

Early Observations of Population Characteristics for an Electrocardiogram-enabled Smartwatch in the United States.



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Background

Over one-in-five Americans now use a smartwatch or fitness tracker on a daily basis, and many of these consumer wearable technologies now offer electrocardiogram (ECG) capabilities. The wearable watch segment had over 25% year-over-year growth in 2021.

Expert interpretation of single-lead ECGs has demonstrated high diagnostic accuracy in atrial fibrillation (AF) detection, suggesting potential as a screening tool.

Generalizability concerns remain given limited available data on demographic data, such as age and geographic distributions of consumer smartwatch users.

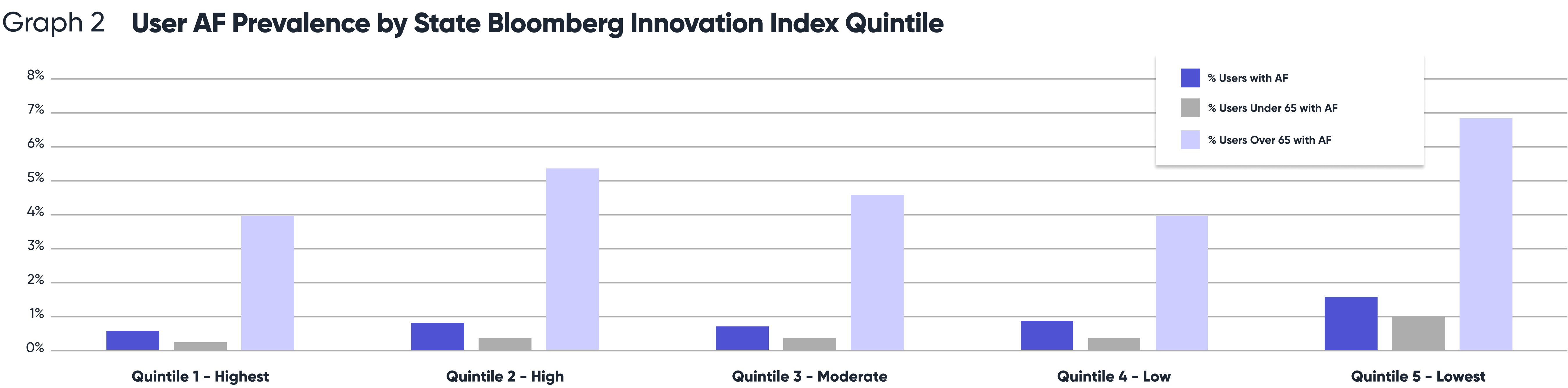
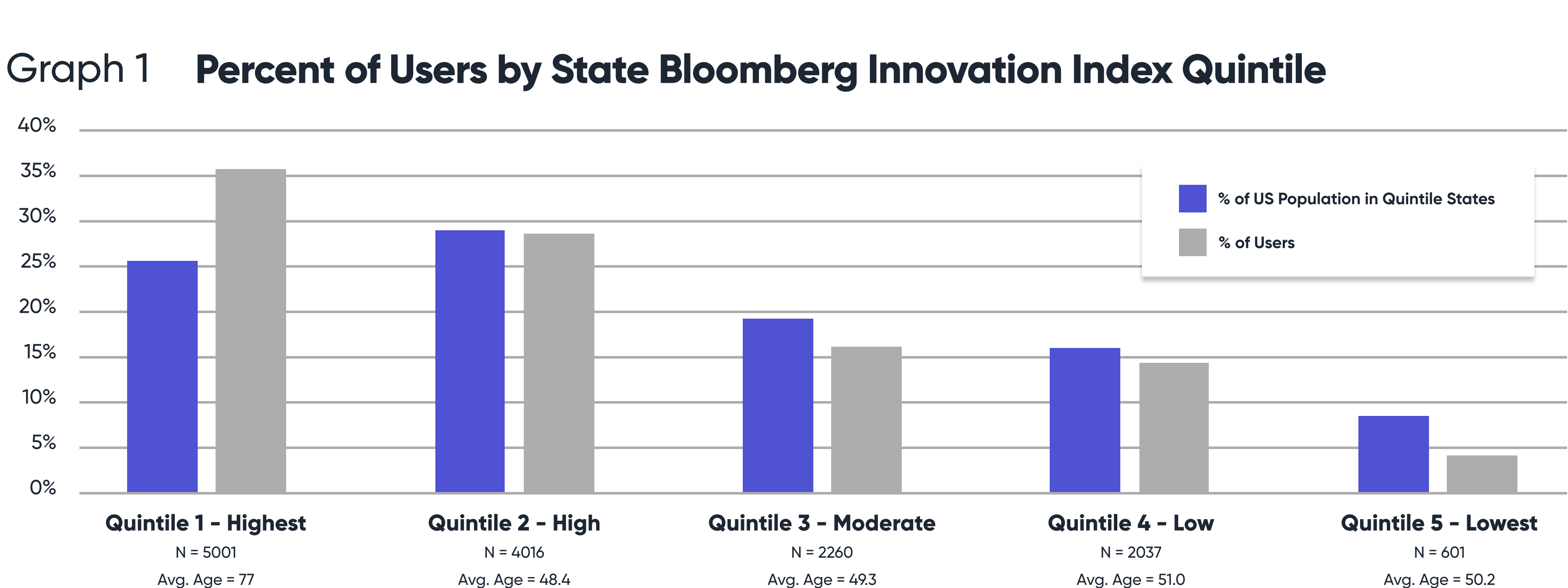
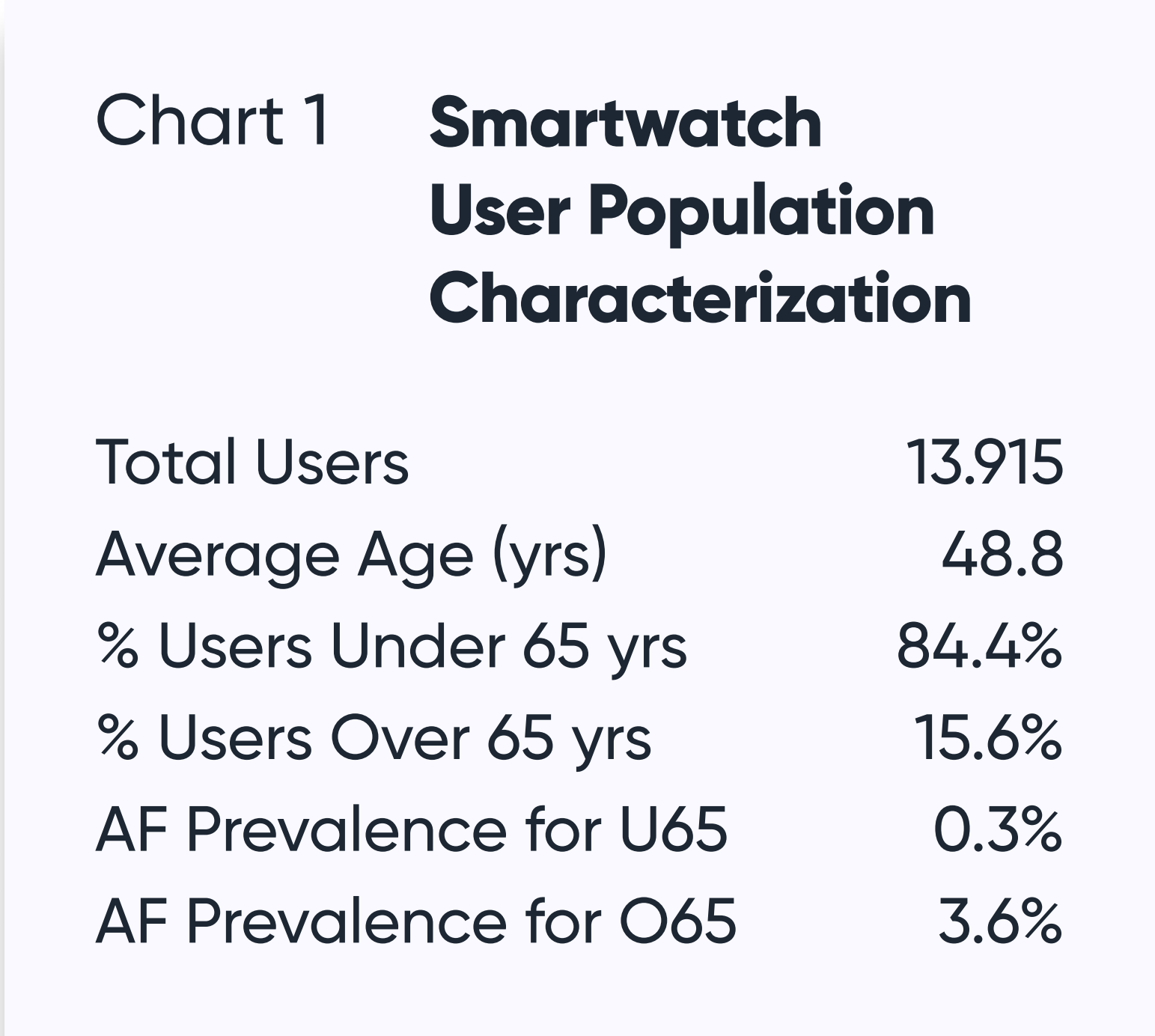
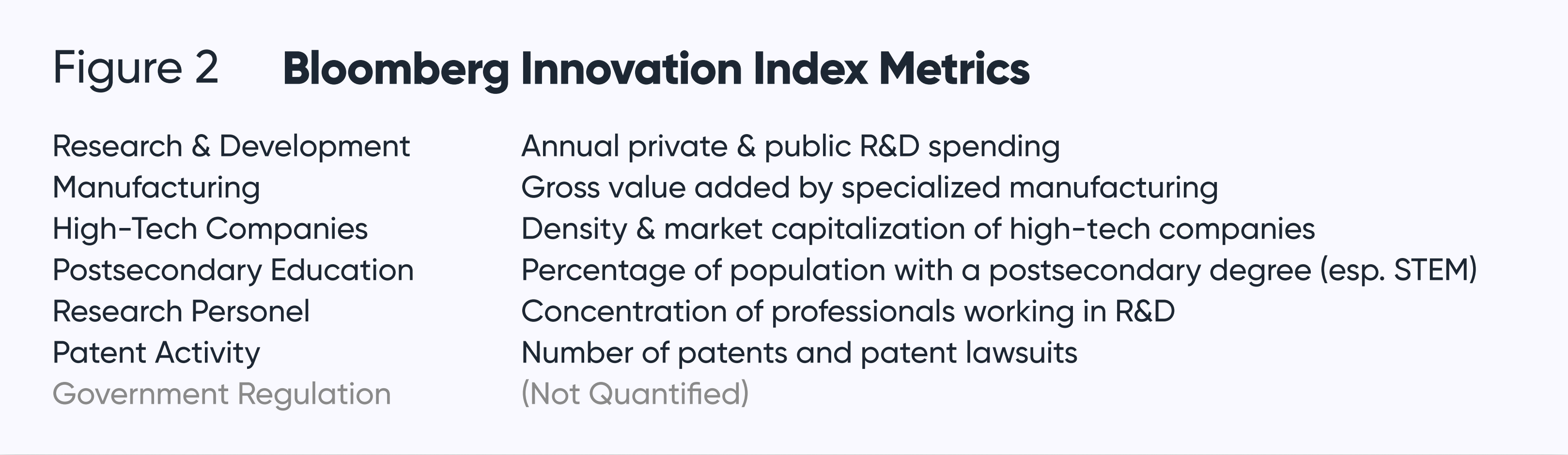
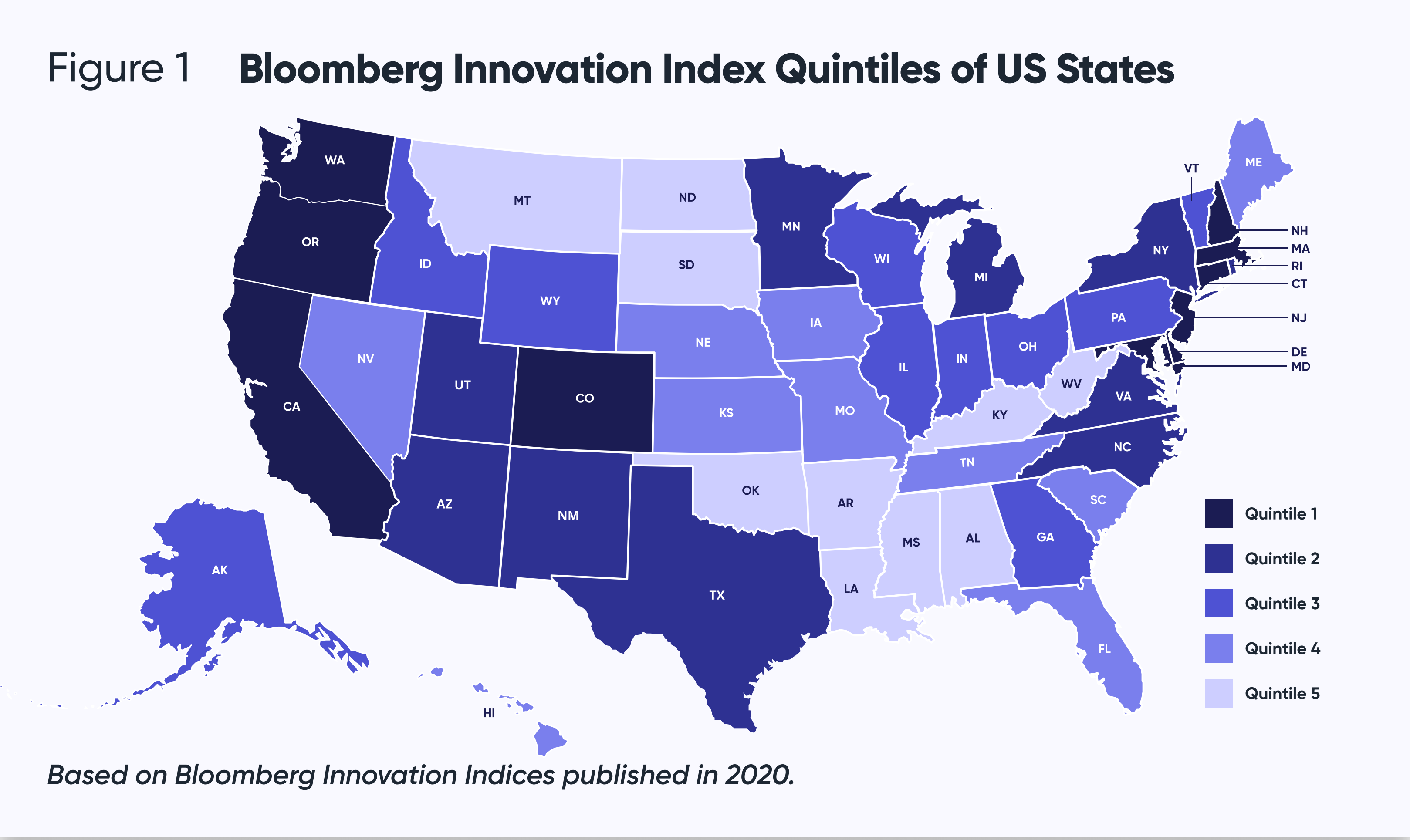
Study Design

After obtaining FDA clearance, consumer smartwatch was launched in the United States in November 2021 and enabled users to transmit single-lead ECG recordings.

Between November 2021 and May 2022, Heartbeat Health, a team with trained virtual cardiology providers, received and interpreted ECG recordings from 13,915 smartwatch users.

Each reading was classified into five categories: 1) atrial fibrillation 2) normal sinus rhythm 3) high heart rate 4) low heart rate 5) possible other arrhythmia and 6) artifact. ECG findings were categorized by age and state Bloomberg Innovation Index (BII) for population analysis.

Principal Findings



Conclusions & Implications

A large-scale trained provider review of smartwatch-enabled ECGs revealed rates of AF that were lower than the widely understood prevalence of AF in the US, suggestive of a potential demographic gap between consumers with access versus those that are more likely to surface undiagnosed AF via smartwatch ECG screening.

Characterization of smartwatch ECG users revealed a higher share of users and younger users in states with higher BII, measured by density of technology companies, research & development, and postsecondary education.

Wearables such as smartwatches have demonstrated higher in-usage time than other technologies, such as tablets, but have still not gained the level of penetration seen in mobile phones. With the growing penetration of consumer smartwatches, equitable distribution of innovation is increasingly important.

Disclosures

The authors of this study were employed by Heartbeat Health ("Significant" or "Modest support) at the time of this study.

All clinical interpretation and data analysis for this study was done independent of the consumer smartwatch company. The authors have no other relevant disclosures for this study as presented.