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What's the Difference between the Pre-DC and Pre-AH Models?
September 2022

As of October 2022, MDPCP-participating practices will be able to access multiple sets of risk scores for their patient panel. As before, practices will be able to access risk scores based on the **Pre-AH Model™**, which estimates individuals' risk of incurring an avoidable hospital event in the near future. Now, however, practices will also be able to access risk scores for their entire patient panel based on the **Pre-DC Model™**, which estimates individuals' risk of incurring inpatient admissions or emergency department (ED) visits for severe complications of type 2 diabetes.

Both the Pre-AH Model™ and the Pre-DC Model™ include diabetes complications in the outcome that is predicted; however, the predicted outcome differs significantly across the two models, and the resulting risk scores are statistically distinct. This document is intended to explain the differences between these two models and sets of risk scores.

Differences in Outcome Definition

The Pre-AH outcome (that is predicted by the Pre-AH Model™) is a composite of 10 conditions (prevention quality indicators, or PQIs) determined to be potentially preventable with high-quality outpatient care by the Agency for Healthcare Research and Quality (AHRQ):[1]

- PQI #1: Diabetes Short-Term Complications
- PQI #3: Diabetes Long-Term Complications
- PQI #5: COPD or Asthma in Older Adults
- PQI #7: Hypertension
- PQI #8: Heart Failure
- PQI #11: Community Acquired Pneumonia
- PQI #12: Urinary Tract Infection
- PQI #14: Uncontrolled Diabetes
- PQI #15: Asthma in Younger Adults
- PQI #16: Lower-Extremity Amputation among Patients with Diabetes

These PQIs are intended to serve as a high-level check of primary/outpatient care access in a community and to help organizations identify potentially unmet needs in their communities.

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[1] For more information, see https://www.qualityindicators.ahrq.gov/modules/pqi_resources.aspx

The Pre-AH outcome indexes—among other non-diabetes-related conditions—uncontrolled diabetes, as well as complications from type 1 diabetes, type 2 diabetes, and other forms diabetes (e.g., gestational diabetes) regardless of severity.

In comparison, the Pre-DC outcome is based on the Diabetes Complications Severity Index (DCSI), which quantifies the *severity* of diabetes complications across seven domains of complications: [2]

- Retinopathy
- Nephropathy
- Neuropathy (no severe complications in this domain)
- Cerebrovascular Complications
- Cardiovascular Complications
- Peripheral Vascular Disease
- Metabolic Complications

The DCSI is not optimized to capture preventability; instead, it is designed to quantify severity based on patients' risk for adverse medical outcomes, including future medical needs, high treatment costs, hospitalizations, and mortality. Although the DCSI can measure non-severe and severe complications from all forms of diabetes, we focused on severe complications related to type 2 diabetes only for the Pre-DC Model™.

To further understand the distinction between the Pre-AH and Pre-DC outcomes, we quantified the overlap in the ICD-10 diagnosis codes included in each outcome. See Table 1.

Table 1. Breakdown of ICD-10 Diagnosis Codes, by Model

Breakdown of ICD-10 Diagnosis Codes	
Overlapping	*N*=36
Unique to Pre-AH Outcome	*N*=244
Unique to Pre-DC Outcome	*N*=491

Statistical Differences

To confirm that the Pre-DC outcome was statistically distinct from the Pre-AH outcome, we calculated the correlation between the Pre-AH and Pre-DC outcome frequency and risk scores in the MDPCP scoring data (y4q3m8). See Table 2.

Table 2. Event and Risk Score Correlation, by Model

AH & DC Event Correlation	AH & DC Risk Score Correlation
r = 0.268	*r* = 0.647

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[2] Young et al. (2008). In *The American Journal of Managed Care*, *14*(1), 15–23.

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Additionally, we compared the Pre-DC risk score rank of beneficiaries with the highest Pre-AH risk scores (and vice versa) to understand whether the same beneficiaries had the highest risk in both models (Table 3). We found that beneficiaries with higher Pre-DC risk generally have high Pre-AH risk; however, beneficiaries with higher Pre-AH risk do not necessarily have high Pre-DC risk. Therefore, these two models are picking up on different patterns of risk.

Table 3. Concordance of Risk Ranks, by Model

	Mean Rank	Min Rank	Max Rank
Pre-AH Rank for Top 10 Pre-DC Beneficiaries?	709.5	13	3,145
Pre-DC Rank for Top 10 Pre-AH Beneficiaries?	13,379.3	48	64,574

As a final check, we analyzed the composition of the AH outcome (Table 4). We determined that only 12.46% of the AH events in the MDPCP scoring data (y4q3m8) were related to PQIs indexing diabetes or its complications (i.e., PQI#1, PQI#3, PQI#16).

Table 4. Distribution of AH Outcome

AH Reason	Percentage
PQI #12: Urinary Tract Infection	25.43
PQI #5: COPD or Asthma in Older Adults	18.47
PQI #18: Heart Failure	17.96
PQI #7: Hypertension	15.29
PQI #11: Bacterial Pneumonia	10.07
PQI #14: Uncontrolled Diabetes	6.85
PQI #3: Diabetes Long-Term Comp.	3.65
PQI #1: Diabetes Short-Term Comp.	1.16
PQI #16: Lower-Extremity Amputation in Patients w/Diabetes	0.81
PQI #15: Asthma in Younger Adults	0.32

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