

Study uses electronic health record data to assess metformin failure risk, optimize care

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A recent Mayo Clinic study published in the *Journal of Clinical Endocrinology & Metabolism* has found that using machine learning and electronic health record (EHR) data can help pinpoint patients with type 2 diabetes who are at high-risk of experiencing metformin failure.

Metformin is a widely used medication for treating [diabetes](#); however, it is not always effective in controlling blood sugar levels. Although it is the first line of therapy used for treatment, [metformin](#) has an estimated failure rate of 35%.

"What we wanted to do within this study was to identify a diverse group of patients at high risk of failure," says Suzette Bielinski, Ph.D., a professor of epidemiology at Mayo Clinic College of Medicine and Science, who is also the study's lead author.

The study assessed patient populations at the University of Mississippi Medical Center, Mountain Park Health Center in Arizona and the Rochester Epidemiology Project (REP). REP is a medical records-linkage system in Minnesota that links EHR data gathered by local health care professionals throughout the region for research use over the past 50 years.

The project analyzed clinical data in the EHR systems with [machine learning](#) to help determine demographics and clinical predictors of metformin failure. Machine learning is a subfield of artificial intelligence that uses algorithms and statistical models to allow a system to make predictions or decisions.

Researchers found that specific health indicators, including hemoglobin

A1c levels, a measure of long-term blood sugar control, were associated with a higher risk of an ineffective outcome of metformin treatment. Older age, higher potassium levels, triglycerides and a higher heart rate were also predictive markers. Another factor in determining a positive outcome was the amount and timing of health care utilized.

The authors point out that, approximately 26 million U.S. adults have been diagnosed with type 2 [diabetes mellitus](#), more commonly known as diabetes. Also, 91.8 million have elevated glucose, a precursor for potentially having the condition in the future. The prevalence of diabetes in the U.S. is twice as high in African Americans and 35% higher in Latinos than in whites.

However, according to Dr. Bielinski, researchers found that when the baseline for hemoglobin A1C was controlled, there was no difference based on race and ethnicity with failure rates.

With metformin being one of the most widely prescribed medications for type 2 diabetes, the study provides a means for health care professionals to identify patients needing more intensive treatment or closer monitoring. Dr. Bielinski notes that the study demonstrates how EHR data can help optimize patient care. By identifying these high-risk patients, [health care professionals](#) can take steps to improve treatment and outcomes through innovative practices in personalized medicine and predictive modeling.

More information: Suzette J Bielinski et al, Predictors of Metformin Failure: Repurposing Electronic Health Record Data to Identify High-Risk Patients, *The Journal of Clinical Endocrinology & Metabolism* (2023). [DOI: 10.1210/clinem/dgac759](https://doi.org/10.1210/clinem/dgac759)

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