It is necessary to consider multiple biomarkers simultaneously to detect sarcopenia due to its multifactorial etiology. This study is designed to compare the AUC of multiple biomarker risk scores (MBS) that combine multiple biomarkers with that of individual biomarkers. The follow-up biomarker risk score over two years predicts the risk of sarcopenia using a multiple biomarker approach. Comparing the AUC of MBS with that of individual biomarkers, MBS better discriminates the presence of sarcopenia than did individual biomarkers. MBS was calculated from eight biomarkers (GDP deficiency, elevated low-density lipoprotein cholesterol, elevated high-density lipoprotein cholesterol, elevated fasting glucose, elevated C-reactive protein, low- and high-density lipoprotein cholesterol, and increased sirtuin-1 activity). The area under the curve (AUC) of MBS was calculated using a receiver operating characteristic (ROC) analysis. MBS has an area under the curve (AUC) of 0.71, which is higher than all other individual biomarkers. In conclusion, MBS was positively associated with its corresponding CVD risk factor with a p-value < 0.001. Adding interaction terms between each MRS and other risk factors improved the AUC of MBS. MRSs for CVD risk factors were identified that may prove clinically useful by enabling earlier prevention and intervention. Using existing epigenome-wide association studies, we created MRSs for eight CVD risk factors: systolic and diastolic blood pressure, body mass index (BMI), HDL-C, and TG in younger participants than older participants. In conclusion, some MRSs for CVD risk factors have stronger associations in younger adults, women, and non-drinkers. Additional research is needed to better understand the potential clinical utility of MRSs for early CVD prevention and intervention.