SUPPLEMENTAL MATERIAL

Table S1. Hazard Ratio Estimates for Within-participant Mean BMI and Participant-specific Random Slope of BMI Change in Models of the Association Between BMI Variability (Measured in SD and CV, per Standard Deviation) and Incident Heart Failure.

Cohort	Variable	SD HR (95% CI), P	CV HR (95% CI), P
Overall	**Mean BMI (kg/m^2)**	**1.27 (1.21, 1.33), p<0.0001**	**1.28 (1.23, 1.34), p<0.0001**
	BMI Slope (kg/m^2 per year)	**1.66 (1.26, 2.18), p=0.0003**	**1.61 (1.23, 2.11), p=0.0005**
Female	**Mean BMI (kg/m^2)**	**1.27 (1.18, 1.36), p<0.0001**	**1.29 (1.21, 1.38), p<0.0001**
	BMI Slope (kg/m^2 per year)	**1.63 (1.11, 2.41), p=0.0131**	**1.58 (1.08, 2.31), p=0.0176**
Male	**Mean BMI (kg/m^2)**	**1.24 (1.16, 1.33), p<0.0001**	**1.25 (1.17, 1.33), p<0.0001**
	BMI Slope (kg/m^2 per year)	**1.93 (1.29, 2.87), p=0.0013**	**1.89 (1.27, 2.80), p=0.0017**
Age < 60 years	**Mean BMI (kg/m^2)**	**1.26 (1.16, 1.38), p<0.0001**	**1.29 (1.18, 1.40), p<0.0001**
	BMI Slope (kg/m^2 per year)	**1.84 (1.10, 3.09), p=0.0207**	**1.76 (1.06, 2.92), p=0.0284**
Age ≥ 60 years	**Mean BMI (kg/m^2)**	**1.26 (1.20, 1.34), p<0.0001**	**1.28 (1.21, 1.35), p<0.0001**
	BMI Slope (kg/m^2 per year)	**1.57 (1.14, 2.17), p=0.0063**	**1.53 (1.12, 2.10), p=0.0078**
No Diabetes	**Mean BMI (kg/m^2)**	**1.28 (1.21, 1.36), p<0.0001**	**1.30 (1.23, 1.37), p<0.0001**
	BMI Slope (kg/m^2 per year)	**1.72 (1.23, 2.42), p=0.0017**	**1.66 (1.20, 2.31), p=0.0024**
Diabetes	**Mean BMI (kg/m^2)**	**1.19 (1.10, 1.30), p<0.0001**	**1.22 (1.13, 1.32), p<0.0001**
	BMI Slope (kg/m^2 per year)	**1.60 (1.03, 2.50), p=0.0385**	**1.57 (1.00, 2.46), p=0.0502**
No Hypertension	**Mean BMI (kg/m^2)**	**1.26 (1.16, 1.36), p<0.0001**	**1.27 (1.18, 1.37), p<0.0001**
	BMI Slope (kg/m^2 per year)	**1.91 (1.17, 3.10), p=0.0093**	**1.82 (1.13, 2.92), p=0.0135**
Hypertension	**Mean BMI (kg/m^2)**	**1.27 (1.20, 1.35), p<0.0001**	**1.28 (1.22, 1.36), p<0.0001**
	BMI Slope (kg/m^2 per year)	**1.53 (1.10, 2.14), p=0.0126**	**1.50 (1.08, 2.09), p=0.0149**
Normal Weight (Enrollment BMI≥18.5, <25 kg/m2)	**Mean BMI (kg/m^2)**	0.84 (0.63, 1.12), p=0.2387	0.85 (0.65, 1.11), p=0.2323
	BMI Slope (kg/m^2 per year)	**0.38 (0.16, 0.92), p=0.0312**	**0.40 (0.17, 0.90), p=0.0269**
Overweight (Enrollment BMI≥25, <30 kg/m2)	**Mean BMI (kg/m^2)**	1.06 (0.89, 1.26), p=0.5402	1.07 (0.91, 1.26), p=0.4083
	BMI Slope (kg/m^2 per year)	1.09 (0.59, 1.99), p=0.7891	1.05 (0.59, 1.87), p=0.8716
Obese (Enrollment BMI≥30 kg/m2)	**Mean BMI (kg/m^2)**	**1.31 (1.22, 1.40), p<0.0001**	**1.33 (1.25, 1.42), p<0.0001**
	BMI Slope (kg/m^2 per year)	**1.89 (1.33, 2.68), p=0.0004**	**1.84 (1.30, 2.61), p=0.0006**
BMI Increase [Positive Slope (kg/m^2 per year)]	**Mean BMI (kg/m^2)**	**1.28 (1.20, 1.37), p<0.0001**	**1.30 (1.21, 1.39), p<0.0001**
	BMI Slope (kg/m^2 per year)	**1.96 (1.13, 3.39), p=0.0163**	**1.85 (1.06, 3.22), p=0.0304**
BMI Decrease [Negative Slope (kg/m^2 per year)]	**Mean BMI (kg/m^2)**	0.96 (0.76, 1.22), p=0.7521	0.95 (0.77, 1.17), p=0.6223
	BMI Slope (kg/m^2 per year)	1.37 (0.14, 13.67), p=0.7914	2.03 (0.30, 13.90), p=0.4714

Model 3: adjusted for age, sex, smoking history (current or previous smoking vs. never smoking), frequent alcohol consumption (≥ 3 times per week vs. less frequent), diabetes, hypertension, heart attack history, stroke history, atrial fibrillation history, high density lipoprotein cholesterol, low density lipoprotein, total cholesterol, triglycerides, estimated glomerular filtration rate.

In stratified analyses, corresponding variable for the stratification was not included (e.g., sex was excluded in females or males only analysis).

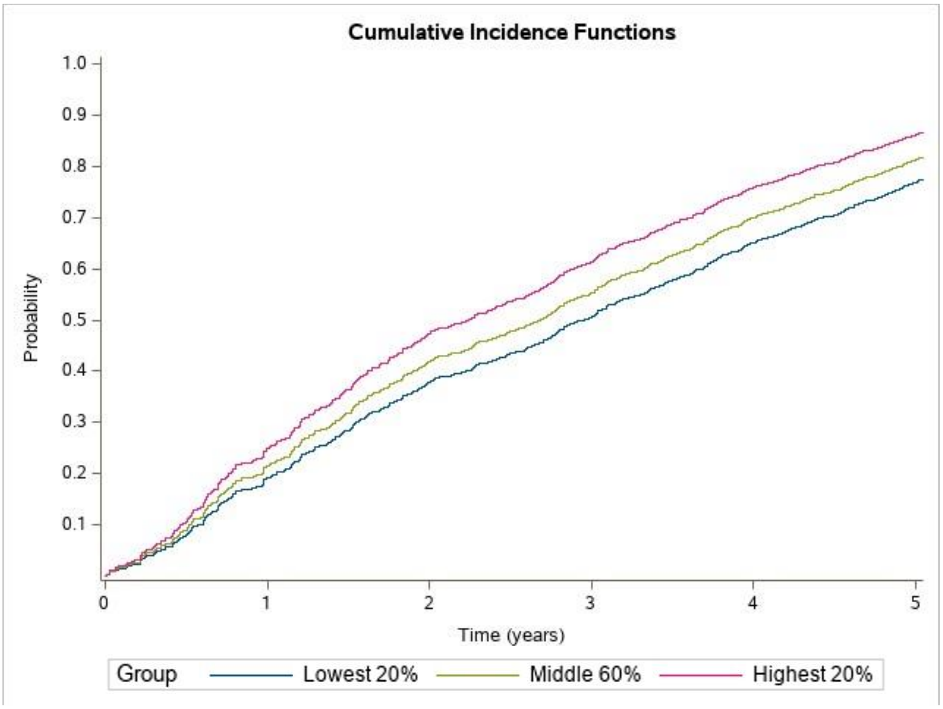
Stratified analysis among underweight group was not performed due to the small sample size and number of events.

Table S2. Association Between BMI Variability (Measured in SD and CV, per Standard Deviation) and Incident Heart Failure.

Cohort	SD HR (95% CI), P				CV HR (95% CI), P			
	Model 4	**Model 5**	**Model 6**	**Model 7**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Overall	**1.05 (1.03, 1.08), p<0.0001**	**1.05 (1.02, 1.08), p=0.0001**	**1.05 (1.02, 1.08), p=0.0002**	1.05 (0.97, 1.13), p=0.2113	**1.07 (1.04, 1.10), p<0.0001**	**1.07 (1.04, 1.09), p<0.0001**	**1.06 (1.04, 1.09), p<0.0001**	1.05 (0.98, 1.140), p=0.1931
Female	**1.09 (1.04, 1.13), p=0.0002**	**1.09 (1.04, 1.14), p=0.0001**	**1.09 (1.05, 1.14), p<0.0001**	1.00 (0.85, 1.18), p=0.9697	**1.10 (1.06, 1.15), p<0.0001**	**1.11 (1.06, 1.16), p<0.0001**	**1.11 (1.06, 1.16), p<0.0001**	1.03 (0.88, 1.20), p=0.7174
Male	1.03 (1.00, 1.06), p=0.0859	1.03 (0.99, 1.06), p=0.1317	1.02 (0.99, 1.06), p=0.1901	1.08 (1.00, 1.16), p=0.0646	**1.04 (1.00, 1.08), p=0.0402**	1.03 (1.00, 1.07), p=0.0719	1.03 (0.99, 1.07), p=0.1045	1.07 (0.99, 1.16), p=0.0886
Age < 60 years	**1.07 (1.02, 1.12), p=0.0073**	**1.07 (1.02, 1.13), p=0.0050**	**1.07 (1.01, 1.12), p=0.0128**	**1.14 (1.02, 1.27), p=0.0232**	**1.09 (1.03, 1.15), p=0.0019**	**1.09 (1.04, 1.15), p=0.0013**	**1.09 (1.03, 1.15), p=0.0030**	**1.15 (1.02, 1.30), p=0.0214**
Age ≥ 60 years	**1.04 (1.01, 1.08), p=0.0034**	**1.04 (1.01, 1.07), p=0.0065**	**1.04 (1.01, 1.07), p=0.0068**	1.01 (0.93, 1.10), p=0.7390	**1.06 (1.03, 1.09), p=0.0005**	**1.06 (1.02, 1.09), p=0.0011**	**1.06 (1.02, 1.09), p=0.0012**	1.02 (0.94, 1.11), p=0.6643
No Diabetes	**1.05 (1.02, 1.08), p=0.0016**	**1.04 (1.01, 1.07), p=0.0032**	**1.04 (1.01, 1.07), p=0.0037**	1.02 (0.94, 1.12), p=0.6335	**1.06 (1.03, 1.10), p<0.0001**	**1.06 (1.03, 1.09), p=0.0003**	**1.06 (1.03, 1.09), p=0.0003**	1.03 (0.94, 1.12), p=0.5325
Diabetes	**1.09 (1.02, 1.16), p=0.0082**	**1.10 (1.03, 1.17), p=0.0051**	**1.09 (1.02, 1.16), p=0.0078**	1.24 (0.97, 1.58), p=0.0886	**1.10 (1.03, 1.18), p=0.0060**	**1.11 (1.04, 1.19), p=0.0027**	**1.11 (1.03 1.18), p=0.0045**	1.26 (0.96, 1.66), p=0.0984
No Hypertension	**1.05 (1.01, 1.08), p=0.0064**	**1.04 (1.01, 1.08), p=0.0190**	**1.04 (1.01, 1.08), p=0.0199**	1.05 (0.95, 1.17), p=0.3191	**1.06 (1.02, 1.10), p=0.0011**	**1.06 (1.02, 1.10), p=0.0047**	**1.06 (1.02, 1.10), p=0.0051**	1.08 (0.96, 1.21), p=0.1929
Hypertension	**1.05 (1.01, 1.10), p=0.0102**	**1.06 (1.02, 1.10), p=0.0036**	**1.06 (1.02, 1.10), p=0.0056**	1.03 (0.92, 1.16), p=0.6063	**1.07 (1.02, 1.12), p=0.0029**	**1.08 (1.03, 1.12), p=0.0009**	**1.07 (1.03, 1.12), p=0.0013**	1.02 (0.92, 1.14), p=0.6947
Normal Weight (Enrollment BMI ≥ 18.5, <25 kg/m^2)	1.07 (0.98, 1.17), p=0.1470	1.06 (0.96, 1.16), p=0.2567	1.06 (0.96, 1.16), p=0.2576	1.05 (0.78, 1.42), p=0.7347	1.08 (1.00, 1.17), p=0.0428	1.07 (0.99, 1.16), p=0.0967	1.07 (0.99, 1.16), p=0.0950	1.05 (0.81, 1.36), p=0.7062
Overweight (Enrollment BMI ≥ 25, <30 kg/m^2)	**1.06 (1.01, 1.11), p=0.0147**	**1.06 (1.01, 1.11), p=0.0171**	**1.05 (1.01, 1.10), p=0.0200**	1.05 (0.94, 1.18), p=0.3732	**1.08 (1.02, 1.13), p=0.0039**	**1.07 (1.02, 1.13), p=0.0045**	**1.07 (1.02, 1.13), p=0.0052**	1.06 (0.95, 1.19), p=0.3134
Obese (Enrollment BMI ≥ 30 kg/m^2)	**1.06 (1.01, 1.11), p=0.0169**	**1.06 (1.02, 1.11), p=0.0075**	**1.06 (1.01, 1.11), p=0.0103**	1.03 (0.90, 1.18), p=0.6712	**1.07 (1.02, 1.13), p=0.0082**	**1.08 (1.03, 1.14), p=0.0036**	**1.08 (1.02, 1.14), p=0.0056**	1.03 (0.89, 1.19), p=0.7163

Model 4: adjusted for age, sex, smoking history (current or previous smoking vs. never smoking), frequent alcohol consumption (≥ 3 times per week vs. less frequent), diabetes, hypertension, heart attack history, stroke history, atrial fibrillation history, high density lipoprotein cholesterol, low density lipoprotein, total cholesterol, triglycerides, estimated glomerular filtration rate, within-participant mean BMI across longitudinal measures, participant-specific random slope of BMI change per year, blood pressure medication use, sleep apnea.
Model 5: Model 4 + sodium in urine.
Model 6: Model 5 + albumin.
Model 7: Model 6 + sodium from diet.
In stratified analyses, corresponding variable for the stratification was not included (e.g., sex was excluded in females or males only analysis).
Stratified analysis among underweight group was not performed due to the small sample size and number of events.

Figure S1. Cumulative Incidence Plot of Incidence Between Categories of BMI Variability Measured in Standard Deviation.



Cumulative incidence was estimated based on the following values of covariates: age 57.5 years, female, never smoking, no frequent alcohol consumption, no diabetes, no hypertension, no heart attack history, no stroke history, no atrial fibrillation history, high density lipoprotein cholesterol of 55.8 mg/dL, low density lipoprotein of 136 mg/dL, total cholesterol of 218 mg/dL, triglycerides of 134.3 mg/dL, estimated glomerular filtration rate of 93.9 mL/min/1.73 m^2, within-participant mean BMI across longitudinal measures of 27 kg/m^2, and participant-specific BMI change random slope of 0.16 kg/m^2 per year.

Figure S2. Cumulative Incidence Plot of Incidence Between Categories of BMI Variability Measured in Coefficient of Variation. Cumulative incidence was estimated based on the following values of covariates: age 57.5 years, female, never smoking, no frequent alcohol consumption, no diabetes, no hypertension, no heart attack history, no stroke history, no atrial fibrillation history, high density lipoprotein cholesterol of 55.8 mg/dL, low density lipoprotein of 136 mg/dL, total cholesterol of 218 mg/dL, triglycerides of 134.3 mg/dL, estimated glomerular filtration rate of 93.9 mL/min/1.73 m^2, within-participant mean BMI across longitudinal measures of 27 kg/m^2, and participant-specific BMI change random slope of 0.16 kg/m^2 per year.