

Description of Additional supplementary files

Supplementary Data 1: Detailed information about the pretraining and task-specific ECG datasets.

Supplementary Data 2: The results of ablation experiment for CVDs prediction.

Supplementary Data 3: Detailed performance comparisons for heart functional phenotype prediction.

Supplementary Data 4: Detailed performance comparisons for anthropometric measurement prediction.

Supplementary Data 5: Detailed information about the CVD-related phenotypes for phenome-wide association analysis.

Supplementary Data 6: Phenome-wide association study for 16 EDFs. P-values were derived from two-sided regression models (linear or logistic regression depending on the trait type) as implemented in PHESANT.

Supplementary Data 7: Genome-wide association study for 16 EDFs based on 41,235 individuals of UK Biobank. P-values were obtained from linear mixed models computed by BOLT-LMM.

Supplementary Data 8: The inflation factor and liability-scale heritability for GWAS of EDF.

Supplementary Data 9: Mendelian Randomization analysis result for the causal relationships between EDFs and CVDs. P-values were obtained from the inverse-variance weighted (IVW) method.

Supplementary Data 10: Multi-trait genome-wide meta-analysis for EDFs based on 41,235 individuals of UK Biobank. P-values were obtained from two-sided meta-analysis using METAL, based on linear mixed models computed by BOLT-LMM.

Supplementary Data 11: Overview of GWAS studies for ECG traits included in the genetic association analysis.

Supplementary Data 12: Overview of GWAS studies for CVDs included in the genetic association analysis.

Supplementary Data 13: Genetic associations between the novel SNPs and CVDs. P-values were obtained from the published GWAS summary statistics.

Supplementary Data 14: The candidate genes identified by MAGMA. P-values were calculated using the two-sided multiple linear principal components regression model in MAGMA.

Supplementary Data 15: The candidate genes identified by FUMA.

Supplementary Data 16: Genetic correlations between the EDF and ECG traits and CVDs. P-values were calculated from LDSC.

Supplementary Data 17: Colocalization analysis for ECG traits.

Supplementary Data 18: Pathway enrichment analysis results for 63 unique genes identified by FUMA analysis or MAGMA.

