

Clinical Face Validation of a Segmentation Model for Classifying Patients with Cardiometabolic Conditions

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Background

Population health management (PHM) strategies are important for effective and efficient management of chronic conditions. Many PHM approaches group patients based on measures such as cost; however, data-driven methods based on measures of clinical risk and/or clinical needs have not been extensively evaluated. Such methods can serve as the basis for developing distinct care models for different subgroups of patients, optimizing the way care is personalized to match clinical needs. We conducted a face validation exercise to evaluate the clinical validity of a five-cluster segmentation model developed using measures of disease burden, complexity, and clinical need.

Method and Study Setting

Akaike and Bayesian information criteria were used to segment 182,884 primary care patients with CM conditions into five segments. Segment-specific profiles were created to describe each segment on the basis of decreasing CV risk (Segment 1 to Segment 5), demographics, and/or morbidity. Profiles were shared with three primary care physicians, and separate semi-structured interviews were conducted focusing on three questions: 1) From a patient management perspective, were 5 segments too many or too few to manage; 2) Are the segments clinically distinct; 3) Can a physician correctly assign patients from their panel to the correct segment?

Results

Physicians understood the value of segmentation, and believed it will improve patient care, quality, and efficiency if used in a team model. All three physicians suggested combining segments 4 and 5 into one segment due to similarities in cardiovascular disease risk and health gaps, and believed the other three segments have distinct features that distinguish them from each other. All physicians were able to correctly assign patients selected from the highest-risk and the lowest-risk segments, but two had difficulty differentiating patients in segment 4 from those in segment 5. Clinicians recommended including clinically relevant and actionable factors for each segment to improve point-of-care utility.

Discussion

We completed the initial step of establishing the clinical validity of a data-driven segmentation approach derived using measures of disease burden; however, large-scale clinical validation with more clinicians is needed to determine the final segments. Future work will focus on refining the description and interpretation of segments and developing segment-specific care models.