CASE STUDY

Improving Chronic Disease Detection Using Artificial Intelligence (AI)

Cedar Gate experts teamed up with the State of Montana to determine if the use of AI could lead to earlier, more accurate detection of diabetes mellitus in their population.

BUSINESS CHALLENGE

The client wanted to understand how they could use AI to improve their current programs and identification of members with diabetes. They currently use tools that apply rule-based logic to medical claims in order to identify members with the disease. This traditional method relies on a number of assumptions that can lead to inaccurate analysis, such as missed diagnoses and misclassification of members.

- **FALSE NEGATIVE (missed diagnosis) example**: A new employee with diabetes enrolls in the health plan, but hasn't yet received diabetes-specific care at a doctor's office. They would not have a claim with a diabetes-related diagnosis code and thus would be missed in a rule-based analysis. (Patients with this profile are at risk for poor disease control, including high glucose levels and missed quality measures).
- **FALSE POSITIVE (misclassification) example:** A member visits a doctor for possible diabetes-related symptoms and receives a glucose test, which returns normal results that rule out diabetes. A rule-based analysis could pick up a diagnosis for the glucose test as a diabetes-related claim and incorrectly classify the member as having diabetes.

Until now, there's been limited opportunity to independently determine the accuracy of the existing standard for identifying members with chronic disease.

According to the CDC, More than 20M Americans have diabetes and an estimated 1 in 4 don't even know they have it. The ability to accurately diagnose chronic diseases earlier leads to better health outcomes for members and alleviates resource strains on organizations. ***Organizations looking to run effective programs to decrease hospitalizations and spend resources where they are needed most must be able to accurately identify members with chronic disease.***

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ANALYSIS

Cedar Gate and the State analyzed claims for 28,888 members to compare the accuracy of analysis using traditional rule-based logic versus AI to identify members with diabetes. The AI model used computer algorithms to look at claims to determine if patterns in the structure and features of a member's health history were consistent with a diabetes diagnosis. A physician audited the initial results and worked with the Cedar Gate product development team to refine the computer algorithms to maximize the model's diagnostic power. Clients have the ability to adjust the output based upon the level of analysis they wish to conduct.

THE RESULTS

Out of 28,888 members, the business rules logic classified 2,011 total members as having diabetes. Using AI, it was determined 131 members were likely incorrectly classified. Out of 2011, 87 were false positives, meaning they likely didn't have diabetes, 44 members were false negatives and were missed altogether, but likely had diabetes, and 1,924 members were classified correctly.

87 FALSE POSITIVES
44 FALSE NEGATIVES
1,982 CLASSIFIED CORRECTLY

CONCLUSION

AI can predict the likelihood a member has a chronic disease, such as diabetes, with a high degree of accuracy. This is animprovement over using only rules-based logic, which has been shown to have significant limitations. Organizations should supplement traditional models with AI to avoid missed opportunities and misdirection of efforts and resources to manage individuals that don't have the disease.

THE ANALYSIS

The State of Montana can use this information to make critical decisions around program refinement (e.g., outreach, disease management, and case management), quality measurement, and resource use. This will enable them to act sooner and intervene with members earlier, leading to better overall health management and more efficient utilization of services. This information will also give them a better framework by which to assess the overall costs of their plan as well as a foundation for conversations around rate and contract negotiation.

***A DEEPER LOOK (possible explanations for misclassification):** claim and coding errors were found that generated false positives, including (1) a patient with diabetes insipidus miscoded as having diabetes mellitus, (2) a pharmacy error that generated a single claim for insulin that was later reversed, and (3) an unconscious patient, initially treated by paramedics and coded with hypoglycemia, later determined to have an alternate diagnosis once the medical evaluation was complete.*

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