



# EMERGENCY DEPARTMENT UTILIZATION AND HIERARCHICAL CONDITION CATEGORY RISK SCORES

Ashten Duncan, MPH, CPH, Blake Lesselroth, MD, MBI, Melissa Van Cain, MD, MBI, Peter Aran, MD and Juell Homco, PhD, MPH



OU-TU School of Community Medicine

## Background

The Centers for Medicare and Medicaid Services (CMS) introduced Comprehensive Primary Care Plus (CPC+) to improve the quality of primary care services nationwide. The CPC+ utilization measures use a risk-adjustment model to predict utilization patterns in different patient populations. Risk is determined using Hierarchical Condition Categories (HCCs), which are based on ICD-10 codes and patient demographics. Since patients with higher HCC scores are expected to have higher overall utilization rates, CMS uses these calculations to compare practices and categorize patients into "risk tiers," which guide payments. OU Physicians participates in CPC+ (Track 2).

## Study Aims

The purpose of this study was to analyze emergency department utilization (EDU) patterns among OU Physicians patients as a function of HCC score. We sought to answer the following:

1. What associations exist between HCC risk tiers and patterns of EDU?
2. What characteristics of our patients are associated with HCC risk scores?

## Methods

We analyzed cross-sectional CPC+ data for fiscal year 2018 provided by CMS. We performed multiple linear regression, Tukey's method, and independent-samples t-tests to explore possible relationships between EDU, HCC risk score and associated risk tiers (range 1-5), and patient characteristics like dual-eligibility status and age. The study population included 906 Medicare-only and 1173 dual-eligible patients aged 18 years and older attributed to the OUSCM Internal Medicine (n = 1122) or Family Medicine (n = 957) practice.

## Results

Our patient population had a median HCC risk score of 0.93 (CMS-reported Oklahoma median risk score = 0.74). We found that 56.4% of our patients (n = 2079) were dual-eligible compared to the national average of 19.4%. As shown in **Figure 1**, Tukey multiple comparison test demonstrated significant differences between risk tiers separated by >1 category and ED visits (p < .05). Dual-eligible patients had a higher average HCC risk score than Medicare-only patients (t(2072) = 8.491; p < .00001) and a higher average number of ED visits (t(2077) = 3.9577; p < .00001). In **Figure 2**, a stratified density analysis of HCC scores by age group suggested low-risk (i.e., less than the neutral HCC risk score of 1.00) clustering for older adults. Subsequent analysis of the patient-level data revealed clustering primarily between 45 and 75 years of age. **Figure 3** shows that age was weakly correlated with HCC risk scores for the Family Medicine practice (r = .074, p = .0228), and **Figure 4** shows no significant correlation between the two variables for the Internal Medicine practice (r = .043, p = .1503).

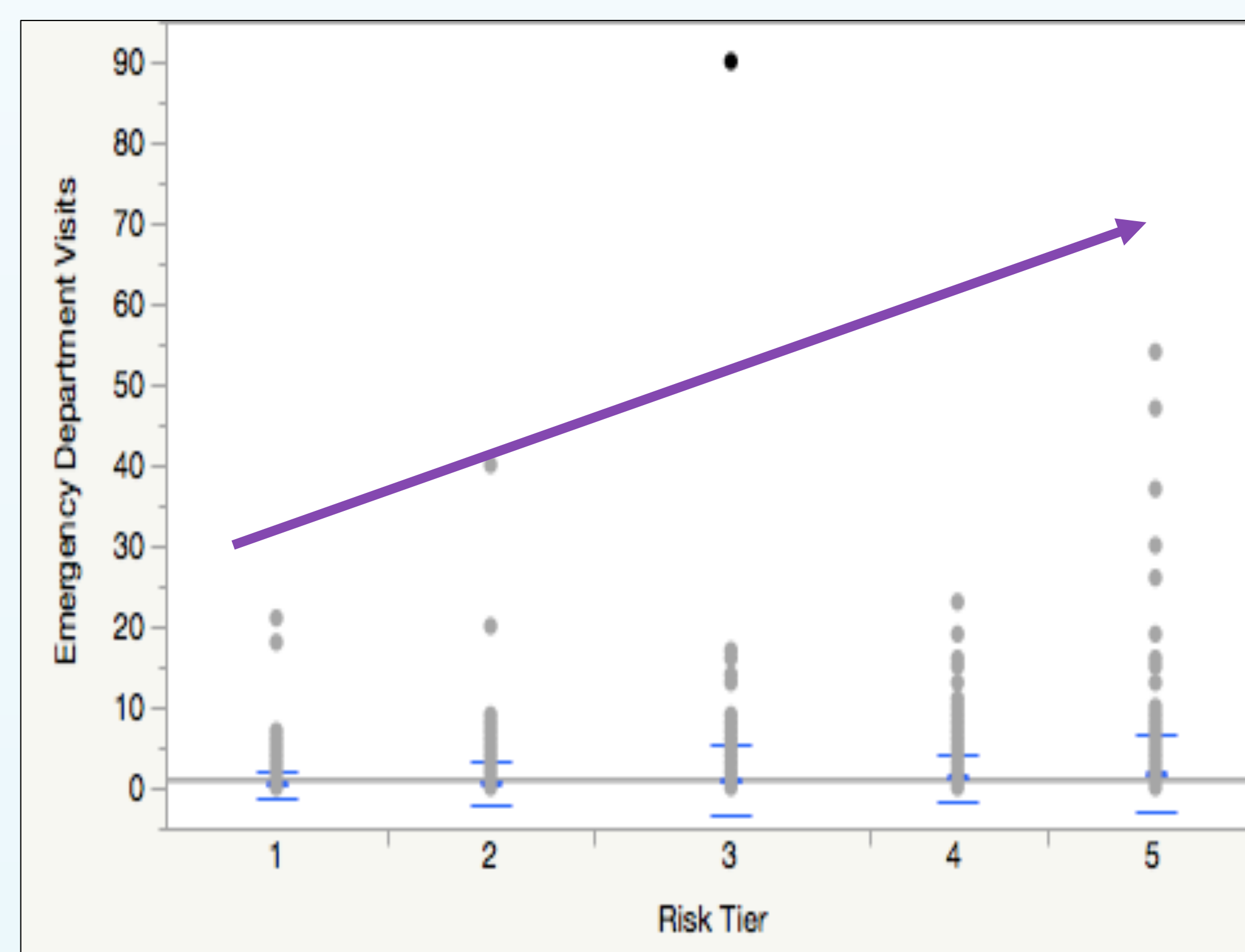


Figure 1: Number of Emergency Department Visits for Each Patient Based on Risk Tier

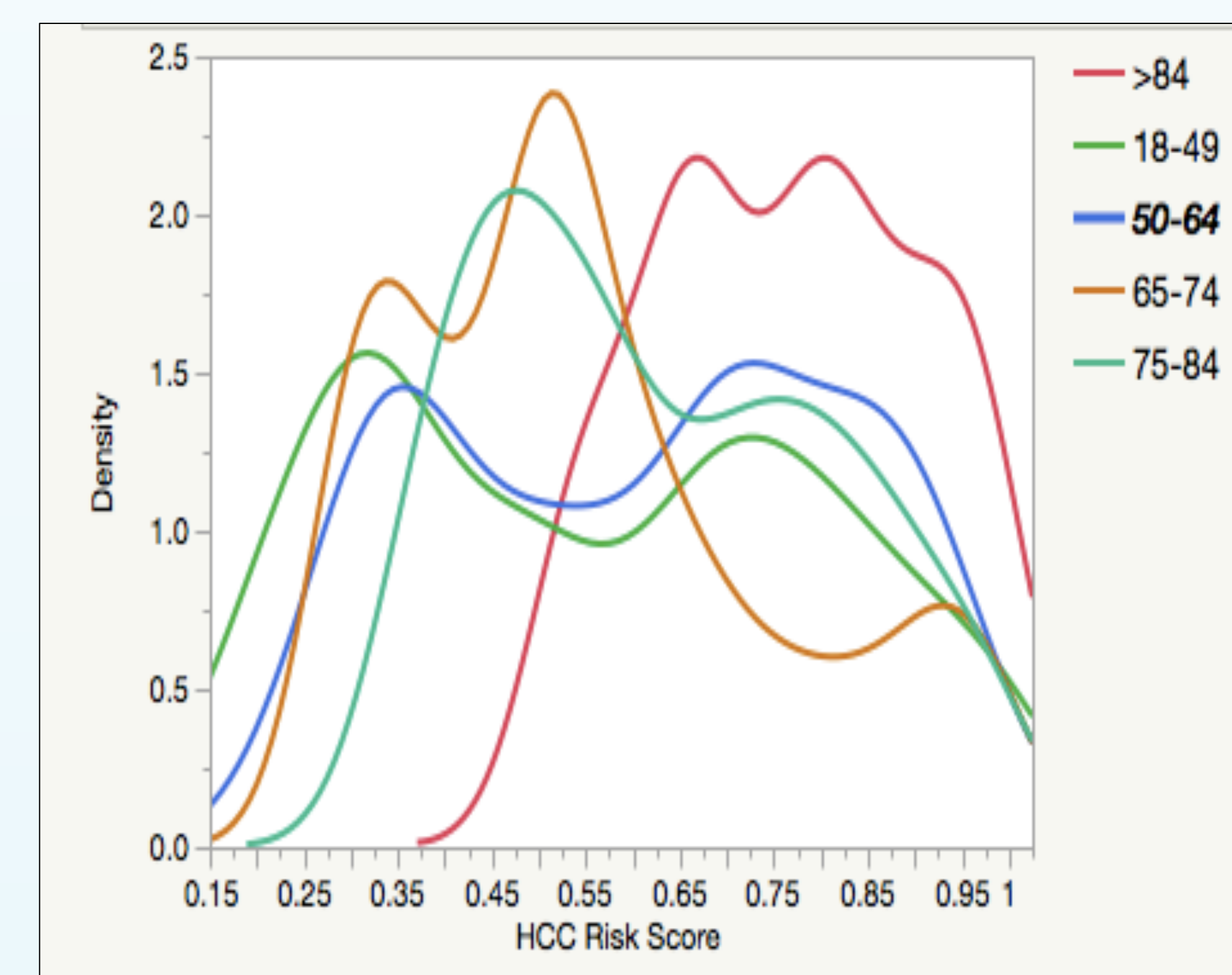
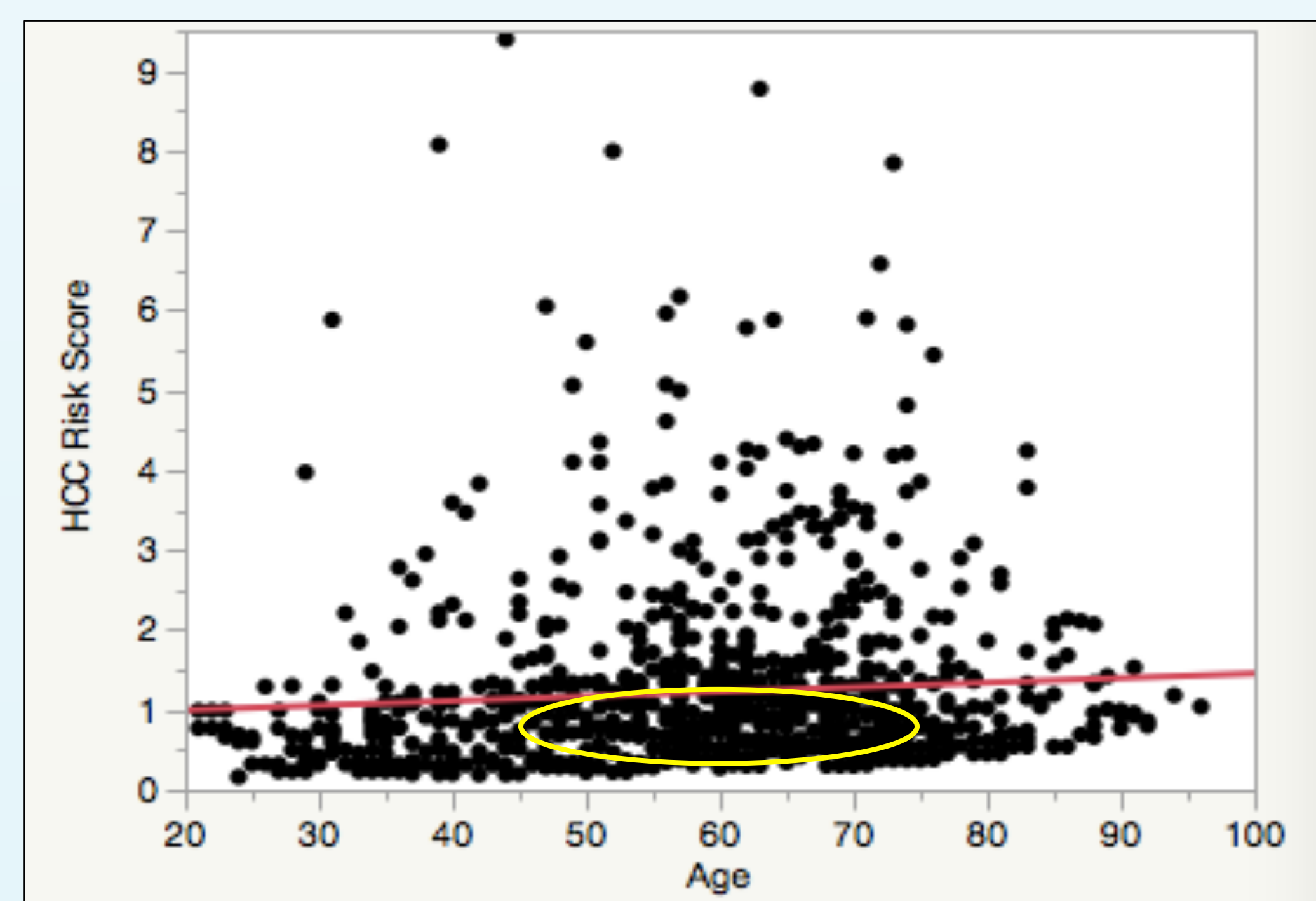
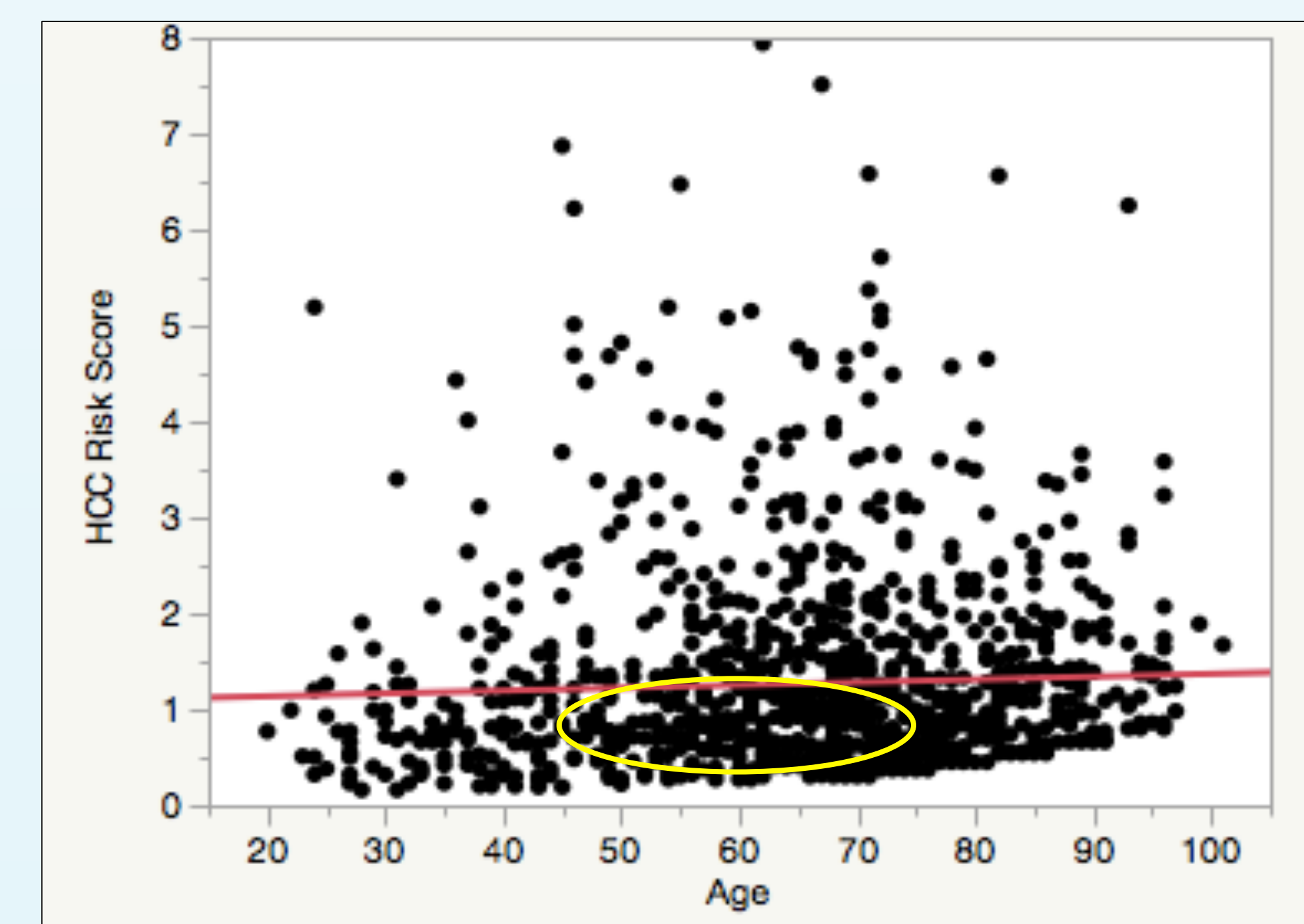


Figure 2: Distribution of Relative Densities of HCC Risk Scores ≤1.00 Based on Age Group



Family Medicine (n = 955), r = .074, p = .0228



Internal Medicine (n = 1119), r = .043, p = .1503

Figures 3 & 4: Scatterplots of HCC Risk Score Based on Patient Age for the Family Medicine and Internal Medicine Practices

## Discussion

HCC risk tier classifications are predictive of EDU rates in our patient population. However, our overall HCC score was lower than anticipated given the complexity of our patient population. Dual-eligible status was associated with higher risk and EDU rates. However, age—typically an independent predictor of morbidity and mortality—was only weakly correlated with HCC scores for only one of the included practices, suggesting clinicians may be undercoding encounters for adults between the ages of 45 and 75 years, which decreases revenue.

As we shift to value-based payment models, accurately determining patient risk is critical for setting utilization targets and developing quality improvement interventions for clinical practice. Classifying patient risk is complex and requires systems-based interventions to improve the quality of medical coding and establish consistent feedback loops with providers and administrators alike.

## Selected References

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