minimum strength of association that an unmeasured confounder would need to have with both the treatment and OS to completely explain away a significant association between treatment and OS based on the multivariable model. RESULTS/ANTICIPATED RESULTS: Results from the multivariable model found higher hazards of death for partial regimens (HR=1.81, 95% CI=1.43, 2.29), single agent/RT (HR=1.74, 95% CI=1.30, 2.34), or no treatment (HR=1.98, 95% CI=1.56, 2.552) compared to full regimens. We calculated an E-value for single agent/RT because it has the smallest HR of the treatment levels. The observed HR of 1.74 could be explained away by an unmeasured confounder that was associated with both treatment and OS with a HR of 2.29, above and beyond the measured confounders; the 95% CI could be moved to include the null by an unmeasured confounder that was associated with both the treatment and OS with a HR of 1.69. Of the

measured confounders, B symptoms had the strongest relationship with treatment (HR=2.08) and OS (HR=1.38), which was below the E-value. **DISCUSSION/SIGNIFICANCE OF FINDINGS:** Patients with advanced stage HL who did not receive full chemotherapy regimens had worse 3-year OS, even after adjusting for potential confounders related to the patient and disease. The E-value analysis made explicit the amount of unmeasured confounding necessary to fully explain away the relationship between treatment and OS.

## Digital Health/Social Media

### Data Science/Biostatistics/Informatics

28561

#### Optimization of Heart Failure Treatment Using a Novel Application Programming Interface (API)

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**ABSTRACT IMPACT:** This project will aid in the optimization of treatment for those with heart failure with a reduced ejection fraction in order to both maximize health benefits and minimize financial burdens. **OBJECTIVES/GOALS:** To evaluate the accuracy and clinical applicability of a novel web-based application programming interface in the optimization of care for patients being treated for heart failure with reduced ejection fraction (HFrEF). The purpose of this validation is to ensure the translatability of this algorithm to a clinical setting using real-world data. **METHODS/STUDY POPULATION:** This study is a retrospective analysis of a previously created algorithm designed to optimize therapy for patients currently diagnosed with HFrEF. Patients that are seen for HFrEF treatment at Michigan Medicine are enrolled in a heart failure registry and were included in this study. Exceptions include those with heart transplants, LVAD, and those undergoing treatment with chronic inotropes (milrinone/dobutamine). Clinically relevant information (demographics, vital statistics, labs, and medications including dose and frequency) was taken from their respective electronic health record (EHR) and this data was used as the input for the algorithm. The therapy recommendations were collected and manually compared to the 2017 ACC/AHA/HFSA guidelines to verify the accuracy of the algorithm outputs. **RESULTS/ANTICIPATED RESULTS:** Data is currently being collected and analyzed. At first glance, our algorithm has been successful at detecting patients that are good candidates for therapy optimization. Based on inputs given, the treatment recommendations have been appropriate when compared to the most up-to-date HF treatment guidelines. The algorithm has also correctly identified levels of urgency for therapeutic recommendations. Finally, we have also shown the algorithm to have effectiveness for identifying areas of inappropriately adjusted therapy. Preliminary results have led to changes to the functionality of the algorithm, including how medications are retrieved from the EHR's and how medication doses are identified. Previous iterations created discrepancies in dosing and the algorithm has since been adjusted. **DISCUSSION/SIGNIFICANCE OF FINDINGS:** By verifying its validity, our algorithm can accurately flag patients with HFrEF that are eligible for therapy optimization and give providers the opportunity to make appropriate changes. Given the high health and financial burdens of HFrEF, our algorithm has the ability to provide significant morbidity, mortality, and financial benefits.

## Dissemination and Implementation

95262

#### Making telehealth accessible for patients who are visually impaired: A scoping review

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**ABSTRACT IMPACT:** By outlining telehealth access disparities in the vision-impaired population, this scoping review has identified a set of effective and clinically appropriate implementation strategies and interventions for improving the technical, provider-level, and system-level accessibility of telehealth for vision-impaired patients. **OBJECTIVES/GOALS:** Evidence-based recommendations that ensure telehealth access for vision-impaired patients are critical to reducing health disparities. This review identifies, evaluates, and proposes strategies for public and private sector stakeholders to increase telehealth access for vision-impaired patients during the pandemic and beyond. **METHODS/STUDY POPULATION:** This scoping review included five steps: 1) the implementation of an iterative search strategy using relevant keywords to query 4 electronic databases (PubMed, Cochrane, Google Scholar, and Europe PMC) for relevant articles, 2) the application of a set of inclusion criteria to filter database results for article evaluation, 3) a quality assessment of the articles retained, 4) the extraction and summary of data from each assessed article, and 5) a narrative synthesis of the qualitative literature reviewed. **RESULTS/ANTICIPATED RESULTS:** To date, 21 articles that fit the inclusion criteria, published between 2006 and 2020, have been identified. To ensure the most robust collection of existing literature is aggregated, the iterative search strategy and inclusion criteria sorting process will be underway until December 20. The assessment of articles, and extraction and summary of data contained within said articles, will be finalized on January 20. The narrative synthesis will be complete on February 1. The poster and abstract will be complete by February 20. **DISCUSSION/SIGNIFICANCE OF FINDINGS:** Future research should examine outcomes associated with the implementation of accessible telehealth programs to identify remaining barriers. To improve outcomes for vision-impaired patients, policymakers, providers, payers, and industry must collaborate to promote accessibility in telehealth design and implementation.

## Health Equity & Community Engagement

14820

#### Mental Health Mobile App Use in Integrated Primary Care Settings: Considerations for Serving Underserved Patients

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**ABSTRACT IMPACT:** Mobile app may help improve the depression symptoms among underserved patients **OBJECTIVES/GOALS:** Depression is one of most common mental health conditions and the leading cause of disability worldwide, affecting about one in 10 adults in the US. The aim of this study was to explore the factors that affect feasibility of incorporating mobile app self-management