

One Year Follow-up of Medicare Advantage Patients with Type 2 Diabetes and an Initial Elevated HbA1c Value

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- 1. Humana, Inc.
- 2. Humana, Inc. at the time of the study

Background

Hemoglobin A1c (HbA1c) control (<8.0%) among persons with type 2 diabetes mellitus (T2DM) is an important measure of disease management and clinical quality. Achieving and maintaining HbA1c levels less than 8.0% has been associated with reduced incidence of microvascular complications, placing urgency on patients who receive an uncontrolled HbA1c lab result (8.0%+)¹ to return to controlled levels. Understanding the likelihood of a patient returning to a controlled HbA1c level and the drivers of a return to control will allow for improved targeting of health system resources.

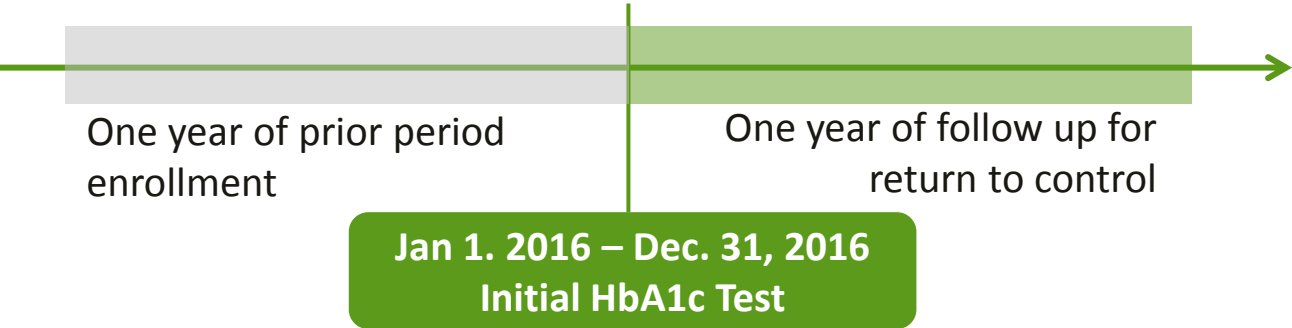
Objective

This study aims to characterize the proportion of patients returning to HbA1c control within a one year period after an uncontrolled result. Factors associated with slower return to control are also identified.

Methods

Study Design: Retrospective cohort

Figure 1. Study Design



Study Sample: Health plan individuals with a large, national health and wellness company enrolled in a Medicare Advantage HMO plan

Inclusion Criteria:

- Residing in Florida with a diagnosis of T2DM
- Recorded HbA1c lab value greater than or equal to 8.0% in 2016²
- Attributed to a globally capitated provider
- At least one year of continuous coverage prior to the uncontrolled result and were followed until disenrollment, death, or a controlled HbA1c lab value (<8.0%), up to a maximum of 365 days

Analysis:

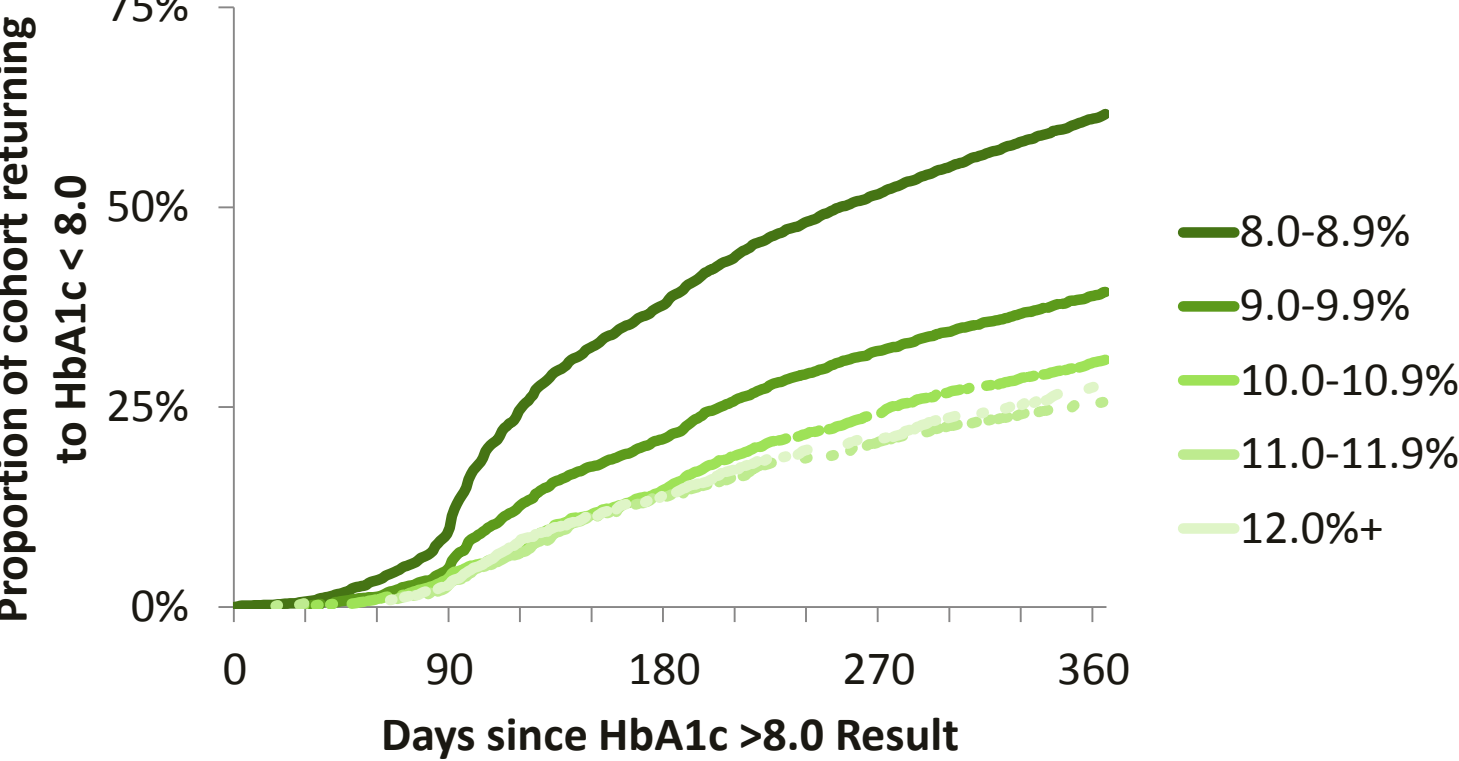
- All data cleaning and analyses were performed using SAS.
- Factors significantly associated with return to HbA1c compliance over one year and also satisfying the proportional hazards assumption were identified using log-rank tests and visual inspection of log-log survival curves.
- Multivariate Cox regression stratified by initial HbA1c value (8.0-8.9%, 9.0-9.9%, 10.0-10.9%, 11.0-11.9%, 12.0%+) was used to assess the adjusted proportion of persons returning to control over the one year follow up period. Forward selection was used to identify significant confounders to initial HbA1c.
- Multivariate Cox regression not stratified by initial HbA1c was performed to generate a plot of driving factors. Forward selection was used to identify significant confounders to initial HbA1c.
- Confounders in the models included: demographic factors (10-year age bands, sex, race), plan characteristics (Medicare entitlement, low income subsidy, special needs plan enrollment), current and historic supply of insulin, and comorbidities as defined by the CMS-HCC risk adjustment model³ using data from 2015.
- Proportional hazards assumptions of the final models were checked using an assessment of Schoenfeld residual plots.

Results

Table 1. Patient Characteristics

Characteristics	Overall	Initial HbA1c 8.0-8.9%	Initial HbA1c 11.0%+
N	28,026	16,453	2,867
Demographics			
Mean Age (SD)	71.9 (9.4)	72.9 (8.8)	68.7 (10.3)
% Female	50.8%	51.1%	51.5%
Race: % White/Caucasian	57.4%	59.8%	49.2%
Race: % Black/African American	26.7%	24.2%	36.6%
Race: % Hispanic	9.9%	9.9%	9.1%
Diabetes Characteristics			
Initial HbA1c 8.0-8.9%	58.7%	100%	-
Initial HbA1c 9.0-9.9%	21.1%	-	-
Initial HbA1c 10.0-10.9%	10.0%	-	-
Initial HbA1c 11.0%+	10.2%	-	100%
Insulin use within last year	28.8%	24.1%	33.9%
Plan Characteristics			
Medicare Eligibility due to Disability	32.3%	28.3%	42.8%
Low Income Subsidy Recipient	42.4%	39.4%	50.5%
Special Needs Plan (SNP) Enrollee	32.4%	30.3%	38.5%
HCC Comorbidities			
Diabetes with Chronic Complications	66.2%	66.8%	61.8%
Vascular Disease	40.9%	42.1%	35.4%
Specified Heart Arrhythmias	11.0%	11.5%	8.8%
Coagulation Defects and Other Specified Hematological Disorders	7.8%	8.1%	6.6%
Rheumatoid Arthritis and Inflammatory Connective Tissue Disease	5.9%	6.0%	5.7%

Figure 2. Stratified Cox Regression Assessing Return to Compliance by Initial HbA1c



Cohorts with higher initial HbA1c measurement had a lower likelihood of return to control within a one year period

Figure 3. Cox Regression Assessing Factors Associated with Return to Compliance



Diabetes related complications and vascular conditions, as well as disability status, were also associated with lower return to HbA1c control.

Conclusions

- Evidence suggests that Medicare Advantage patients with T2DM and HbA1c lab values above 8.0% experience difficulties returning to control in a one year period if their initial result is over 9.0%
- Results also suggests that both acute and micro - and macrovascular complications of diabetes are associated with a lower return to control.

Limitations

- Limitations common to claims data apply to this study (e.g., coding errors, missing data, fixed variables).
- Laboratory HbA1c results may not have been received, or may have been received with a lab result value that could not be incorporated into the analysis.
- Diagnosis of T2DM patients were identified to the extent such information was available from administrative claims.
- Patients were from a single health plan in Florida and may not be generalizable to broader populations.
- Unmeasured confounding variables may have had an impact on patient outcomes.

References

1. National Committee for Quality Assurance. Comprehensive Diabetes Care. 2017. <https://www.ncqa.org/report-cards/health-plans/state-of-health-care-quality/2017-table-of-contents/diabetes-care>
2. LOINC codes for HbA1c lab values: 43150-2, 41995-2, 17855-8, 55454-3, 17856-6, 4548-4, 4549-2, 59261-8, 62388-4, 71875-9
3. Centers for Medicare and Medicaid Services Risk adjustment information: <https://www.cms.gov/Medicare/Health-Plans/MedicareAdvtgSpecRateStats/Risk-Adjustors.html>