

Personalizing Cholesterol Treatment Recommendations for Primary Cardiovascular Disease Prevention

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Supplementary Information

Supplemental Table 1. Definitions of Cardiovascular Disease.

	ICD-9-CM	ICD-10-CM
Myocardial infarction	410.*	I21.*, I22.*, I23.3, I24.0, I24.9, I25.9, I51.3,
Coronary artery disease	411.*, 413.*, 414.*	I20.*, I23.7, I24.*, I25.*, T82.85,
Ischemic stroke	433.01, 433.11, 433.21, 433.31, 434.81, 433.91, 434.11, 434.91, 436.*	G46.*, I63.*, I67.85, I69.30, I77.89, P91.0, Z86.73
Hemorrhagic stroke	430.*, 431.*, 432.*	I60.*, I61.*, I62.*, I63.89, I67.1, P52.*, P54.8, S06.2*, S06.4*, S06.5*
Atrial fibrillation, heart failure	427.31, 428.*	I27.29, I48.0, I48.1, I48.2, I48.91, I50.*, I51.9, Z86.79
Other cardiovascular disease	412.*, 346.6*, 433.*, 434.*, 435.*, 437.*, 438.*, 440.*, V45.81, or V45.82	G43.6*, G45.*, G46.*, G81.94, G83.9, G93.89, G93.9, G95.19, I25.1, I25.2, I63.*, I65.*, I66.*, I67.*, I68.*, I69.*, I70.*, I72.5, I76, I77.75, I77.89, I77.9, I99.8, M47.01, P91.0, Z98.61

Abbreviations: ICD-9-CM—International classification of diseases, 9th revision; ICD-10-CM—International classification of diseases, 10th revision

Supplemental Table 2. Classification of Statin Intensity.

Cholesterol Lowering Strategies	Definition
Low-intensity statin	Fluvastatin 20-40mg Lovastatin 20mg Simvastatin 10mg Pitavastatin 1mg
Moderate-intensity statin	Atorvastatin 10-20mg Fluvastatin 40mg BID or 80mg XL Lovastatin 40mg Pitavastatin 2-4mg Pravastatin 40-80mg Rosuvastatin 5-10mg Simvastatin 20-40mg
High-intensity statin	Atorvastatin 40-80mg Rosuvastatin 20-40mg

Abbreviations: mg, milligrams

Supplemental Table 3. List of patient features used in the weighted k-nearest neighbor (wkNN) regression model for cross-validation.

Category	Variable
PCE	Age Female HDL cholesterol Total cholesterol History of Type 2 Diabetes Current smoking status On antihypertensive medications Systolic BP Race: African American (Self-reported) Race: Non-Hispanic White (Self-reported)
Clinical Variables	Diastolic BP Height Weight Race: Asian (Self-reported) Race: Hispanic (Self-reported)
Socioeconomic Variables	Median household income Percent with up to a 9th grade education Percent with up to 12th grade education Percent with up to a high school graduation Percent with up to some college Percent with up to an associate's degree Percent with up to a bachelor's degree
Utilization Variables	Number of other service visits Number of primary care visits Number of specialty care visits
Diagnostic Variables	CCS: Alcohol-related disorders CCS: Anxiety disorders CCS: Aortic; peripheral; and visceral artery aneurysms CCS: Cancer of head and neck CCS: Cancer of kidney and renal pelvis CCS: Chronic kidney disease CCS: Chronic ulcer of skin CCS: Deficiency and other anemia CCS: Delirium, dementia, and amnestic and other cognitive disorders CCS: Diabetes mellitus with complications CCS: Diabetes mellitus without complication CCS: Diseases of white blood cells CCS: Epilepsy; convulsions

	CCS: Essential hypertension CCS: Heart valve disorders CCS: HIV infection CCS: Hypertension with complications and secondary hypertension CCS: Nervous approach congenital anomalies CCS: Nonspecific chest pain CCS: Other and ill-defined heart disease CCS: Other connective tissue disease CCS: Other endocrine disorders CCS: Other hematologic conditions CCS: Other infections; including parasitic CCS: Other injuries and conditions due to external causes CCS: Other nervous approach disorders CCS: Other non-traumatic joint disorders CCS: Pancreatic disorders (not diabetes) CCS: Parkinson's disease CCS: Peri-; endo-; and myocarditis; cardiomyopathy (except that caused by tuberculosis or sexually transmitted disease) CCS: Septicemia (except in labor) Family history of emphysema
Lab test Variables	Number of abnormal lab test results Number of normal lab test results LDL-C cholesterol Albumin lab: abnormal Albumin/Creatinine lab: abnormal Aspartate aminotransferase lab: normal Basophils lab: normal Bilirubin lab: abnormal Bilirubin lab: normal C reactive protein lab: abnormal Calcium lab: normal Eosinophils lab: abnormal Eosinophils lab: normal Fibrinogen lab: abnormal Glomerular filtration rate lab: abnormal Glucose lab: abnormal Lymphocytes lab: abnormal Monocytes lab: abnormal Potassium lab: normal Prostate specific Ag lab: normal Protein lab: abnormal Thyroxine lab: abnormal Triglycerides: normal Triglycerides: abnormal Urea nitrogen lab: abnormal

Medication Variables	Total number of medications prescribed GPI4: ACE Inhibitors GPI4: Aminoglycosides GPI4: Aminopenicillins GPI4: Angiotensin II Receptor Antagonists GPI4: Antidementia Agents GPI4: Antidiarrheal Combinations GPI4: Antihistamines - Non-Sedating GPI4: Antihyperlipidemics - Combinations GPI4: Antipsychotics - Misc. GPI4: B-Complex with C GPI4: B-Complex with Folic Acid GPI4: Beta Blockers Cardio-Selective GPI4: Beta-blockers - Ophthalmic GPI4: Bulk Chemicals - C's GPI4: Bulk Laxatives GPI4: Central Muscle Relaxants GPI4: Cephalosporins - 3rd Generation GPI4: CMV Agents GPI4: Cough/Cold/Allergy Combinations GPI4: Emollient/Keratolytic Agents GPI4: Emollients GPI4: Erythromycins GPI4: H-2 Antagonists GPI4: HMG CoA Reductase Inhibitors GPI4: Immunosuppressive Agents GPI4: Infant Care Products GPI4: Iron GPI4: Leprostatics GPI4: Loop Diuretics GPI4: Nasal Anti-allergy GPI4: Ophthalmic Immunomodulators GPI4: Penicillin Combinations GPI4: Salicylates GPI4: Surfactant Laxatives GPI4: Thiazides and Thiazide-Like Diuretics GPI4: Vitamins with Lipotropics GPI4: Water Soluble Vitamins
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Abbreviations: Ag, antigen; ASCVD, atherosclerotic cardiovascular disease; BP – blood pressure; CCS, Clinical Classification Software; CMV – cytomegalovirus; GPI, Generic Product Identifier; HDL, high-density lipoprotein; HIV, human immunodeficiency virus; HMG CoA, 3-hydroxy-3-methyl-glutaryl-coenzyme A; LDL-C, low-density lipoprotein cholesterol; PCE, pooled cohort equations