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# Title

*Identifying the Factors Associated with the Accumulation of Diabetes Complications to Inform a Prediction Tool* 

# Priority 1 (Research Category)

**Big Data** 

### Presenters

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### Abstract

Context: Complications account for morbidity attributable to type 2 diabetes mellitus (T2DM). While preventable, many fail to receive timely treatment in primary care, leading the sickest to accumulate complications.

Objective: To identify the factors associated with the accumulation of T2DM complications

Study Design and Analysis: We assessed baseline (2016) characteristics associated with changes in the Diabetes Complications Severity Index (DCSI; which captures the number and severity of complications) during the study period (2016-2020).

Population Studied: Adults aged 46 years and older with T2DM enrolled in a Medicare Advantage plan

Setting or Dataset: Enrollment and medical and pharmacy claims data (2016-2020) from a national insurer

Measures: The dependent variable was change in DCSI. Independent variables included demographics (age, sex, race/ethnicity, insurance plan), geography (state, rural vs. non-rural), comorbidities, utilization, Healthcare Effectiveness Data and Information Set diabetes measures, and medication

adherence. We used four MANOVA and generalized linear models with a progressively expanding set of variables, including demographics (model 1), comorbidities (model 2), utilization (model 3), and quality measures (model 4).

Results: We included 19,445 individuals in model 1 and 5,407 individuals in model 4. All four models showed a consistent relationship between age and DCSI progression (coeff=-0.31, SE=0.07, 46-64 year age group, model 4). In model 3, female sex was associated with a decrease in DCSI (coeff=-0.09, SE=0.03), while non-rural status (coeff=0.11; SE=0.04) was associated with an increase in DCSI and state of residence (F=1.55; p=0.01) was significant. Comorbidities (e.g., heart failure, cardiovascular disease, and chronic kidney disease) were associated with decreases in DCSI, suggesting a ceiling effect for severely ill patients. Inpatient admissions were associated with a decrease in DCSI (coeff=-0.17, SE=0.05) while the Medicare Risk Score was associated with an increase in DCSI (coeff=0.08, SE=0.04).

Conclusions: Younger age, female sex, rural status, certain comorbidities, and hospital admissions in 2016 were associated with decreases in DCSI. These results will inform a tool for primary care that uses artificial intelligence/machine learning to predict those individuals at high risk for diabetes progression.