

The Relationship Between HbA1c Reduction and Costs: A Cohort Study of Patients with Type 2 Diabetes

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BACKGROUND AND OBJECTIVE

Background

- The American Diabetes Association (ADA) recommends a HbA1c target of 7% for most adults¹, while the Healthcare Effectiveness Data and Information Set (HEDIS) defines poor control as HbA1c greater than 9%.²

Objective

- To examine the relationship between HbA1c reduction and 2-year medical costs among patients with type 2 diabetes (T2D).

STUDY DESIGN

Retrospective Cohort Study

- The study utilizes data from the IBM MarketScan® databases from January 1, 2013 through December 31, 2017.

Identified with T2D and Receipt of At Least 1 HbA1c Test Result from 7/1/13 – 12/31/15 (identification window*), with first such HbA1c Result Identified as Index Date
N=257,408

No Diagnosis of Pregnancy from 6 Months Prior (pre-period) through 2 years post (post-period) index date
N=255,351

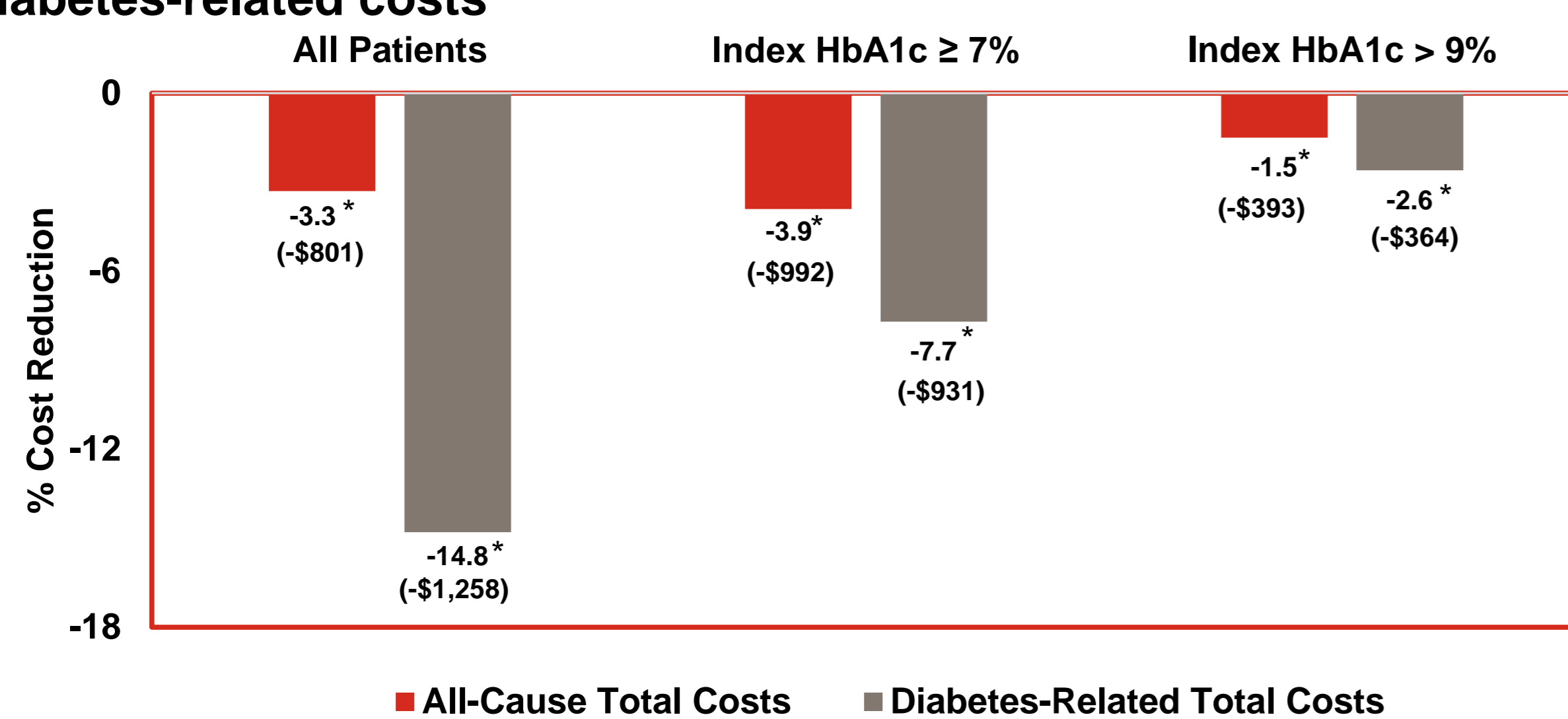
Age 18 or Older as of Index Date and At Least 1 Additional HbA1c Result in the First Year of the Post-Period
N=143,642

Continuous Insurance Coverage From the Start of the Pre-Period Through the End of the Post-Period
N=79,393

* Identification window (7/1/13-12/31/15) determined by duration of data (1/1/13-12/31/17), and requirement of 6-month pre-period and 2-year post-period

KEY RESULT

For all patients and patients whose index HbA1c $\geq 7\%$ or $> 9\%$, a 1% reduction in HbA1c was associated with significant reductions in 2-year all-cause and diabetes-related costs



* Reduction in cost is statistically significant (P<0.05)

Results from multivariable analyses that control for patient characteristics, and pre-period general health, comorbidities, resource utilization, medication use and index HbA1c

Sample sizes: All patients - N=79,393; Index HbA1c $\geq 7\%$ - N=35,814; Index HbA1c $> 9\%$ - N=10,824

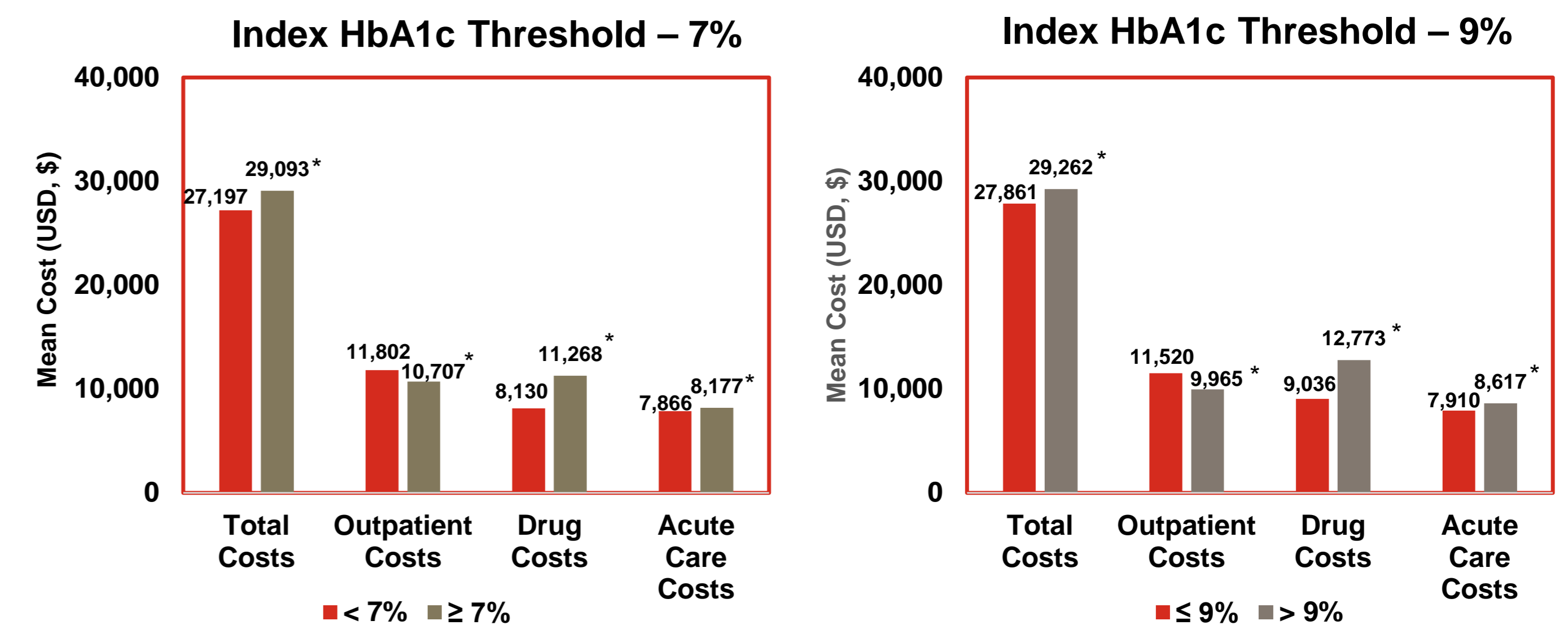
Methods

- The research focuses on the association between HbA1c and costs.
 - Patients were classified based upon their HbA1c value at index date.
 - Costs were measured by gross payments to a provider for a service and were converted to 2017 dollars using the medical component of the consumer price index.
 - Both all-cause and diabetes-related costs were considered and each of these cost components were categorized into drug costs, outpatient costs and acute care (inpatient and emergency room) costs.
- Generalized linear models with gamma distribution and log link were used to examine total costs, drug costs and outpatient costs, while two-part models were used to estimate acute care costs.
 - All models controlled for patient characteristics, pre-period general health, comorbidities, resource utilization, medication use and index HbA1c.

Methods (continued)

Differences in 2-Year All-Cause Costs Based Upon Index HbA1c

- Patients whose index HbA1c was $< 7\%$ or $\leq 9\%$ have significantly lower total 2-year all-cause costs compared to patients with index HbA1c $\geq 7\%$ or $> 9\%$, respectively

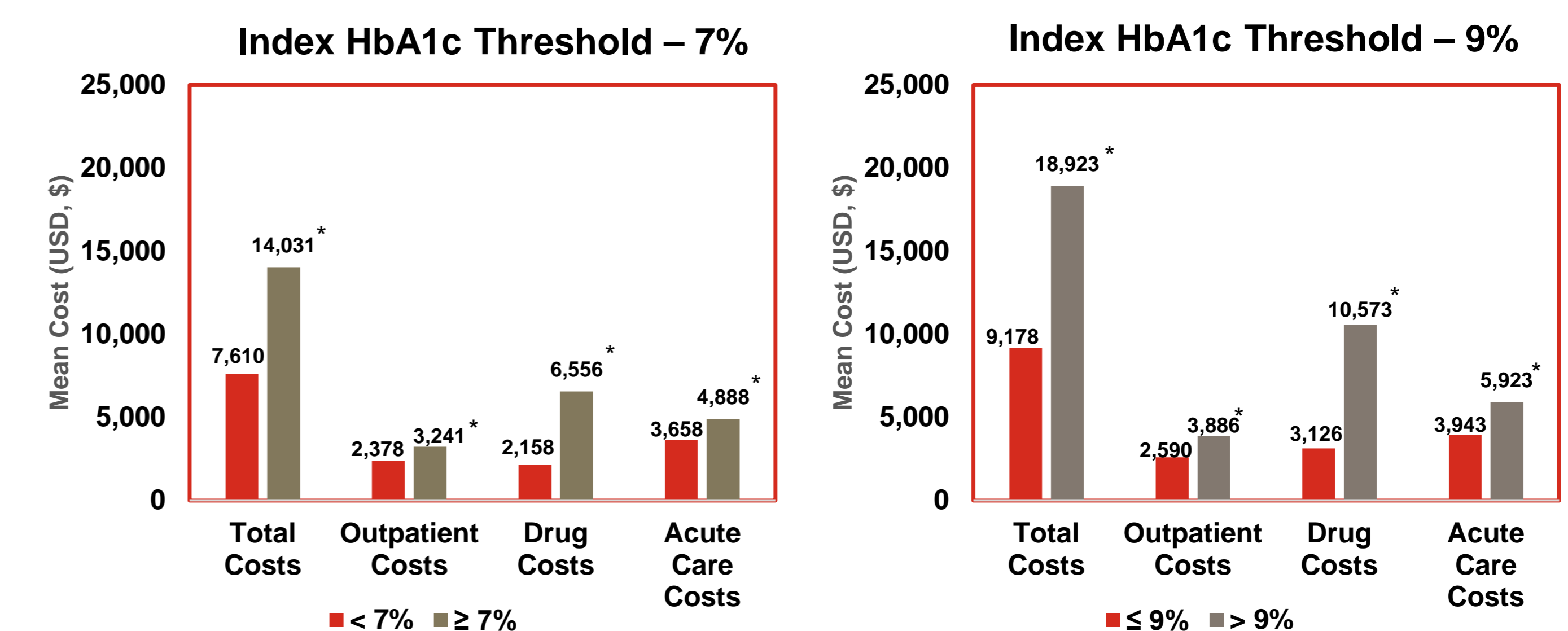


* Difference is statistically significant (P<0.05)

Results from multivariable analyses that control for patient characteristics, and pre-period general health, comorbidities, resource utilization, medication use and index HbA1c

Differences in 2-Year Diabetes-Related Costs Based Upon Index HbA1c

- Patients whose index HbA1c was $< 7\%$ or $\leq 9\%$ have significantly lower total 2-year diabetes-related costs compared to patients with index HbA1c $\geq 7\%$ or $> 9\%$, respectively



* Difference is statistically significant (P<0.05)

Results from multivariable analyses that control for patient characteristics, and pre-period general health, comorbidities, resource utilization, medication use and index HbA1c

Study Strengths and Limitations

- Study included a relatively large cohort of patients with T2D (N=79,393) and examined a wide range of HbA1c thresholds in order to examine robustness of results to alternative HbA1c targets.
- Data focused on patients who were relatively well-insured; as such, may not be generalizable to the entire U.S. population.
- Study relied on diagnostic codes provided in retrospective data and such criteria may not be as rigorous as clinical evaluations of patients.
- Study required that patients have multiple recorded HbA1c tests in the 1st year of the post-period; this requirement eliminates a relatively large proportion of patients who may differ significantly compared to our final cohort.

CONCLUSIONS

- For all patients and those with an index HbA1c $\geq 7\%$ or $> 9\%$, a 1% reduction in HbA1c is associated with significant reductions in 2-year all-cause costs and diabetes-related costs.
 - For all patients, a 1% reduction in HbA1c was associated with a 3.3% reduction in all-cause costs and a 14.8% reduction in diabetes-related costs.
 - For patients with an index HbA1c $\geq 7\%$ or $> 9\%$, a 1% reduction in HbA1c was associated with a 3.9% and 1.5% reduction in all-cause costs and a 7.7% and 2.6% reduction in diabetes-related total costs, respectively.
- Higher index HbA1c was associated with significantly higher 2-year all-cause and diabetes-related total costs.
- Results of this study suggest that there are significant economic benefits associated with reducing HbA1c.

References

- American Diabetes Association. Diabetes Care 2019;42(1):S61-S70.
- National Committee for Quality Assurance. <https://www.ncqa.org/hedis/measures/comprehensive-diabetes-care/>. 2019.