OSF Innovation develops AI mortality predictor to help identify those who may benefit most from end-of-life care discussions

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(August 31, 2023 | Peoria, Ill.) – Recent research shows that only 22% of Americans have documented their end-of-life wishes for healthcare. Healthcare professionals need that information to ensure that every patient receives their desired end-of-life care.

Peoria-based OSF HealthCare has made it a top priority to ensure that every patient has an advanced care plan so that end-of-life care can be compassionately provided to every patient according to their individual needs and values. To advance that goal, OSF actively trains clinicians to become more capable and comfortable in having those conversations, and they're encouraging providers to have those discussions earlier before an end-of-life crisis occurs.

OSF's clinical leadership sought to encourage these conversations in a timely manner. To meet this need, OSF Innovation researchers developed a new AI model to predict death in the 5-90 days after the start of an inpatient admission. This timeframe was chosen to be early enough to give clinicians time to have these crucial discussions, yet late enough that clinicians would recognize the urgency of the need.

The research team, led by OSF Senior Fellow for Innovation, Jonathan Handler, MD, then assessed the predictor on a dataset of more than 75,000 inpatient visits for its overall performance and to determine if the performance was equitable across genders, races and ethnicities, levels of socioeconomic advantage, and rurality. Performance of AI predictors often worsens over time as medical care, populations, and diseases change. To assess for this, the team also evaluated performance before and during the COVID-19 pandemic, perhaps one of the most significant changes to the healthcare environment in recent memory.

The team's recently published, peer-reviewed research indicates that the AI could be set to identify more than half of those who died soon (within 5-90 days) after their inpatient admission. The overall near-term mortality rate for included patients was about 1 in 12, whereas the near-term mortality rate for those with a positive prediction at that setting was approximately 3 times higher, at about 1 in 4. Model performance remained consistent and did not degrade over time, with nearly identical performance in the pre-COVID-19 and during-COVID-19 study periods. Finally, the model performed equitably in most demographic groups when compared to all included patients. The few statistically significant differences were not consistently significant across the two studied time periods.

Dr. Handler points out the AI was trained on a Midwestern, mixed-rurality population, so it might be useful for similar health systems.

> "Unlike many machine learning predictive models that may use thousands of data inputs, ours uses only 13 data inputs, each derived from commonly available data elements. That may simplify implementation and user training." -Dr. Jonathan Handler

He adds, "Our prediction tool also lists the contributing factors and their importance to each prediction to help clinicians better assess and understand the predictions."

The system has already been implemented at OSF to provide decision support for its clinicians. Going forward, the team hopes to analyze to what extent the mortality predictions actually prompted care teams to initiate end-of-life planning discussions. Dr. Handler believes researchers also have opportunities to further enhance performance and then reassess for the presence of bias in various populations.

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