CHIDS RESEARCH PROJECT BRIEF

Promoting Better Pain Management Outcomes: Precision Decision Support for Opioid Prescription

3-minute read quick brief

This brief provides a quick download of the results from the above-titled research project, which was completed by a research team affiliated with the Center for Health Information & Decision Systems at the Robert H. Smith School of Business.

Problem. Chronic opioid use (COU) has been linked with many serious negative outcomes, including addiction, overdose and health problems. The net impact of COU on a given patient's health – beneficial, adverse, or neutral – may be difficult to determine before prescribing opioids and is affected by many unobservable factors.

Opportunity. Decision support systems can support treatment judgments, however the primary, current approach to relevant decision support relies on static clinical guidelines that allow limited personalization, which cannot fully support individualized care.

Goal. Build unbiased predictive models using modern analytics capabilities to inform pain management treatment choices and improve the predictability of COU. These methods may serve as a foundation for clinical decision support systems and influence information rich prescriber behaviors.

Data and Methods. A wide array of prediction models, from the simple to the more complex, were evaluated while investigating the trade-off between interpretability and model performance. We developed and validated predictive methods for the initiation of COU by conducting a retrospective cohort study using data on all persons who served in a particular military branch during 2011 to 2014.

Key Takeaways

♦ The accuracy of models in the first three months of use, especially in the second and third months of use, are good enough to encourage a detailed discussion between the physician and the patient about potential risks and alternative course of treatments for the highest risk patients. Physicians should be especially wary of prescribing opioids for the patients scored as highest risk for COU.

♦ Our analysis using state-of-the-art prediction methods for COU risk found that in terms of predictive accuracy, adaptive boosting and logistic regression out-performed LASSO and random forests given our data structure.

♦ Prescribing an initial opioid supply that exceeds 7 days raises the risk of COU significantly. Providers should seek to prescribe at the clinically necessary minimum quantity/duration.

♦ The presence of a psychotropic prescription, in general, signals high risk of potential COU and prescribers should take extra caution.

♦ A decision support system for COU to inform clinical judgment in general should be set to focus on the highest risk patients, corresponding to a relatively small sensitivity value (such as between 5-10%).

♦ Policies that can bring about a change in prescribing behavior have the potential of reducing costs and improving quality of life. At plausible price points, such policies would be cost-effective.

For more details on findings and resources, please visit the project webpage at go.umd.edu/opioidsdss.

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