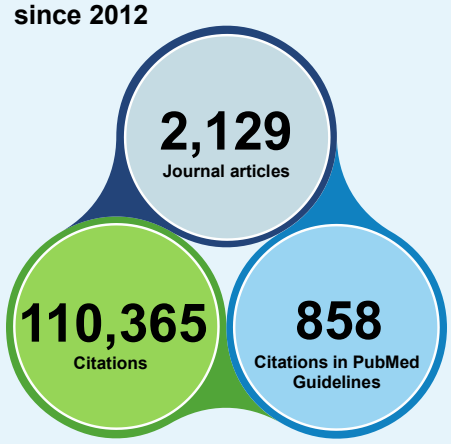
Kaiser Permanente Research Brief

Cardiovascular disease

This brief summarizes the contributions of Kaiser Permanente Research since 2012 on the topic of cardiovascular disease. Although CVD encompasses a wide array of health conditions, this brief will focus primarily on research related to stroke, coronary heart disease, and heart failure.

According to the Centers for Disease Control and Prevention, cardiovascular disease is responsible for more than 700,000 deaths in the United States each year.[1] Though mostly preventable, it remains the leading cause of death in both men and women, and across nearly all racial and ethnic groups nationally.[1] Coronary heart disease, or the accumulation of atherosclerotic plaque within the arterial vessels of the heart, is the most common form of heart disease, and is associated with more than 370,000 deaths each year.[1] An estimated 6.7 million Americans also suffer from heart failure, or the heart's inability to pump sufficient blood and oxygen to the body's organ systems.[2] Heart failure is considered a contributing cause in approximately 1 in 8 deaths.[2] Stroke, or a disruption in the blood supply to the brain caused by a burst or blocked blood vessel, occurs in nearly 800,000 Americans each year.[2] Stroke kills approximately 160,000 Americans annually,[2] and is a leading cause of significant long-term disability, with consequences that often require long-term skilled nursing care.[3]

Kaiser Permanente publications related to cardiovascular disease since 2012



Source: Kaiser Permanente Publications Library and Scite metrics, as of November 22, 2024.

Cardiovascular disease is an active area of study for Kaiser Permanente Research. Scientists across the organization have used our rich, comprehensive, longitudinal data to advance knowledge in the areas of understanding risk, improving patient outcomes, and translating research findings into policy and practice. We have published more than 2,100 articles related to CVD since 2012.[4] Together, these articles have been cited over 110,000 times. These articles are the product of observational studies, randomized controlled trials, meta-analyses, and other studies led by Kaiser Permanente scientists. Our unique environment — a fully integrated care and coverage model in which our research scientists, clinicians, medical groups, and health plan leaders collaborate — enables us to contribute important knowledge about CVD, and many other research topics.

This brief summarizes a selection of the publications contained within the Kaiser Permanente Publications Library, which indexes journal articles and other publications authored by individuals affiliated with Kaiser Permanente. The work described in this brief originated from across Kaiser Permanente's 8 regions and was supported by a wide range of funding sources including internal research support as well as both governmental and nongovernmental extramural funding.

Understanding risk

Who is at risk for developing cardiovascular disease?

Kaiser Permanente scientists have assessed a variety of cardiovascular disease risk factors in adults,[5-7] including diabetes,[8-13] atrial fibrillation,[14; 15] high blood pressure,[8; 16-25] high cholesterol,[8; 13; 21; 26; 27] smoking,[8; 28; 29] obesity,[30; 31] insulin resistance,[31] kidney disease,[32-36] HIV,[37; 38] infection with respiratory viruses,[39; 40] diet,[29; 41-45] physical activity and fitness,[29; 46-50] stressful life events and social isolation,[51-53] socioeconomic status,[54] environmental factors,[55-58] biomarkers,[59-62] age,[63] race,[63] and genetics.[64-70] Our researchers have also studied CVD risk factors within pediatric populations,[71] including challenges in the family environment,[72] poor maternal cardiovascular health,[73] congenital heart defects,[74] high blood pressure,[75-77] and obesity.[78-80] Recent studies have also suggested that neighborhood and socioeconomic factors are implicated in the development of CVD.[81; 82]

In large part because of Kaiser Permanente's emphasis on prevention,[83; 84] persistently high cholesterol[85] and uncontrolled blood pressure[86-88] are much less common among our members than in the broader U.S. population. In addition, the racial, ethnic, and socioeconomic disparities in these risk factors seen nationally are notably smaller among our members.[89-93]

Physical fitness insights

Kaiser Permanente researchers have published important insights about physical fitness using data from CARDIA, a 30-year study of CVD risks and causes in 5,115 young adults in 4 U.S. cities.

Greater fitness in young adulthood is associated with superior heart function in middle age.

Short bursts of exercise (<10 minutes) can reduce the risk of high blood pressure.

Active commuting to work is associated with lower BMI, blood pressure, and cholesterol.

Walking or cycling to neighborhood amenities is associated with lower BMI and lower lifetime CVD risk.

What other health risks do people with cardiovascular disease face?

People with CVD face several associated health risks. While death is a well-known consequence of many cardiovascular diseases,[94-102] superior risk-factor control within Kaiser Permanente has reduced fatal and nonfatal CVD rates among our members.[103-107] Nevertheless, CVD carries other significant risks, including cognitive decline,[108-114] dementia,[115-117] reduced physical function,[118] long-term disability[119] and the need for long-term post-acute care following stroke,[120-123] and repeated hospitalization among patients with heart failure.[124-129] Our scientists have highlighted the unique challenges the COVID-19 pandemic has posed for optimal management of cardiovascular illness.[130-139]

Moreover, the medications used to treat various cardiovascular diseases carry significant risks and side effects.[140; 141] Patients receiving anticoagulants for prevention of stroke may be at increased risk of severe bleeding events,[142-145] myocardial infarction,[146] and death.[147] In addition, common treatments for heart failure and high blood pressure can have serious side effects, including high blood potassium,[148] serious injuries from falls,[149; 150] and risk of adverse neonatal outcomes.[151; 152]

Improving Patient Outcomes

What strategies are effective in preventing cardiovascular disease?

Prevention strategies in CVD focus primarily on measuring and treating risk factors. Kaiser Permanente tracks nearly all of the American Heart Association's "Life's Essential 8" cardiovascular health metrics,[153] including physical activity,[154-160] sleep quality,[161; 162] obesity,[163] blood pressure,[86-88; 164-166] cholesterol,[26; 167; 168] and smoking,[154] and uses them to measure treatment response and perform ongoing surveillance.[169] This work is conducted by teams led by primary care physicians.[164; 170-172] Screening also plays a significant role in CVD prevention. For example, early identification of elevated blood pressure has been shown to improve outcomes in adult patients.[173; 174] Our researchers have also studied prehospital screening strategies for patients with suspected strokes,[175] risk scoring and care pathway systems for evaluating patients entering the emergency department with chest pain,[176; 177] and targeted cholesterol screening in pediatric patients.[178; 179]

What are the key factors in effective treatment of cardiovascular disease?

Risk-factor management: In addition to direct treatment of CVD, ongoing risk-factor management is a critical component of the care of these patients. Studies conducted in Kaiser Permanente have found improved outcomes from smoking cessation interventions,[180; 181] dietary advice,[181-183] and physical activity[181; 184-188] interventions in patients with CVD. Self-monitoring in conjunction with counseling, education, and assistance with medication management,[183; 189-196] disease management for heart failure patients in skilled nursing facilities,[197; 198] home-based cardiac rehabilitation,[199] and the provision of additional support to primary care physicians[200] have all been associated with improved outcomes, and with reductions in racial disparities.

Pharmacotherapy: Medications are an established component of evidence-based care for both CVD management and control of risk factors. While a discussion of specific medications is beyond the scope of this brief, our researchers have led or collaborated on key studies exploring the efficacy and safety of numerous medications in CVD populations. These have included key studies of glucose-lowering medications for control of type 2 diabetes and prevention of cardiovascular complications of diabetes,[201-203] drugs to lower blood pressure,[86; 204-211] and cholesterol-lowering medications,[212-215] as well as recent studies of anticoagulant treatments for stroke prevention among patients with atrial fibrillation,[146; 216-219] and medications for acute or chronic heart failure.[220-229]

Kaiser Permanente employs effective strategies to help patients with CVD

Telestroke

Rates of tissue plasminogen activator administration for acute stroke increased in emergency departments with an on-call neurologist available by phone.[271; 272]

Refills by mail

Patients enrolled in a mail-order pharmacy program were more likely to adhere to recommended hypertension treatment.[165]

Interactive voice response

In a randomized trial, statin adherence and cholesterol control were enhanced by IVR reminders.[240-243]

Given its importance in the care of patients with CVD, medication adherence has also been a significant focus of research in Kaiser Permanente. Large cohort studies conducted by our scientists have found that nonadherence to medications such as ACE inhibitors, oral anticoagulants, statins, and beta-blockers is

associated with increased risks for all-cause and cardiovascular mortality, revascularization (an invasive medical procedure that restores blood flow to blocked or narrowed coronary arteries), cardiovascular hospitalization, and other serious cardiovascular events.[212; 230-232] A large study of at-risk members starting statins found that 84% were still receiving them 1 year later, but only 42% had experienced no treatment gaps during that time.[233] The trend of suboptimal preventive use of statins has proven difficult to reverse, as shown by a national-level study conducted by Kaiser Permanente scientists.[234; 235] Furthermore, patients at lower CVD risk are less likely to comply with prescribed statin therapy.[236] We have evaluated several medication-adherence interventions for patients with CVD involving clinical pharmacist[164; 237] or community health worker[238; 239] outreach, interactive voice response calls and reporting,[240-243] mail-order pharmacy programs,[165] or web-based medication self-management.[244]

Other secondary prevention: In addition to medication and lifestyle modifications, surgical procedures (including heart transplantation) and device implantation are also components of CVD management in targeted patients. Coronary revascularization has been studied extensively within Kaiser Permanente, including research on geographic variations in the use of this family of technologies.[245] Studies have found that improved patient outcomes are associated with the appropriate use of specific invasive procedures,[246-253] particular clinical characteristics,[254-258] surgeons who perform more procedures,[259] and improved practices for managing blood clots.[260]

For patients with certain severe heart conditions, heart transplantation is an important treatment strategy. Our researchers have found that receiving a heart from a donor with diabetes mellitus,[261] having a history of transplant rejection,[262] and experiencing longer wait times before transplantation[263] are associated with poorer heart transplant outcomes. Another study described a DNA-based method for noninvasive diagnosis of heart transplant rejection,[264] increasing the ease of post-transplant monitoring. Our research on implantable cardiac defibrillator, or ICD, usage has explored how often these devices are used in non-guideline-directed fashion.[265] Scientists at Kaiser Permanente have also found that preventive ICD implantation is not consistently performed in patients at high risk of sudden cardiac death.[266] Other studies have found that mortality outcomes in patients with ICDs are associated with heart function, the heart's structure,[125] and higher BMI (body mass index),[267] and have evaluated algorithms for the prediction of survival and sudden death in these patients.[268; 269]

Translating Research Findings Into Policy and Practice

As part of a learning health care organization that uses research to inform and improve practice, Kaiser Permanente's research, clinical, and operational partners have tested a range of interventions to reduce the risk of CVD and improve outcomes for patients with established CVD. For example, research supporting the efficacy of combining ACE inhibitors and thiazide diuretics in a single pill for blood pressure management and protocol-driven medication and dose adjustments led to broad adoption of these practices in Kaiser Permanente's blood pressure management program.[87] Our research in acute stroke management[270] has led to implementation of effective telestroke programs with an on-call neurologist available via telemedicine technology to emergency department physicians in our Northern California[271] and Southern California regions.[272] More recently, our scientists have used artificial intelligence techniques to develop risk prediction tools for patients entering the emergency department with acute heart failure,[273-275] and participated in developing and validating the American Heart Association's PREVENT equations for prediction of cardiovascular risks.[276] However, our work has also underscored many of the barriers to the use of similar risk calculators in primary care settings.[277]

Heart attacks and high blood pressure rates

Thanks to interventions validated by our researchers, rates of heart attacks and high blood pressure dropped sharply in Kaiser Permanente Northern California between 1999 and 2014.

	1999	2014
% with high blood pressure[205]	54%	10%
Heart attacks per 100,000 members[104]	274	185

Collectively, research from Kaiser Permanente authors has been cited nearly 860 times within recent consensus statements and clinical practice guidelines published by a wide range of entities, including the American Stroke Association and American Heart Association.[278] In addition, our researchers and clinician scientists have directly contributed as authors of 3 hypertension guidelines,[279-281] as well as other guidelines published by the American College of Chest Physicians,[282] the American College of Cardiology, the American Heart Association, and The Obesity Society,[283] the American College of Cardiology and other societies,[284] the American Heart Association,[285-291] the Western Vascular Society,[292] the Society for Vascular Surgery,[293; 294] the Lancet Commission on Hypertension,[295] the American Academy of Neurology,[296] the Heart Failure Society of America,[297] and the U.S. Preventive Services Task Force.[298-306] Kaiser Permanente researchers have also participated in the Implementation Science Work Group on CVD guidelines convened by the National Heart, Lung, and Blood Institute (NHLBI),[307] a workshop on hypertension control sponsored by the NHLBI and the CDC,[308] NHLBI workshops on research regarding measurement of modifiable CVD risk factors, heart failure and atrial fibrillation,[309-315] an expert panel on cardiac rehabilitation for patients with heart failure,[316] the HEARTs in the Americas Innovation Group,[317-319] and the "Bending the Curve in Cardiovascular Disease Mortality" symposium sponsored by NHLBI and the American Heart Association.[320] Our scientists have also participated in regional health collaboratives in the city of San Diego and Sonoma County aimed at reducing the burden of cardiovascular disease.[321; 322] Finally, the hypertension management efforts implemented in our California regions[86; 87] have received widespread recognition,[323] particularly with respect to reducing racial disparities in blood pressure control.[324]

Kaiser Permanente has shown considerable leadership in the field of CVD research. We have endorsed and actively supported the Department of Health and Human Services' Million Hearts Initiative,[325] and our Colorado,[326] Northern California,[327] and Georgia[328] regions have been recognized as Million Hearts Hypertension Control Champions. Kaiser Permanente has supported care improvement efforts in safety net health care providers that operate in the same communities.[329] Our researchers have led or collaborated on many notable studies related to epidemiology, prevention, risk factors, and treatment of CVD, including the Coronary Artery Risk Development in Young Adults (CARDIA) study, the Cardiovascular Research Network (CVRN), the Effectiveness of Gastric Bypass Versus Gastric Sleeve for Cardiovascular Disease (ENGAGE CVD) study, the Cardiovascular Health of HAPO Offspring (a substudy of the Hyperglycemia and Adverse Pregnancy Outcomes Study), and the Anticoagulation and Risk Factors in Atrial Fibrillation (ATRIA) study, all of which have been sponsored by the NIH's National Heart, Lung, and Blood Institute.

This brief was written by Nicholas P. Emptage, Anna C. Davis, and Elizabeth A. McGlynn. It is available online from about.kaiserpermanente.org/health-and-wellness/health-research/research-briefs. The authors wish to thank the following researchers for their contributions to the development of this brief: Alan S. Go and Kristi Reynolds. Learn more about Kaiser Permanente Research at about.kaiserpermanente.org/health-and-wellness/health-research.

References

1. Centers for Disease Control and Prevention. Heart Disease Facts. 2024; https://www.cdc.gov/heart-disease/data-research/facts-stats/index.html. Accessed December 10, 2024.
2. Martin SS, Aday AW, Almarzooq ZI, et al. 2024 Heart Disease and Stroke Statistics: A Report of US and Global Data From the American Heart Association. *Circulation.* 2024;149(8):e347-e913.
3. Centers for Disease Control and Prevention. Stroke Facts. 2024; https://www.cdc.gov/stroke/data-research/facts-stats/index.html. Accessed December 10, 2024.
4. Kaiser Permanente Publications Library (KPPL) Search conducted on November 22, 2024: (dc.title:cardiac OR dc.title:cardiovascular OR dc.title:cerebrovascular OR dc.title:heart OR dc.title:stroke OR dc.subject.mesh:"aortic diseases" OR dc.subject.mesh:aneurysm OR dc.subject.mesh:"atrial fibrillation" OR dc.subject.mesh:"brain infarction" OR dc.subject.mesh:"brain ischemia" OR dc.subject.mesh:"cardiovascular abnormalities" OR dc.subject.mesh:"cardiovascular diseases" OR dc.subject.mesh:"cardiovascular infections" OR dc.subject.mesh:cerebrovascular OR dc.subject.mesh:"embolism and thrombosis" OR dc.subject.mesh:"heart diseases" OR dc.subject.mesh:hypertension OR dc.subject.mesh:"intracranial arterial diseases" OR dc.subject.mesh:"intracranial hemorrhages" OR dc.subject.mesh:"pregnancy complications, cardiovascular" OR dc.subject.mesh:stroke OR dc.subject.mesh:"vascular diseases") AND dc.type:"Journal Article". Dates 2012 to 2024.
5. Mosley JD, Gupta DK, Tan J, et al. Predictive Accuracy of a Polygenic Risk Score Compared With a Clinical Risk Score for Incident Coronary Heart Disease. *JAMA.* 2020;323(7):627-635.
6. Suthahar N, Lau ES, Blaha MJ, et al. Sex-Specific Associations of Cardiovascular Risk Factors and Biomarkers With Incident Heart Failure. *Journal of the American College of Cardiology.* 2020;76(12):1455-1465.
7. Hussain A, Lee M, Rana J, Virani SS. Epidemiology and risk factors for stroke in young individuals: implications for prevention. *Current opinion in cardiology.* 2021;36(5):565-571.
8. Vazquez-Benitez G, Desai JR, Xu S, et al. Preventable Major Cardiovascular Events Associated With Uncontrolled Glucose, Blood Pressure, and Lipids and Active Smoking in Adults With Diabetes With and Without Cardiovascular Disease: A Contemporary Analysis. *Diabetes care.* 2015;38(5):905-912.
9. Reis JP, Allen NB, Bancks MP, et al. Duration of Diabetes and Prediabetes During Adulthood and Subclinical Atherosclerosis and Cardiac Dysfunction in Middle Age: The CARDIA Study. *Diabetes care.* 2018;41(4):731-738.
10. Modjtahedi BS, Wu J, Luong TQ, Gandhi NK, Fong DS, Chen W. Severity of diabetic retinopathy and the risk of future cerebrovascular disease, cardiovascular disease, and all-cause mortality. *Ophthalmology.* 2021;128(8):1169-1179.
11. Singer DE, Chang Y, Borowsky LH, et al. A New Risk Scheme to Predict Ischemic Stroke and Other Thromboembolism in Atrial Fibrillation: The ATRIA Study Stroke Risk Score. *Journal of the American Heart Association.* 2013;2(3):e000250.
12. Ezaz G, Long JB, Gross CP, Chen J. Risk prediction model for heart failure and cardiomyopathy after adjuvant trastuzumab therapy for breast cancer. *Journal of the American Heart Association.* 2014;3(1):e000472. Epub 002014-000402.
13. Nichols GA, Philip S, Reynolds K, Granowitz CB, Fazio S. Increased Cardiovascular Risk in Hypertriglyceridemic Patients with Statin-Controlled LDL Cholesterol. *The Journal of clinical endocrinology and metabolism.* 2018;103(8):3019-3027.
14. Go AS, Reynolds K, Yang J, et al. Association of Burden of Atrial Fibrillation With Risk of Ischemic Stroke in Adults With Paroxysmal Atrial Fibrillation: The KP-RHYTHM Study. *JAMA cardiology.* 2018;3(7):601-608.
15. Lowres N, Olivier J, Chao TF, et al. Estimated stroke risk, yield, and number needed to screen for atrial fibrillation detected through single time screening: a multicountry patient-level meta-analysis of 141,220 screened individuals. *PLoS medicine.* 2019;16(9):e1002903.
16. Gerber Y, Rana JS, Jacobs DR, et al. Blood Pressure Levels in Young Adulthood and Midlife Stroke Incidence in a Diverse Cohort. *Hypertension.* 2021;77(5):1683-1693.

17. Nwabuo CC, Appiah D, Moreira HT, et al. Long-term cumulative blood pressure in young adults and incident heart failure, coronary heart disease, stroke, and cardiovascular disease: The CARDIA study. *European journal of preventive cardiology.* 2021;28(13):1445-1451.
18. Yano Y, Reis JP, Lewis CE, et al. Association of Blood Pressure Patterns in Young Adulthood With Cardiovascular Disease and Mortality in Middle Age. *JAMA cardiology.* 2020;5(4):382-389.
19. Yano Y, Reis JP, Tedla YG, et al. Racial Differences in Associations of Blood Pressure Components in Young Adulthood With Incident Cardiovascular Disease by Middle Age: Coronary Artery Risk Development in Young Adults (CARDIA) Study. *JAMA cardiology.* 2017;2(4):381-389.
20. Flint AC, Conell C, Ren X, et al. Effect of Systolic and Diastolic Blood Pressure on Cardiovascular Outcomes. *The New England journal of medicine.* 2019;381(3):243-251.
21. Zhang Y, Vittinghoff E, Pletcher MJ, et al. Associations of Blood Pressure and Cholesterol Levels During Young Adulthood With Later Cardiovascular Events. *Journal of the American College of Cardiology.* 2019;74(3):330-341.
22. Whelton SP, McEvoy JW, Shaw L, et al. Association of Normal Systolic Blood Pressure Level With Cardiovascular Disease in the Absence of Risk Factors. *JAMA cardiology.* 2020;5(9):1011-1018.
23. Vemulapalli S, Inohara T, Kim S, et al. Blood Pressure Control and Cardiovascular Outcomes in Patients With Atrial Fibrillation (From the ORBIT-AF Registry). *The American journal of cardiology.* 2019;123(10):1628-1636.
24. Xia M, An J, Fischer H, Allen NB, Xanthakis V, Zhang Y. Blood Pressure Trajectories During Young Adulthood and Cardiovascular Events in Later Life. *American journal of hypertension.* 2024.
25. An J, Fischer H, Ni L, et al. Association Between Young Adult Characteristics and Blood Pressure Trajectories. *Journal of the American Heart Association.* 2024;13(8):e033053.
26. Colantonio LD, Bittner V, Reynolds K, et al. Association of Serum Lipids and Coronary Heart Disease in Contemporary Observational Studies. *Circulation.* 2016;133(3):256-264.
27. Nichols GA, Philip S, Reynolds K, Granowitz CB, Fazio S. Increased Residual Cardiovascular Risk in Patients with Diabetes and High versus Normal Triglycerides Despite Statin-Controlled LDL Cholesterol. *Diabetes, obesity & metabolism.* 2019;21(2):366-371.
28. Gottdiener JS, Buzkova P, Kahn PA, et al. Relation of Cigarette Smoking and Heart Failure in Adults ≥65 Years of Age (From the Cardiovascular Health Study). *The American journal of cardiology.* 2022;168:90-98.
29. Peila R, Xue X, Qi Q, et al. Healthy Lifestyle Index and Risk of Cardiovascular Disease Among Postmenopausal Women With Normal Body Mass Index. *Journal of the American Heart Association.* 2023;12(12):e029111.
30. Nichols GA, Horberg M, Koebnick C, et al. Cardiometabolic Risk Factors Among 1.3 Million Adults With Overweight or Obesity, but Not Diabetes, in 10 Geographically Diverse Regions of the United States, 2012-2013. *Preventing chronic disease.* 2017;14:E22.
31. Savji N, Meijers WC, Bartz TM, et al. The Association of Obesity and Cardiometabolic Traits With Incident HFpEF and HFrEF. *JACC Heart failure.* 2018;6(8):701-709.
32. Fox CS, Matsushita K, Woodward M, et al. Associations of kidney disease measures with mortality and end-stage renal disease in individuals with and without diabetes: a meta-analysis. *Lancet.* 2012;380(9854):1662-1673.
33. Matsushita K, Mahmoodi BK, Woodward M, et al. Comparison of risk prediction using the CKD-EPI equation and the MDRD study equation for estimated glomerular filtration rate. *JAMA.* 2012;307(18):1941-1951.
34. Go AS, Hsu CY, Yang J, Tan TC, Zheng S, Ordonez JD, Liu KD. Acute Kidney Injury and Risk of Heart Failure and Atherosclerotic Events. *Clinical journal of the American Society of Nephrology : CJASN.* 2018;13(6):833-841.
35. Park M, Hsu CY, Go AS, et al. Urine Kidney Injury Biomarkers and Risks of Cardiovascular Disease Events and All-Cause Death: The CRIC Study. *Clinical journal of the American Society of Nephrology : CJASN.* 2017;12(5):761-771.
36. Piccini JP, Stevens SR, Chang Y, et al. Renal Dysfunction as a Predictor of Stroke and Systemic Embolism in Patients with Nonvalvular Atrial Fibrillation: Validation of the R2CHADS2 Index in the ROCKET AF and ATRIA Study Cohorts. *Circulation.* 2013;127(2):224-232.

37. Go AS, Reynolds K, Avula HR, et al. Human Immunodeficiency Virus Infection and Variation in Heart Failure Risk by Age, Sex, and Ethnicity: The HIV HEART Study. *Mayo Clin Proc.* 2022;97(3):465-479.
38. Mefford MT, Silverberg MJ, Leong TK, et al. Multimorbidity Burden and Incident Heart Failure Among People With and Without HIV: The HIV-HEART Study. *Mayo Clinic proceedings Innovations, quality & outcomes.* 2022;6(3):218-227.
39. Lo Re V, Dutcher SK, Connolly JG, et al. Association of COVID-19 vs Influenza With Risk of Arterial and Venous Thrombotic Events Among Hospitalized Patients. *JAMA.* 2022;328(7):637-651.
40. Tobler DL, Pruzansky AJ, Naderi S, Ambrosy AP, Slade JJ. Long-Term Cardiovascular Effects of COVID-19: Emerging Data Relevant to the Cardiovascular Clinician. *Current atherosclerosis reports.* 2022;24(7):563-570.
41. Marklund M, Wu JHY, Imamura F, et al. Biomarkers of Dietary Omega-6 Fatty Acids and Incident Cardiovascular Disease and Mortality. *Circulation.* 2019;139(21):2422-2436.
42. Sun Y, Liu B, Snetselaar LG, et al. Association of Major Dietary Protein Sources With All-Cause and Cause-Specific Mortality: Prospective Cohort Study. *Journal of the American Heart Association.* 2021;10(5):e015553.
43. Choi Y, Larson N, Steffen LM, et al. Plant-Centered Diet and Risk of Incident Cardiovascular Disease During Young to Middle Adulthood. *Journal of the American Heart Association.* 2021;10(16):e020718.
44. Zhao Y, Naumova EN, Bobb JF, Henn BC, Singh GM. Joint Association of Multiple Dietary Components on Cardiovascular Disease Risk: A Machine Learning Approach. *American journal of epidemiology.* 2021;190(7):1353-1365.
45. Shivakoti R, Biggs ML, Djoussé L, et al. Intake and Sources of Dietary Fiber, Inflammation, and Cardiovascular Disease in Older US Adults. *JAMA network open.* 2022;5(3):e225012.
46. Bellettiere J, LaMonte MJ, Evenson KR, et al. Sedentary behavior and cardiovascular disease in older women: The Objective Physical Activity and Cardiovascular Health (OPACH) Study. *Circulation.* 2019;139(8):1036-1046.
47. LaCroix AZ, Bellettiere J, Rillamas-Sun E, et al. Association of Light Physical Activity Measured by Accelerometry and Incidence of Coronary Heart Disease and Cardiovascular Disease in Older Women. *JAMA network open.* 2019;2(3):e190419.
48. Whitaker KM, Pettee Gabriel K, Buman MP, et al. Associations of Accelerometer-Measured Sedentary Time and Physical Activity With Prospectively Assessed Cardiometabolic Risk Factors: The CARDIA Study. *Journal of the American Heart Association.* 2019;8(4):e010586.
49. Full KM, Whitaker KM, Gabriel KP, et al. Cardiovascular risk and functional burden at midlife: Prospective associations of isotemporal reallocations of accelerometer-measured physical activity and sedentary time in the CARDIA study. *Preventive medicine.* 2021;150:106626.
50. Pettee Gabriel K, Jaeger BC, Lewis CE, et al. Analysis of Cardiorespiratory Fitness in Early Adulthood and Midlife With All-Cause Mortality and Fatal or Nonfatal Cardiovascular Disease. *JAMA network open.* 2023;6(2):e230842.
51. Miao Jonasson J, Hendryx M, Shadyab AH, et al. Social Support, Social Network Size, Social Strain, Stressful Life Events, and Coronary Heart Disease in Women With Type 2 Diabetes: A Cohort Study Based on the Women's Health Initiative. *Diabetes care.* 2020;43(8):1759-1766.
52. Mefford MT, Mittleman MA, Li BH, et al. Sociopolitical stress and acute cardiovascular disease hospitalizations around the 2016 presidential election. *Proceedings of the National Academy of Sciences of the United States of America.* 2020;117(43):27054-27058.
53. Golaszewski NM, LaCroix AZ, Godino JG, et al. Evaluation of Social Isolation, Loneliness, and Cardiovascular Disease Among Older Women in the US. *JAMA network open.* 2022;5(2):e2146461.
54. Zhang Y, An J, Xia M, et al. Risk-enhancing factors and social determinants of health in risk assessment for atherosclerotic cardiovascular disease. *PloS one.* 2024;19(10):e0312756.
55. Alexeeff SE, Deosaransingh K, Liao NS, Van Den Eeden SK, Schwartz J, Sidney S. Particulate Matter and Cardiovascular Risk in Adults with Chronic Obstructive Pulmonary Disease. *American journal of respiratory and critical care medicine.* 2021;204(2):159-167.

56. Alexeeff SE, Liao NS, Liu X, Van Den Eeden SK, Sidney S. Long-Term PM2.5 Exposure and Risks of Ischemic Heart Disease and Stroke Events: Review and Meta-Analysis. *Journal of the American Heart Association.* 2021;10(1):e016890.

57. Liao NS, Sidney S, Deosaransingh K, Van Den Eeden SK, Schwartz J, Alexeeff SE. Particulate Air Pollution and Risk of Cardiovascular Events Among Adults With a History of Stroke or Acute Myocardial Infarction. *Journal of the American Heart Association.* 2021;10(10):e019758.

58. Alexeeff SE, Deosaransingh K, Van Den Eeden S, Schwartz J, Liao NS, Sidney S. Association of Long-term Exposure to Particulate Air Pollution With Cardiovascular Events in California. *JAMA network open.* 2023;6(2):e230561.

59. de Boer RA, Nayor M, deFilippi CR, et al. Association of Cardiovascular Biomarkers With Incident Heart Failure With Preserved and Reduced Ejection Fraction. *JAMA cardiology.* 2018;3(3):215-224.

60. Bhambhani V, Kizer JR, Lima JAC, et al. Predictors and outcomes of heart failure with mid-range ejection fraction. *European journal of heart failure.* 2018;20(4):651-659.

61. Lemaitre RN, Jensen PN, Hoofnagle A, et al. Plasma Ceramides and Sphingomyelins in Relation to Heart Failure Risk. *Circulation Heart failure.* 2019;12(7):e005708.

62. Lemaitre RN, McKnight B, Sotoodehnia N, et al. Circulating Very Long-Chain Saturated Fatty Acids and Heart Failure: The Cardiovascular Health Study. *Journal of the American Heart Association.* 2018;7(21):e010019.

63. An J, Zhang Y, Muntner P, Moran AE, Hsu JW, Reynolds K. Recurrent Atherosclerotic Cardiovascular Event Rates Differ Among Patients Meeting the Very High Risk Definition According to Age, Sex, Race/Ethnicity, and Socioeconomic Status. *Journal of the American Heart Association.* 2020;9(23):e017310.

64. Malik R, Chauhan G, Traylor M, et al. Multiancestry genome-wide association study of 520,000 subjects identifies 32 loci associated with stroke and stroke subtypes. *Nature genetics.* 2018;50(4):524-537.

65. Agha G, Mendelson MM, Ward-Caviness CK, et al. Blood Leukocyte DNA Methylation Predicts Risk of Future Myocardial Infarction and Coronary Heart Disease. *Circulation.* 2019;140(8):645-657.

66. Choi SH, Weng LC, Roselli C, et al. Association Between Titin Loss-of-Function Variants and Early-Onset Atrial Fibrillation. *JAMA.* 2018;320(22):2354-2364.

67. Christophersen IE, Rienstra M, Roselli C, et al. Large-scale analyses of common and rare variants identify 12 new loci associated with atrial fibrillation. *Nature genetics.* 2017;49(6):946-952.

68. Hoffmann TJ, Ehret GB, Nandakumar P, et al. Genome-wide association analyses using electronic health records identify new loci influencing blood pressure variation. *Nature genetics.* 2017;49(1):54-64.

69. Keene KL, Hyacinth HI, Bis JC, et al. Genome-Wide Association Study Meta-Analysis of Stroke in 22 000 Individuals of African Descent Identifies Novel Associations With Stroke. *Stroke.* 2020;51(8):2454-2463.

70. Shah S, Henry A, Roselli C, et al. Genome-wide association and Mendelian randomisation analysis provide insights into the pathogenesis of heart failure. *Nature communications.* 2020;11(1):163.

71. Urbina EM, Isom S, Bell RA, et al. Burden of Cardiovascular Risk Factors Over Time and Arterial Stiffness in Youth With Type 1 Diabetes Mellitus: The SEARCH for Diabetes in Youth Study. *Journal of the American Heart Association.* 2019;8(13):e010150.

72. Pierce JB, Kershaw KN, Kiefe CI, Jacobs DR, Sidney S, Merkin SS, Feinglass J. Association of Childhood Psychosocial Environment With 30-Year Cardiovascular Disease Incidence and Mortality in Middle Age. *Journal of the American Heart Association.* 2020;9(9):e015326.

73. Perak AM, Lancki N, Kuang A, et al. Associations of Maternal Cardiovascular Health in Pregnancy With Offspring Cardiovascular Health in Early Adolescence. *JAMA.* 2021;325(7):658-668.

74. Fox CK, Sidney S, Fullerton HJ. Community-Based Case-Control Study of Childhood Stroke Risk Associated With Congenital Heart Disease. *Stroke.* 2015;46(2):336-340.

75. Daley MF, Reifler LM, Johnson ES, et al. Predicting Hypertension Among Children With Incident Elevated Blood Pressure. *Academic pediatrics.* 2017;17(3):275-282.

76. Parker ED, Sinaiko AR, Daley MF, et al. Factors Associated With Adherence to Blood Pressure Measurement Recommendations at Pediatric Primary Care Visits, Minnesota and Colorado, 2007-2010. *Preventing chronic disease.* 2015;12:E118.

77. Koebnick C, Black MH, Wu J, et al. The prevalence of primary pediatric prehypertension and hypertension in a real-world managed care system. *J Clin Hypertens (Greenwich).* 2013;15(11):784-792.

78. Parker ED, Sinaiko AR, Kharbanda EO, et al. Change in Weight Status and Development of Hypertension. *Pediatrics.* 2016;137(3):e20151662.

79. Koebnick C, Black MH, Wu J, et al. High Blood Pressure in Overweight and Obese Youth: Implications for Screening. *J Clin Hypertens (Greenwich).* 2013;15(11):793-805.

80. Kim G, Divers J, Fino NF, et al. Trends in Prevalence of Cardiovascular Risk Factors from 2002-2012 among Youth Early in the Course of Type 1 and Type 2 Diabetes. The SEARCH for Diabetes in Youth Study. *Pediatric diabetes.* 2019;20(6):693-701.

81. Shah NS, Ning H, Petito LC, et al. Associations of Clinical and Social Risk Factors With Racial Differences in Premature Cardiovascular Disease. *Circulation.* 2022;146(3):201-210.

82. Jain V, Al Rifai M, Khan SU, et al. Association Between Social Vulnerability Index and Cardiovascular Disease: A Behavioral Risk Factor Surveillance System Study. *Journal of the American Heart Association.* 2022;11(15):e024414.

83. Schroeder EB, Hanratty R, Beaty BL, Bayliss EA, Havranek EP, Steiner JF. Simultaneous Control of Diabetes Mellitus, Hypertension, and Hyperlipidemia in 2 Health Systems. *Circ Cardiovasc Qual Outcomes.* 2012;5(5):645-653.

84. Campbell N, Ordunez P, Jaffe MG, et al. Implementing standardized performance indicators to improve hypertension control at both the population and healthcare organization levels. *J Clin Hypertens (Greenwich).* 2017;19(5):456-461.

85. Rana JS, Karter AJ, Liu JY, Moffet HH, Jaffe MG. Improved Cardiovascular Risk Factors Control Associated with a Large-Scale Population Management Program Among Diabetes Patients. *The American journal of medicine.* 2018;131(6):661-668.

86. Jaffe MG, Lee GA, Young JD, Sidney S, Go AS. Improved blood pressure control associated with a large-scale hypertension program. *JAMA.* 2013;310(7):699-705.

87. Sim JJ, Handler J, Jacobsen SJ, Kanter MH. Systemic Implementation Strategies to Improve Hypertension: The Kaiser Permanente Southern California Experience. *The Canadian journal of cardiology.* 2014;30(5):544-552.

88. Shaw KM, Handler J, Wall HK, Kanter MH. Improving blood pressure control in a large multiethnic california population through changes in health care delivery, 2004-2012. *Preventing chronic disease.* 2014;11:E191.

89. Bartolome RE, Chen A, Handler J, Platt ST, Gould B. Population Care Management and Team-Based Approach to Reduce Racial Disparities among African Americans/Blacks with Hypertension. *The Permanente journal.* 2016;20(1):53-59.

90. Savitz ST, Leong T, Sung SH, Lee K, Rana JS, Tabada G, Go AS. Contemporary Reevaluation of Race and Ethnicity With Outcomes in Heart Failure. *Journal of the American Heart Association.* 2021;10(3):e016601.

91. Thomas SJ, Booth JN, Dai C, et al. Cumulative Incidence of Hypertension by 55 Years of Age in Blacks and Whites: The CARDIA Study. *Journal of the American Heart Association.* 2018;7(14):07.

92. Valero-Elizondo J, Hong JC, Spatz ES, et al. Persistent socioeconomic disparities in cardiovascular risk factors and health in the United States: Medical Expenditure Panel Survey 2002-2013. *Atherosclerosis.* 2018;269:301-305.

93. Young DR, Fischer H, Arterburn D, et al. Associations of overweight/obesity and socioeconomic status with hypertension prevalence across racial and ethnic groups. *J Clin Hypertens (Greenwich).* 2018;20(3):532-540.

94. Allen LA, Matlock DD, Shetterly SM, et al. Use of Risk Models to Predict Death in the Next Year Among Individual Ambulatory Patients With Heart Failure. *JAMA cardiology.* 2017;2(4):435-441.

95. Tsao CW, Lyass A, Enserro D, et al. Temporal Trends in the Incidence of and Mortality Associated With Heart Failure With Preserved and Reduced Ejection Fraction. *JACC Heart failure.* 2018;6(8):678-685.

96. Sidney S, Quesenberry CP, Jaffe MG, Sorel M, Go AS, Rana JS. Heterogeneity in national U.S. mortality trends within heart disease subgroups, 2000-2015. *BMC cardiovascular disorders.* 2017;17(1):192.

97. Sidney S, Go AS, Jaffe MG, Solomon MD, Ambrosy AP, Rana JS. Association Between Aging of the US Population and Heart Disease Mortality From 2011 to 2017. *JAMA cardiology.* 2019;4(12):1280-1286.

98. Shah NS, Molsberry R, Rana JS, et al. Heterogeneous trends in burden of heart disease mortality by subtypes in the United States, 1999-2018: observational analysis of vital statistics. *BMJ (Clinical research ed).* 2020;370:m2688.

99. Sidney S, Lee C, Liu J, Khan SS, Lloyd-Jones DM, Rana JS. Age-Adjusted Mortality Rates and Age and Risk-Associated Contributions to Change in Heart Disease and Stroke Mortality, 2011-2019 and 2019-2020. *JAMA network open.* 2022;5(3):e223872.

100. Sax DR, Mark DG, Rana JS, Collins SP, Huang J, Reed ME, Network C. Risk adjusted 30-day mortality and serious adverse event rates among a large, multi-center cohort of emergency department patients with acute heart failure. *Journal of the American College of Emergency Physicians open.* 2022;3(3):e12742.

101. Yu AS, Pak KJ, Zhou H, Shaw SF, Shi J, Broder BI, Sim JJ. All-Cause and Cardiovascular-Related Mortality in CKD Patients With and Without Heart Failure: A Population-Based Cohort Study in Kaiser Permanente Southern California. *Kidney medicine.* 2023;5(5):100624.

102. Shah NS, Shimbo D, Muntner P, et al. Hypertension-Related Cardiovascular Mortality in Asian American Subgroups. *American journal of preventive medicine.* 2023;65(1):117-121.

103. Sidney S, Sorel ME, Quesenberry CP, et al. Comparative Trends in Heart Disease, Stroke, and All-Cause Mortality in the United States and a Large Integrated Healthcare Delivery System. *The American journal of medicine.* 2018;131(7):829-836.

104. Solomon MD, Leong TK, Rana JS, Xu Y, Go AS. Community-Based Trends in Acute Myocardial Infarction From 2008 to 2014. *Journal of the American College of Cardiology.* 2016;68(6):666-668.

105. Mefford MT, Li BH, Qian L, et al. Sex-Specific Trends in Acute Myocardial Infarction Within an Integrated Healthcare Network, 2000 Through 2014. *Circulation.* 2020;141(7):509-519.

106. Chen W, Yao J, Liang Z, et al. Temporal Trends in Mortality Rates among Kaiser Permanente Southern California Health Plan Enrollees, 2001-2016. *The Permanente journal.* 2019;23:18-213.

107. Chi GC, Kanter MH, Li BH, et al. Trends in Acute Myocardial Infarction by Race and Ethnicity. *Journal of the American Heart Association.* 2020;9(5):e013542.

108. Yaffe K, Bahorik AL, Hoang TD, et al. Cardiovascular Risk Factors and Accelerated Cognitive Decline in Midlife: the CARDIA Study. *Neurology.* 2020;95(7):e839-e846.

109. Derby CA, Hutchins F, Greendale GA, et al. Cardiovascular risk and midlife cognitive decline in the Study of Women's Health Across the Nation. *Alzheimer's & dementia : the journal of the Alzheimer's Association.* 2021;17(8):1342-1352.

110. George KM, Gilsanz P, Peterson RL, et al. Impact of Cardiovascular Risk Factors in Adolescence, Young Adulthood, and Midlife on Late-Life Cognition: Study of Healthy Aging in African Americans. *The journals of gerontology Series A, Biological sciences and medical sciences.* 2021;76(9):1692-1698.

111. Peterson RL, George KM, Gilsanz P, et al. Racial/Ethnic Disparities in Young Adulthood and Midlife Cardiovascular Risk Factors and Late-life Cognitive Domains: The Kaiser Healthy Aging and Diverse Life Experiences (KHANDLE) Study. *Alzheimer disease and associated disorders.* 2021;35(2):99-105.

112. van Dalen JW, Brayne C, Crane PK, et al. Association of Systolic Blood Pressure With Dementia Risk and the Role of Age, U-Shaped Associations, and Mortality. *JAMA Intern Med.* 2022;182(2):142-152.

113. Hammond CA, Blades NJ, Chaudhry SI, et al. Long-Term Cognitive Decline After Newly Diagnosed Heart Failure: Longitudinal Analysis in the CHS (Cardiovascular Health Study). *Circulation Heart failure.* 2018;11(3):e004476.

114. Jiang X, Lewis CE, Allen NB, Sidney S, Yaffe K. Premature Cardiovascular Disease and Brain Health in Midlife: The CARDIA Study. *Neurology.* 2023;100(14):e1454-e1463.

115. Exalto LG, Biessels GJ, Karter AJ, Huang ES, Katon WJ, Minkoff JR, Whitmer RA. Risk score for prediction of 10 year dementia risk in individuals with type 2 diabetes: a cohort study. *The lancet Diabetes & endocrinology.* 2013;1(3):183-190.

116. Exalto LG, Quesenberry CP, Barnes D, Kivipelto M, Biessels GJ, Whitmer RA. Midlife risk score for the prediction of dementia four decades later. *Alzheimer's & dementia : the journal of the Alzheimer's Association.* 2014;10(5):562-570.

117. Kent DM, Leung LY, Zhou Y, et al. Association of Incidentally Discovered Covert Cerebrovascular Disease Identified Using Natural Language Processing and Future Dementia. *Journal of the American Heart Association.* 2023;12(1):e027672.

118. Damluji AA, Alfaraidhy M, AlHajri N, et al. Sarcopenia and Cardiovascular Diseases. *Circulation.* 2023;147(20):1534-1553.

119. Chan L, Sandel ME, Jette AM, et al. Does Post-Acute Care Site Matter? A longitudinal study assessing functional recovery after a stroke. *Archives of physical medicine and rehabilitation.* 2013;94(4):622-629.

120. Camicia M, Lutz B, Summers D, Klassman L, Vaughn S. Nursing's Role in Successful Stroke Care Transitions Across the Continuum: From Acute Care Into the Community. *Stroke.* 2021;52(12):e794-e805.

121. Camicia M, Lutz BJ, Harvath TA, Joseph JG. Using the Preparedness Assessment for the Transition Home After Stroke Instrument to Identify Stroke Caregiver Concerns Predischarge: Uncertainty, Anticipation, and Cues to Action. *Rehabilitation nursing : the official journal of the Association of Rehabilitation Nurses.* 2021;46(1):33-42.

122. Wang H, Camicia M, DiVita M, Mix J, Niewczyk P. Early inpatient rehabilitation admission and stroke patient outcomes. *American journal of physical medicine & rehabilitation / Association of Academic Physiatrists.* 2015;94(2):85-96.

123. Wang H, Camicia M, Terdiman J, Mannava MK, Sidney S, Sandel ME. Daily Treatment Time and Functional Gains of Stroke Patients During Inpatient Rehabilitation. *PM & R : the journal of injury, function, and rehabilitation.* 2013;5(2):122-128.

124. Krumholz HM, Lin Z, Keenan PS, et al. Relationship between hospital readmission and mortality rates for patients hospitalized with acute myocardial infarction, heart failure, or pneumonia. *JAMA.* 2013;309(6):587-593.

125. Peterson PN, Greiner MA, Qualls LG, et al. QRS duration, bundle-branch block morphology, and outcomes among older patients with heart failure receiving cardiac resynchronization therapy. *JAMA.* 2013;310(6):617-626.

126. Retrum JH, Boggs J, Hersh A, Wright L, Main DS, Magid DJ, Allen LA. Patient-Identified Factors Related to Heart Failure Readmissions. *Circ Cardiovasc Qual Outcomes.* 2013;6(2):171-177.

127. Ahmedani BK, Solberg LI, Copeland LA, et al. Psychiatric Comorbidity and 30-Day Readmissions After Hospitalization for Heart Failure, AMI, and Pneumonia. *Psychiatric services (Washington, DC).* 2015;66(2):134-140.

128. McNaughton CD, Collins SP, Kripalani S, et al. Lower Numeracy Is Associated with Increased Odds of 30-Day Emergency Department and Hospital Recidivism for Patients with Acute Heart Failure. *Circulation Heart failure.* 2013;6(1):40-46.

129. Salah HM, Minhas AMK, Khan MS, et al. Trends in Hospitalizations for Heart Failure, Acute Myocardial Infarction, and Stroke in the United States from 2004-2018. *American heart journal.* 2022;243:103-109.

130. Nguyen-Huynh MN, Tang XN, Vinson DR, et al. Acute Stroke Presentation, Care, and Outcomes in Community Hospitals in Northern California During the COVID-19 Pandemic. *Stroke.* 2020;51(10):2918-2924.

131. An J, Wei R, Zhou H, et al. Angiotensin-Converting Enzyme Inhibitors or Angiotensin Receptor Blockers Use and COVID-19 Infection Among 824 650 Patients With Hypertension From a US Integrated Healthcare System. *Journal of the American Heart Association.* 2021;10(3):e019669.

132. Nogueira RG, Qureshi MM, Abdalkader M, et al. Global Impact of COVID-19 on Stroke Care and Intravenous Thrombolysis. *Neurology.* 2021;96(23):e2824-e2838.

133. Padrick MM, Sangha N, Paletz L, et al. COVID-19 Impact on Acute Ischemic Stroke Treatment at 9 Comprehensive Stroke Centers across Los Angeles. *Cerebrovascular diseases (Basel, Switzerland).* 2021;50(6):707-714.

134. Solomon MD, McNulty EJ, Rana JS, et al. The Covid-19 Pandemic and the Incidence of Acute Myocardial Infarction. *The New England journal of medicine.* 2020;383(7):691-693.

135. Solomon MD, Nguyen-Huynh M, Leong TK, Alexander J, Rana JS, Klingman J, Go AS. Changes in Patterns of Hospital Visits for Acute Myocardial Infarction or Ischemic Stroke During COVID-19 Surges. *JAMA.* 2021;326(1):82-84.

136. An J, Zhou H, Luong TQ, et al. Risk of hospitalization and mortality associated with uncontrolled blood pressure in patients with hypertension and COVID-19. *International journal of cardiology Cardiovascular risk and prevention.* 2021;11:200117.

137. Nogueira RG, Abdalkader M, Qureshi MM, et al. Global impact of COVID-19 on stroke care. *International journal of stroke : official journal of the International Stroke Society.* 2021;16(5):573-584.

138. Khan NA, Stergiou GS, Omboni S, et al. Virtual management of hypertension: lessons from the COVID-19 pandemic-International Society of Hypertension position paper endorsed by World Hypertension League and European Society of Hypertension. *Journal of hypertension.* 2022;40(8):1435-1448.

139. Mefford MT, An J, Gupta N, et al. Rates of Acute Myocardial Infarction During the COVID-19 Pandemic. *The Permanente journal.* 2021;25.

140. Bromfield SG, Ngameni CA, Colantonio LD, et al. Blood Pressure, Antihypertensive Polypharmacy, Frailty, and Risk for Serious Fall Injuries Among Older Treated Adults With Hypertension. *Hypertension.* 2017;70(2):259-266.

141. Leonard CE, Brensinger CM, Aquilante CL, et al. Comparative Safety of Sulfonylureas and the Risk of Sudden Cardiac Arrest and Ventricular Arrhythmia. *Diabetes care.* 2018;41(4):713-722.

142. Cullen MW, Kim S, Piccini JP, et al. Risks and Benefits of Anticoagulation in Atrial Fibrillation: Insights From the Outcomes Registry for Better Informed Treatment of Atrial Fibrillation (ORBIT-AF) Registry. *Circ Cardiovasc Qual Outcomes.* 2013;6(4):461-469.

143. An J, Niu F, Lang DT, et al. Stroke and Bleeding Risk Associated With Antithrombotic Therapy for Patients With Nonvalvular Atrial Fibrillation in Clinical Practice. *Journal of the American Heart Association.* 2015;4(7):e001921.

144. Quinn GR, Singer DE, Chang Y, Go AS, Borowsky LH, Fang MC. How Well Do Stroke Risk Scores Predict Hemorrhage in Patients With Atrial Fibrillation? *The American journal of cardiology.* 2016;118(5):697-699.

145. Li G, Thabane L, Delate T, Witt DM, Levine MA, Cheng J, Holbrook A. Can We Predict Individual Combined Benefit and Harm of Therapy? Warfarin Therapy for Atrial Fibrillation as a Test Case. *PloS one.* 2016;11(8):e0160713.

146. Go AS, Singer DE, Toh S, et al. Outcomes of Dabigatran and Warfarin for Atrial Fibrillation in Contemporary Practice: A Retrospective Cohort Study. *Annals of internal medicine.* 2017;167(12):845-854.

147. Freeman JV, Reynolds K, Fang M, et al. Digoxin and Risk of Death in Adults with Atrial Fibrillation: The ATRIA-CVRN Study. *Circulation Arrhythmia and electrophysiology.* 2015;8(1):49-58.

148. Lee KK, Shilane D, Hlatky MA, Yang J, Steimle AE, Go AS. Effectiveness and Safety of Spironolactone for Systolic Heart Failure. *The American journal of cardiology.* 2013;112(9):1427-1432.

149. Sim JJ, Zhou H, Bhandari S, et al. Low Systolic Blood Pressure From Treatment and Association With Serious Falls/Syncope. *American journal of preventive medicine.* 2018;55(4):488-496.

150. Shimbo D, Barrett Bowling C, Levitan EB, et al. Short-Term Risk of Serious Fall Injuries in Older Adults Initiating and Intensifying Treatment With Antihypertensive Medication. *Circ Cardiovasc Qual Outcomes.* 2016;9(3):222-229.

151. Dublin S, Idu A, Avalos LA, et al. Maternal and neonatal outcomes of antihypertensive treatment in pregnancy: A retrospective cohort study. *PloS one.* 2022;17(5):e0268284. Epub 0262022-0268205.

152. Duan L, Ng A, Chen W, Spencer HT, Lee MS. Beta-blocker subtypes and risk of low birth weight in newborns. *J Clin Hypertens (Greenwich).* 2018;20(11):1603-1609.

153. Lloyd-Jones DM, Allen NB, Anderson CAM, et al. Life's Essential 8: Updating and Enhancing the American Heart Association's Construct of Cardiovascular Health: A Presidential Advisory From the American Heart Association. *Circulation.* 2022;146(5):e18-e43.

154. Ghai NR, Jacobsen SJ, Ahmed AT, Haque R, Rhoads GG, Quinn VP, Van den Eeden SK. A comparison of lifestyle and behavioral cardiovascular disease risk factors between Asian Indian and White non-Hispanic men. *Ethnicity & disease.* 2012;22(2):168-174.

155. Young DR, Reynolds K, Sidell M, et al. Effects of physical activity and sedentary time on the risk of heart failure. *Circulation Heart failure.* 2014;7(1):21-27.

156. Coleman KJ, Ngor E, Reynolds K, et al. Initial validation of an exercise "vital sign" in electronic medical records. *Medicine and science in sports and exercise.* 2012;44(11):2071-2076.

157. Pandey A, Allen NB, Ayers C, et al. Fitness in Young Adulthood and Long-Term Cardiac Structure and Function: The CARDIA Study. *JACC Heart failure.* 2017;5(5):347-355.

158. White DK, Gabriel KP, Kim Y, Lewis CE, Sternfeld B. Do Short Spurts of Physical Activity Benefit Cardiovascular Health? The CARDIA Study. *Medicine and science in sports and exercise.* 2015;47(11):2353-2358.

159. Nagata JM, Vittinghoff E, Gabriel KP, et al. Physical activity from young adulthood to middle age and premature cardiovascular disease events: a 30-year population-based cohort study. *The international journal of behavioral nutrition and physical activity.* 2022;19(1):123.

160. Nagata JM, Vittinghoff E, Pettee Gabriel K, et al. Physical Activity and Hypertension From Young Adulthood to Middle Age. *American journal of preventive medicine.* 2021;60(6):757-765.

161. Jackson CL, Redline S, Emmons KM. Sleep as a potential fundamental contributor to disparities in cardiovascular health. *Annual review of public health.* 2015;36:417-440.

162. Gordon NP, Yao JH, Brickner LA, Lo JC. Prevalence of sleep-related problems and risks in a community-dwelling older adult population: a cross-sectional survey-based study. *BMC public health.* 2022;22(1):2045.

163. Sidell MA, Ghai NR, Reynolds K, et al. Statins as a free pass: Body mass index and other cardiovascular risk factors among lipid-lowering medication users and nonusers in the California Men's Health Study. *Preventive medicine.* 2019;129:105822.

164. Heisler M, Hofer TP, Schmittdiel JA, et al. Improving Blood Pressure Control through a Clinical Pharmacist Outreach Program in Diabetes Patients in Two-High Performing Health Systems: The Adherence and Intensification of Medications (AIM) Cluster Randomized Controlled Pragmatic Trial. *Circulation.* 2012;125(23):2863-2872.

165. Adams AS, Uratsu C, Dyer W, et al. Health System Factors and Antihypertensive Adherence in a Racially and Ethnically Diverse Cohort of New Users. *JAMA Intern Med.* 2013;173(1):54-61.

166. Klamerus ML, Kerr EA, Bosworth HB, Schmittdiel JA, Heisler M. Characteristics of Diabetic Patients associated with Achieving and Maintaining Blood Pressure Targets in the Adherence and Intensification of Medications Program. *Chronic illness.* 2014;10(1):60-73.

167. Grant DSL, Scott RD, Harrison TN, et al. Trends in Lipid Screening Among Adults in an Integrated Health Care Delivery System, 2009-2015. *Journal of managed care & specialty pharmacy.* 2018;24(11):1090-1101.

168. Mefford MT, Zhou M, Zhou H, et al. Safety Net Program to Improve Statin Initiation Among Adults With High Low-Density Lipoprotein Cholesterol. *American journal of preventive medicine.* 2023;65(4):687-695.

169. Ogunmoroti O, Oni E, Michos ED, et al. Life's Simple 7 and Incident Heart Failure: The Multi-Ethnic Study of Atherosclerosis. *Journal of the American Heart Association.* 2017;6(6):06.

170. Ip EJ, Shah BM, Yu J, Chan J, Nguyen LT, Bhatt DC. Enhancing diabetes care by adding a pharmacist to the primary care team. *American journal of health-system pharmacy : AJHP : official journal of the American Society of Health-System Pharmacists.* 2013;70(10):877-886.

171. Low KJ, Pelter MA, Deamer RL, Burchette RJ. Identification and Evaluation of Risk Factors in Patients With Continuously Uncontrolled Hypertension. *J Clin Hypertens (Greenwich).* 2015;17(4):281-289.

172. Ross R, Blair SN, Arena R, et al. Importance of Assessing Cardiorespiratory Fitness in Clinical Practice: A Case for Fitness as a Clinical Vital Sign: A Scientific Statement From the American Heart Association. *Circulation.* 2016;134(24):e653-e699.

173. Piper MA, Evans CV, Burda BU, Margolis KL, O'Connor E, Whitlock EP. Diagnostic and Predictive Accuracy of Blood Pressure Screening Methods With Consideration of Rescreening Intervals: An Updated Systematic Review for the U.S. Preventive Services Task Force. *Annals of internal medicine.* 2015;162(3):192-204.

174. Handler J, Mohan Y, Kanter MH, et al. Screening for High Blood Pressure in Adults During Ambulatory Nonprimary Care Visits: Opportunities to Improve Hypertension Recognition. *J Clin Hypertens (Greenwich).* 2015;17(6):431-439.

175. Noorian AR, Sanossian N, Shkirkova K, et al. Los Angeles Motor Scale to Identify Large Vessel Occlusion: Prehospital Validation and Comparison With Other Screens. *Stroke.* 2018;49(3):565-572.

176. Mark DG, Huang J, Chettipally U, et al. Performance of Coronary Risk Scores Among Patients With Chest Pain in the Emergency Department. *Journal of the American College of Cardiology.* 2018;71(6):606-616.

177. Sharp AL, Baecker AS, Shen E, et al. Effect of a HEART Care Pathway on Chest Pain Management Within an Integrated Health System. *Annals of emergency medicine.* 2019;74(2):171-180.

178. Lozano P, Henrikson NB, Dunn J, et al. Lipid Screening in Childhood and Adolescence for Detection of Familial Hypercholesterolemia: Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA.* 2016;316(6):645-655.

179. Lozano P, Henrikson NB, Morrison CC, Dunn J, Nguyen M, Blasi PR, Whitlock EP. Lipid Screening in Childhood and Adolescence for Detection of Multifactorial Dyslipidemia: Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA.* 2016;316(6):634-644.

180. Adams J, Cymbala AA, Delate T, Kurz D, Olson KL, Youngblood M, Zadvorny E. Cluster-Randomized Trial of Clinical Pharmacist Tobacco Cessation Counseling among Patients with Cardiovascular Disease. *Population health management.* 2015;18(4):300-306.

181. Booth JN, Colantonio LD, Howard G, et al. Healthy lifestyle factors and incident heart disease and mortality in candidates for primary prevention with statin therapy. *International journal of cardiology.* 2016;207:196-202.

182. Vesco KK, Karanja N, King JC, et al. Efficacy of a group-based dietary intervention for limiting gestational weight gain among obese women: A randomized trial. *Obesity (Silver Spring, Md).* 2014;22(9):1989-1996.

183. Nguyen-Huynh MN, Young JD, Ovbiagele B, et al. Effect of Lifestyle Coaching or Enhanced Pharmacotherapy on Blood Pressure Control Among Black Adults With Persistent Uncontrolled Hypertension: A Cluster Randomized Clinical Trial. *JAMA network open.* 2022;5(5):e2212397.

184. Young DR, Coleman KJ, Ngor E, Reynolds K, Sidell M, Sallis RE. Associations between physical activity and cardiometabolic risk factors assessed in a southern california health care system, 2010-2012. *Preventing chronic disease.* 2014;11:E219.

185. Valero-Elizondo J, Salami JA, Osondu CU, et al. Economic Impact of Moderate-Vigorous Physical Activity Among Those With and Without Established Cardiovascular Disease: 2012 Medical Expenditure Panel Survey. *Journal of the American Heart Association.* 2016;5(9):e003614.

186. Myers J, McElrath M, Jaffe A, et al. A Randomized Trial of Exercise Training in Abdominal Aortic Aneurysm Disease. *Medicine and science in sports and exercise.* 2014;46(1):2-9.

187. Almeida FA, Smith-Ray RL, Dzewaltowski DA, et al. An Interactive Computer Session to Initiate Physical Activity in Sedentary Cardiac Patients: Randomized Controlled Trial. *Journal of medical Internet research.* 2015;17(8):e206.

188. Klasnja P, Smith S, Seewald NJ, et al. Efficacy of Contextually Tailored Suggestions for Physical Activity: A Micro-randomized Optimization Trial of HeartSteps. *Annals of behavioral medicine : a publication of the Society of Behavioral Medicine.* 2018;53(6):573-582.

189. Tucker KL, Sheppard JP, Stevens R, et al. Self-monitoring of blood pressure in hypertension: A systematic review and individual patient data meta-analysis. *PLoS medicine.* 2017;14(9):e1002389.

190. Margolis KL, Asche SE, Dehmer SP, et al. Long-term Outcomes of the Effects of Home Blood Pressure Telemonitoring and Pharmacist Management on Blood Pressure Among Adults With Uncontrolled Hypertension: Follow-up of a Cluster Randomized Clinical Trial. *JAMA network open.* 2018;1(5):e181617.

191. Victor RG, Blyler CA, Li N, et al. Sustainability of Blood Pressure Reduction in Black Barbershops. *Circulation.* 2019;139(8):1036-1046.

192. Daumit GL, Dalcin AT, Dickerson FB, et al. Effect of a Comprehensive Cardiovascular Risk Reduction Intervention in Persons With Serious Mental Illness: A Randomized Clinical Trial. *JAMA network open.* 2020;3(6):e207247.

193. Margolis KL, Dehmer SP, Sperl-Hillen J, et al. Cardiovascular Events and Costs With Home Blood Pressure Telemonitoring and Pharmacist Management for Uncontrolled Hypertension. *Hypertension.* 2020;76(4):1097-1103.

194. Green BB, Anderson ML, Cook AJ, et al. Clinic, Home, and Kiosk Blood Pressure Measurements for Diagnosing Hypertension: a Randomized Diagnostic Study. *Journal of general internal medicine.* 2022;37(12):2948-2956.

195. Harrison TN, Zhou H, Wei R, et al. Blood Pressure Control Among Black and White Adults Following a Quality Improvement Program in a Large Integrated Health System. *JAMA network open.* 2023;6(1):e2249930.

196. Thompson MJ, Anderson ML, Cook AJ, et al. Acceptability and Adherence to Home, Kiosk, and Clinic Blood Pressure Measurement Compared to 24-H Ambulatory Monitoring. *Journal of general internal medicine.* 2023;38(8):1854-1861.

197. Boxer RS, Dolansky MA, Chaussee EL, et al. A Randomized Controlled Trial of Heart Failure Disease Management vs Usual Care in Skilled Nursing Facilities. *Journal of the American Medical Directors Association.* 2022;23(3):359-366.

198. Weerahandi H, Chaussee EL, Dodson JA, Dolansky M, Boxer RS. Disease Management in Skilled Nursing Facilities Improves Outcomes for Patients With a Primary Diagnosis of Heart Failure. *Journal of the American Medical Directors Association.* 2022;23(3):367-372.

199. Nkonde-Price C, Reynolds K, Najem M, et al. Comparison of Home-Based vs Center-Based Cardiac Rehabilitation in Hospitalization, Medication Adherence, and Risk Factor Control Among Patients With Cardiovascular Disease. *JAMA network open.* 2022;5(8):e2228720.

200. Parchman ML, Anderson ML, Dorr DA, et al. A Randomized Trial of External Practice Support to Improve Cardiovascular Risk Factors in Primary Care. *Annals of family medicine.* 2019;17(Suppl 1):S40-S49.

201. Toh S, Hampp C, Reichman ME, et al. Risk for Hospitalized Heart Failure Among New Users of Saxagliptin, Sitagliptin, and Other Antihyperglycemic Drugs: A Retrospective Cohort Study. *Annals of internal medicine.* 2016;164(11):705-714.

202. Lafata JE, Karter AJ, O'Connor PJ, et al. Medication Adherence Does Not Explain Black-White Differences in Cardiometabolic Risk Factor Control among Insured Patients with Diabetes. *Journal of general internal medicine.* 2016;31(2):188-195.

203. Neugebauer R, Schroeder EB, Reynolds K, et al. Comparison of Mortality and Major Cardiovascular Events Among Adults With Type 2 Diabetes Using Human vs Analogue Insulins. *JAMA network open.* 2020;3(1):e1918554.

204. An J, Luong T, Qian L, et al. Treatment Patterns and Blood Pressure Control With Initiation of Combination Versus Monotherapy Antihypertensive Regimens. *Hypertension.* 2021;77(1):103-113.

205. Jaffe MG, Young JD. The Kaiser Permanente Northern California Story: Improving Hypertension Control From 44% to 90% in 13 Years (2000 to 2013). *J Clin Hypertens (Greenwich).* 2016;18(4):260-261.

206. Barzilay JI, Davis BR, Pressel SL, et al. Long-Term Effects of Incident Diabetes Mellitus on Cardiovascular Outcomes in People Treated for Hypertension: The ALLHAT Diabetes Extension Study. *Circ Cardiovasc Qual Outcomes.* 2012;5(2):153-162.

207. Daugherty SL, Powers JD, Magid DJ, et al. The Association Between Medication Adherence and Treatment Intensification With Blood Pressure Control in Resistant Hypertension. *Hypertension.* 2012;60(2):303-309.

208. Bress AP, Bellows BK, King JB, et al. Cost-Effectiveness of Intensive versus Standard Blood-Pressure Control. *The New England journal of medicine.* 2017;377(8):745-755.

209. Derington CG, Bress AP, Moran AE, et al. Antihypertensive Medication Regimens Used in the Systolic Blood Pressure Intervention Trial. *Hypertension.* 2023;80(3):590-597.

210. Derington CG, Bress AP, Herrick JS, et al. Antihypertensive Medication Regimens Used by US Adults With Hypertension and the Potential for Fixed-Dose Combination Products: The National Health and Nutrition Examination Surveys 2015 to 2020. *Journal of the American Heart Association.* 2023;12(11):e028573.

211. Ghazi L, Shen J, Ying J, et al. Identifying Patients for Intensive Blood Pressure Treatment Based on Cognitive Benefit: A Secondary Analysis of the SPRINT Randomized Clinical Trial. *JAMA network open.* 2023;6(5):e2314443.

212. Flint AC, Conell C, Ren X, Kamel H, Chan SL, Rao VA, Johnston SC. Statin Adherence Is Associated With Reduced Recurrent Stroke Risk in Patients With or Without Atrial Fibrillation. *Stroke.* 2017;48(7):1788-1794.

213. Chi MD, Vansomphone SS, Liu IL, Cheetham C, Green KR, Scott RD, Reynolds K. Adherence to statins and LDL-cholesterol goal attainment. *The American journal of managed care.* 2014;20(4):e105-112.

214. Harrison TN, Scott RD, Cheetham TC, et al. Trends in Statin Use 2009-2015 in a Large Integrated Health System: Pre- and Post-2013 ACC/AHA Guideline on Treatment of Blood Cholesterol. *Cardiovascular drugs and therapy.* 2018;32(4):397-404.

215. Reynolds K, Mues KE, Harrison TN, et al. Trends in statin utilization among adults with severe peripheral artery disease including critical limb ischemia in an integrated healthcare delivery system. *Vascular medicine (London, England).* 2019:1358863x19871100.

216. Shah SJ, Eckman MH, Aspberg S, Go AS, Singer DE. Effect of Variation in Published Stroke Rates on the Net Clinical Benefit of Anticoagulation for Atrial Fibrillation. *Annals of internal medicine.* 2018;169(8):517-527.

217. McGrath ER, Go AS, Chang Y, Borowsky LH, Fang MC, Reynolds K, Singer DE. Use of Oral Anticoagulant Therapy in Older Adults with Atrial Fibrillation After Acute Ischemic Stroke. *Journal of the American Geriatrics Society.* 2017;65(2):241-248.

218. Ashburner JM, Go AS, Chang Y, Fang MC, Fredman L, Applebaum KM, Singer DE. Influence of Competing Risks on Estimating the Expected Benefit of Warfarin in Individuals with Atrial Fibrillation Not Currently Taking Anticoagulants: The Anticoagulation and Risk Factors in Atrial Fibrillation Study. *Journal of the American Geriatrics Society.* 2017;65(1):35-41.

219. An J, Niu F, Zheng C, et al. Warfarin Management and Outcomes in Patients with Nonvalvular Atrial Fibrillation Within an Integrated Health Care System. *Journal of managed care & specialty pharmacy.* 2017;23(6):700-712.

220. Velazquez EJ, Morrow DA, DeVore AD, et al. Angiotensin-Neprilysin Inhibition in Acute Decompensated Heart Failure. *The New England journal of medicine.* 2019;380(6):539-548.

221. Morrow DA, Velazquez EJ, DeVore AD, et al. Clinical Outcomes in Patients With Acute Decompensated Heart Failure Randomly Assigned to Sacubitril/Valsartan or Enalapril in the PIONEER-HF Trial. *Circulation.* 2019;139(19):2285-2288.

222. Kim C, Duan L, Phan DQ, Lee MS. Frequency of Utilization of Beta Blockers in Patients With Heart Failure and Depression and Their Effect on Mortality. *The American journal of cardiology.* 2019;124(5):746-750.

223. Lee MS, Duan L, Clare R, Hekimian A, Spencer H, Chen W. Comparison of Effects of Statin Use on Mortality in Patients With Heart Failure and Preserved Versus Reduced Left Ventricular Ejection Fraction. *The American journal of cardiology.* 2018;122(3):405-412.

224. Zhou H, Sim JJ, Shi J, et al. β-Blocker Use and Risk of Mortality in Heart Failure Patients Initiating Maintenance Dialysis. *American journal of kidney diseases : the official journal of the National Kidney Foundation.* 2020;77(5):704-712.

225. DeVore AD, Braunwald E, Morrow DA, et al. Initiation of Angiotensin-Neprilysin Inhibition After Acute Decompensated Heart Failure: Secondary Analysis of the Open-label Extension of the PIONEER-HF Trial. *JAMA cardiology.* 2020;5(2):202-207.

226. Ambrosy AP, Braunwald E, Morrow DA, et al. Angiotensin Receptor-Neprilysin Inhibition Based on History of Heart Failure and Use of Renin-Angiotensin System Antagonists. *Journal of the American College of Cardiology.* 2020;76(9):1034-1048.

227. Kosiborod MN, Bhatt AS, Claggett BL, et al. Effect of Dapagliflozin on Health Status in Patients With Preserved or Mildly Reduced Ejection Fraction. *Journal of the American College of Cardiology.* 2023;81(5):460-473.

228. Bhatt AS, Kosiborod MN, Vaduganathan M, et al. Effect of dapagliflozin on health status and quality of life across the spectrum of ejection fraction: Participant-level pooled analysis from the DAPA-HF and DELIVER trials. *European journal of heart failure.* 2023;25(7):981-988.

229. Greene SJ, Velazquez EJ, Anstrom KJ, et al. Effect of Torsemide Versus Furosemide on Symptoms and Quality of Life Among Patients Hospitalized for Heart Failure: The TRANSFORM-HF Randomized Clinical Trial. *Circulation.* 2023;148(2):124-134.

230. Phan DQ, Duan L, Lam B, Hekimian A, Wee D, Zadegan R, Lee MS. Statin Adherence and Mortality in Patients Aged 80 Years and Older After Acute Myocardial Infarction. *Journal of the American Geriatrics Society.* 2019;67(10):2045-2049.

231. An J, Bider Z, Luong TQ, Cheetham TC, Lang DT, Fischer H, Reynolds K. Long-Term Medication Adherence Trajectories to Direct Oral Anticoagulants and Clinical Outcomes in Patients With Atrial Fibrillation. *Journal of the American Heart Association.* 2021;10(21):e021601.

232. An J, Nichol MB. Multiple Medication Adherence and its Effect on Clinical Outcomes Among Patients With Comorbid Type 2 Diabetes and Hypertension. *Medical care.* 2013;51(10):879-887.

233. Go AS, Fan D, Sung SH, et al. Contemporary rates and correlates of statin use and adherence in nondiabetic adults with cardiovascular risk factors: The KP CHAMP study. *American heart journal.* 2017;194:25-38.

234. Ngo-Metzger Q, Zuvekas S, Shafer P, Tracer H, Borsky AE, Bierman AS. Statin Use in the U.S. for Secondary Prevention of Cardiovascular Disease Remains Suboptimal. *Journal of the American Board of Family Medicine : JABFM.* 2019;32(6):807-817.

235. Jacobs JA, Addo DK, Zheutlin AR, et al. Prevalence of Statin Use for Primary Prevention of Atherosclerotic Cardiovascular Disease by Race, Ethnicity, and 10-Year Disease Risk in the US: National Health and Nutrition Examination Surveys, 2013 to March 2020. *JAMA cardiology.* 2023;8(5):443-452.

236. Fung V, Graetz I, Reed M, Jaffe MG. Patient-reported adherence to statin therapy, barriers to adherence, and perceptions of cardiovascular risk. *PloS one.* 2018;13(2):e0191817.

237. Nogueira RG, Jadhav AP, Haussen DC, et al. Thrombectomy 6 to 24 Hours after Stroke with a Mismatch between Deficit and Infarct. *The New England journal of medicine.* 2018;378(1):11-21.

238. Towfighi A, Cheng EM, Ayala-Rivera M, et al. Randomized controlled trial of a coordinated care intervention to improve risk factor control after stroke or transient ischemic attack in the safety net: Secondary stroke prevention by Uniting Community and Chronic care model teams Early to End Disparities (SUCCEED). *BMC neurology.* 2017;17(1):24.

239. Towfighi A, Cheng EM, Ayala-Rivera M, et al. Effect of a Coordinated Community and Chronic Care Model Team Intervention vs Usual Care on Systolic Blood Pressure in Patients With Stroke or Transient Ischemic Attack: The SUCCEED Randomized Clinical Trial. *JAMA network open.* 2021;4(2):e2036227.

240. Smith DH, O'Keeffe-Rosetti M, Owen-Smith AA, et al. Improving Adherence to Cardiovascular Therapies: An Economic Evaluation of a Randomized Pragmatic Trial. *Value in health : the journal of the International Society for Pharmacoeconomics and Outcomes Research.* 2016;19(2):176-184.

241. Vollmer WM, Owen-Smith AA, Tom JO, et al. Improving adherence to cardiovascular disease medications with information technology. *The American journal of managed care.* 2014;20(11 Spec No. 17):SP502-510.

242. Derose SF, Green K, Marrett E, et al. Automated outreach to increase primary adherence to cholesterol-lowering medications. *JAMA Intern Med.* 2013;173(1):38-43.

243. Harrison TN, Green KR, Liu IL, et al. Automated Outreach for Cardiovascular-Related Medication Refill Reminders. *J Clin Hypertens (Greenwich).* 2016;18(7):641-646.

244. Grant RW, Pandiscio JC, Pajolek H, Woulfe A, Pelletier A, Kvedar J, Park ER. Implementation of a web-based tool for patient medication self-management: the Medication Self-titration Evaluation Programme (Med-STEP) for blood pressure control. *Informatics in primary care.* 2012;20(1):57-67.

245. Matlock DD, Groeneveld PW, Sidney S, et al. Geographic variation in cardiovascular procedure use among Medicare fee-for-service vs Medicare Advantage beneficiaries. *JAMA.* 2013;310(2):155-162.

246. Jia B, Feng L, Liebeskind DS, et al. Mechanical thrombectomy and rescue therapy for intracranial large artery occlusion with underlying atherosclerosis. *Journal of neurointerventional surgery.* 2018;10(8):746-750.

247. Arnold SV, Chinnakondepalli KM, Spertus JA, et al. Health Status After Transcatheter Mitral-Valve Repair in Heart Failure and Secondary Mitral Regurgitation: COAPT Trial. *Journal of the American College of Cardiology.* 2019;73(17):2123-2132.

248. Mack MJ, Lindenfeld J, Abraham WT, et al. 3-Year Outcomes of Transcatheter Mitral Valve Repair in Patients With Heart Failure. *Journal of the American College of Cardiology.* 2021;77(8):1029-1040.

249. Stone GW, Lindenfeld J, Abraham WT, et al. Transcatheter Mitral-Valve Repair in Patients with Heart Failure. *The New England journal of medicine.* 2018;379(24):2307-2318.

250. Sarraj A, Hassan AE, Abraham MG, et al. Trial of Endovascular Thrombectomy for Large Ischemic Strokes. *The New England journal of medicine.* 2023;388(14):1259-1271.

251. Sarraj A, Kleinig TJ, Hassan AE, et al. Association of Endovascular Thrombectomy vs Medical Management With Functional and Safety Outcomes in Patients Treated Beyond 24 Hours of Last Known Well: The SELECT Late Study. *JAMA neurology.* 2023;80(2):172-182.

252. Sarraj A, Hassan AE, Abraham MG, et al. Endovascular Thrombectomy for Large Ischemic Stroke Across Ischemic Injury and Penumbra Profiles. *JAMA.* 2024;331(9):750-763.

253. Sarraj A, Abraham MG, Hassan AE, et al. Endovascular thrombectomy plus medical care versus medical care alone for large ischaemic stroke: 1-year outcomes of the SELECT2 trial. *Lancet.* 2024;403(10428):731-740.

254. Tsai TT, Patel UD, Chang TI, et al. Validated Contemporary Risk Model of Acute Kidney Injury in Patients Undergoing Percutaneous Coronary Interventions: Insights From the National Cardiovascular Data Registry Cath-PCI Registry. *Journal of the American Heart Association.* 2014;3(6):e001380.

255. Kashyap VS, Schneider PA, Foteh M, et al. Early Outcomes in the ROADSTER 2 Study of Transcarotid Artery Revascularization in Patients With Significant Carotid Artery Disease. *Stroke.* 2020;51(9):2620-2629.

256. Ambrosy AP, Stevens SR, Al-Khalidi HR, et al. Burden of medical co-morbidities and benefit from surgical revascularization in patients with ischaemic cardiomyopathy. *European journal of heart failure.* 2019;21(3):373-381.

257. Phan DQ, Zadegan R, Lee MS. Revascularization versus medical therapy in patients aged 80 and older with stable ischemic heart disease. *Journal of the American Geriatrics Society.* 2021.

258. Sarraj A, Albers GW, Blasco J, et al. Thrombectomy vs Medical Management in Mild Strokes due to Large Vessel Occlusion: Exploratory Analysis from the EXTEND-IA Trials and a Pooled International Cohort. *Annals of neurology.* 2022;92(3):364-378.

259. Brilakis ES, Banerjee S, Karmpaliotis D, et al. Procedural Outcomes of Chronic Total Occlusion Percutaneous Coronary Intervention: A Report From the NCDR (National Cardiovascular Data Registry). *JACC Cardiovascular interventions.* 2015;8(2):245-253.

260. Subherwal S, Peterson ED, Dai D, et al. Temporal Trends in and Factors Associated With Bleeding Complications Among Patients Undergoing Percutaneous Coronary Intervention: A Report From the National Cardiovascular Data CathPCI Registry. *Journal of the American College of Cardiology.* 2012;59(21):1861-1869.

261. Khush KK, Menza R, Nguyen J, Zaroff JG, Goldstein BA. Donor Predictors of Allograft Utilization and Recipient Outcomes after Heart Transplantation. *Circulation Heart failure.* 2013;6(2):300-309.

262. Haddad F, Khazanie P, Deuse T, et al. Clinical and Functional Correlates of Early Microvascular Dysfunction Following Heart Transplantation. *Circulation Heart failure.* 2012;5(6):759-768.

263. Goldstein BA, Thomas L, Zaroff JG, Nguyen J, Menza R, Khush KK. Assessment of heart transplant waitlist time and pre- and post-transplant failure: A mixed methods approach. *Epidemiology (Cambridge, Mass).* 2016;27(4):469-476.

264. De Vlaminck I, Valantine HA, Snyder TM, et al. Circulating cell-free DNA enables noninvasive diagnosis of heart transplant rejection. *Science translational medicine.* 2014;6(241):241ra277.

265. Schneider PM, Pellegrini CN, Wang Y, et al. Prevalence of Guideline-Directed Medical Therapy Among Patients Receiving Cardiac Resynchronization Therapy Defibrillator Implantation in the National Cardiovascular Data Registry During the Years 2006 to 2008. *The American journal of cardiology.* 2014;113(12):2052-2056.

266. Schrage B, Lund LH, Benson L, et al. Predictors of primary prevention implantable cardioverter-defibrillator use in heart failure with reduced ejection fraction: impact of the predicted risk of sudden cardiac death and all-cause mortality. *European journal of heart failure.* 2022;24(7):1212-1222.

267. Shadman R, Poole JE, Dardas TF, et al. A novel method to predict the proportional risk of sudden cardiac death in heart failure: Derivation of the Seattle Proportional Risk Model. *Heart rhythm.* 2015;12(10):2069-2077.

268. Bilchick KC, Wang Y, Cheng A, et al. Seattle Heart Failure and Proportional Risk Models Predict Benefit From Implantable Cardioverter-Defibrillators. *Journal of the American College of Cardiology.* 2017;69(21):2606-2618.

269. Levy WC, Li Y, Reed SD, et al. Does the Implantable Cardioverter-Defibrillator Benefit Vary With the Estimated Proportional Risk of Sudden Death in Heart Failure Patients? *JACC Clinical electrophysiology.* 2017;3(3):291-298.

270. Sauser-Zachrison K, Shen E, Ajani Z, Neil WP, Sangha N, Gould MK, Sharp AL. Emergency Care of Patients with Acute Ischemic Stroke in the Kaiser Permanente Southern California Integrated Health System. *The Permanente journal.* 2016;20(2):10-13.

271. Nguyen-Huynh MN, Klingman JG, Avins AL, et al. Novel Telestroke Program Improves Thrombolysis for Acute Stroke Across 21 Hospitals of an Integrated Healthcare System. *Stroke.* 2018;49(1):133-139.

272. Sauser-Zachrison K, Shen E, Sangha N, et al. Safe and Effective Implementation of Telestroke in a US Community Hospital Setting. *The Permanente journal.* 2016;20(4):11-15.

273. Sax DR, Mark DG, Huang J, et al. Use of Machine Learning to Develop a Risk-Stratification Tool for Emergency Department Patients With Acute Heart Failure. *Annals of emergency medicine.* 2021;77(2):237-248.

274. Sax DR, Sturmer LR, Mark DG, Rana JS, Reed ME. Barriers and Opportunities Regarding Implementation of a Machine Learning-Based Acute Heart Failure Risk Stratification Tool in the Emergency Department. *Diagnostics (Basel, Switzerland).* 2022;12(10):2463.

275. Parikh RV, Go AS, Bhatt AS, et al. Developing Clinical Risk Prediction Models for Worsening Heart Failure Events and Death by Left Ventricular Ejection Fraction. *Journal of the American Heart Association.* 2023;12(19):e029736.

276. Khan SS, Matsushita K, Sang Y, et al. Development and Validation of the American Heart Association's PREVENT Equations. *Circulation.* 2024;149(6):430-449.

277. Tuzzio L, O'Meara ES, Holden E, Parchman ML, Ralston JD, Powell JA, Baldwin LM. Barriers to Implementing Cardiovascular Risk Calculation in Primary Care: Alignment With the Consolidated Framework for Implementation Research. *American journal of preventive medicine.* 2021;60(2):250-257.

278. Bushnell C, McCullough LD, Awad IA, et al. Guidelines for the prevention of stroke in women: a statement for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke.* 2014;45(5):1545-1588.

279. James PA, Oparil S, Carter BL, et al. 2014 Evidence-Based Guideline for the Management of High Blood Pressure in Adults: Report From the Panel Members Appointed to the Eighth Joint National Committee (JNC 8). *JAMA.* 2014;311(5):507-520.

280. Reboussin DM, Allen NB, Griswold ME, et al. Systematic Review for the 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Hypertension.* 2018;71(6):e145.

281. Jaffe MG, Frieden TR, Campbell NRC, et al. Recommended treatment protocols to improve management of hypertension globally: A statement by Resolve to Save Lives and the World Hypertension League (WHL). *J Clin Hypertens (Greenwich).* 2018;20(5):829-836.

282. You JJ, Singer DE, Howard PA, et al. Antithrombotic Therapy for Atrial Fibrillation: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. *Chest.* 2012;141(2 Suppl):e531S-575S.

283. Jensen MD, Ryan DH, Apovian CM, et al. 2013 AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society. *Journal of the American College of Cardiology.* 2014;63(25 Pt B):2985-3023.

284. Aortic Stenosis Writing G, Bonow RO, Brown AS, et al. ACC/AATS/AHA/ASE/EACTS/HVS/SCA/SCAI/SCCT/SCMR/STS 2017 Appropriate Use Criteria for the Treatment of Patients With Severe Aortic Stenosis: A Report of the American College of Cardiology Appropriate Use Criteria Task Force, American Association for Thoracic Surgery, American Heart Association, American Society of Echocardiography, European Association for Cardio-Thoracic Surgery, Heart Valve Society, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, and Society of Thoracic Surgeons. *Journal of the American Society of Echocardiography : official publication of the American Society of Echocardiography.* 2018;31(2):117-147.

285. Young DR, Spengler JO, Frost N, Evenson KR, Vincent JM, Whitsel L. Promoting Physical Activity Through the Shared Use of School Recreational Spaces: A Policy Statement From the American Heart Association. *American journal of public health.* 2014;104(9):1583-1588.

286. Young DR, Hivert MF, Alhassan S, et al. Sedentary Behavior and Cardiovascular Morbidity and Mortality: A Science Advisory From the American Heart Association. *Circulation.* 2016;134(13):e262-279.

287. Lobelo F, Rohm Young D, Sallis R, et al. Routine Assessment and Promotion of Physical Activity in Healthcare Settings: A Scientific Statement From the American Heart Association. *Circulation.* 2018;137(18):e495-e522.

288. Kontos MC, Gunderson MR, Zegre-Hemsey JK, et al. Prehospital Activation of Hospital Resources (PreAct) ST-Segment-Elevation Myocardial Infarction (STEMI): A Standardized Approach to Prehospital Activation and Direct to the Catheterization Laboratory for STEMI Recommendations From the American Heart Association's Mission: Lifeline Program. *Journal of the American Heart Association.* 2020;9(2):e011963.

289. Parikh NI, Gonzalez JM, Anderson CAM, et al. Adverse Pregnancy Outcomes and Cardiovascular Disease Risk: Unique Opportunities for Cardiovascular Disease Prevention in Women: A Scientific Statement From the American Heart Association. *Circulation.* 2021;143(18):e902-e916.

290. Roger VL, Sidney S, Fairchild AL, et al. Recommendations for Cardiovascular Health and Disease Surveillance for 2030 and Beyond: A Policy Statement From the American Heart Association. *Circulation.* 2020;141(9):e104-e119.

291. Kaufman JD, Elkind MSV, Bhatnagar A, et al. Guidance to Reduce the Cardiovascular Burden of Ambient Air Pollutants: A Policy Statement From the American Heart Association. *Circulation.* 2020;142(23):e432-e447.

292. Mell MW, Starnes BW, Kraiss LW, Schneider PA, Pevec WC. Western Vascular Society guidelines for transfer of patients with ruptured abdominal aortic aneurysm. *J Vasc Surg.* 2017;65(3):603-608.

293. AbuRahma AF, Avgerinos ED, Chang RW, et al. Society for Vascular Surgery clinical practice guidelines for management of extracranial cerebrovascular disease. *J Vasc Surg.* 2022;75(1S):4S-22S.

294. AbuRahma AF, Avgerinos ED, Chang RW, et al. The Society for Vascular Surgery implementation document for management of extracranial cerebrovascular disease. *J Vasc Surg.* 2022;75(1S):26S-98S.

295. Padwal R, Campbell NRC, Schutte AE, et al. Optimizing observer performance of clinic blood pressure measurement: a position statement from the Lancet Commission on Hypertension Group. *Journal of hypertension.* 2019;37(9):1737-1745.

296. Messé SR, Gronseth GS, Kent DM, et al. Practice advisory update summary: Patent foramen ovale and secondary stroke prevention: Report of the Guideline Subcommittee of the American Academy of Neurology. *Neurology.* 2020;94(20):876-885.

297. Beavers CJ, Ambrosy AP, Butler J, et al. Iron Deficiency in Heart Failure: A Scientific Statement from the Heart Failure Society of America. *Journal of cardiac failure.* 2023;29(7):1059-1077.

298. U. S. Preventive Services Task Force, Grossman DC, Bibbins-Domingo K, et al. Behavioral Counseling to Promote a Healthful Diet and Physical Activity for Cardiovascular Disease Prevention in Adults Without Cardiovascular Risk Factors: US Preventive Services Task Force Recommendation Statement. *JAMA.* 2017;318(2):167-174.

299. Patnode CD, Evans CV, Senger CA, Redmond N, Lin JS. Behavioral Counseling to Promote a Healthful Diet and Physical Activity for Cardiovascular Disease Prevention in Adults Without Known Cardiovascular Disease Risk Factors: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA.* 2017;318(2):175-193.

300. Lin JS, Evans CV, Johnson E, Redmond N, Coppola EL, Smith N. Nontraditional Risk Factors in Cardiovascular Disease Risk Assessment: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA.* 2018;320(3):281-297.

301. O'Connor EA, Evans CV, Rushkin MC, Redmond N, Lin JS. Behavioral Counseling to Promote a Healthy Diet and Physical Activity for Cardiovascular Disease Prevention in Adults With Cardiovascular Risk Factors: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA.* 2020;324(20):2076-2094.

302. Patnode CD, Redmond N, Iacocca MO, Henninger M. Behavioral Counseling Interventions to Promote a Healthy Diet and Physical Activity for Cardiovascular Disease Prevention in Adults Without Known Cardiovascular Disease Risk Factors: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA.* 2022;328(4):375-388.

303. Guirguis-Blake JM, Evans CV, Perdue LA, Bean SI, Senger CA. Aspirin Use to Prevent Cardiovascular Disease and Colorectal Cancer: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA.* 2022;327(16):1585-1597.

304. Dehmer SP, O'Keefe LR, Evans CV, Guirguis-Blake JM, Perdue LA, Maciosek MV. Aspirin Use to Prevent Cardiovascular Disease and Colorectal Cancer: Updated Modeling Study for the US Preventive Services Task Force. *JAMA.* 2022;327(16):1598-1607.

305. O'Connor EA, Evans CV, Ivlev I, Rushkin MC, Thomas RG, Martin A, Lin JS. Vitamin and Mineral Supplements for the Primary Prevention of Cardiovascular Disease and Cancer: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA.* 2022;327(23):2334-2347.

306. Guirguis-Blake JM, Webber EM, Coppola EL. Screening for Asymptomatic Carotid Artery Stenosis in the General Population: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA.* 2021;325(5):487-489.

307. Chan WV, Pearson TA, Bennett GC, et al. ACC/AHA Special Report: Clinical Practice Guideline Implementation Strategies: A Summary of Systematic Reviews by the NHLBI Implementation Science Work Group: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Journal of the American College of Cardiology.* 2017;69(8):1076-1092.

308. Commodore-Mensah Y, Loustalot F, Himmelfarb CD, et al. Proceedings From a National Heart, Lung, and Blood Institute and the Centers for Disease Control and Prevention Workshop to Control Hypertension. *American journal of hypertension.* 2022;35(3):232-243.

309. Al-Khatib SM, Benjamin EJ, Albert CM, et al. Advancing Research on the Complex Interrelations Between Atrial Fibrillation and Heart Failure: A Report From a US National Heart, Lung, and Blood Institute Virtual Workshop. *Circulation.* 2020;141(23):1915-1926.

310. Benjamin EJ, Go AS, Desvigne-Nickens P, et al. Research Priorities in Atrial Fibrillation Screening: A Report From a National Heart, Lung, and Blood Institute Virtual Workshop. *Circulation.* 2021;143(4):372-388.

311. Benjamin EJ, Al-Khatib SM, Desvigne-Nickens P, et al. Research Priorities in the Secondary Prevention of Atrial Fibrillation: A National Heart, Lung, and Blood Institute Virtual Workshop Report. *Journal of the American Heart Association.* 2021;10(16):e021566.

312. Al-Khatib SM, Benjamin EJ, Buxton AE, et al. Research Needs and Priorities for Catheter Ablation of Atrial Fibrillation: A Report From a National Heart, Lung, and Blood Institute Virtual Workshop. *Circulation.* 2020;141(6):482-492.

313. Go AS, Al-Khatib SM, Desvigne-Nickens P, et al. Research Opportunities in Stroke Prevention for Atrial Fibrillation: A Report From a National Heart, Lung, and Blood Institute Virtual Workshop. *Stroke.* 2023;54(3):e75-e85.

314. Benjamin EJ, Thomas KL, Go AS, et al. Transforming Atrial Fibrillation Research to Integrate Social Determinants of Health: A National Heart, Lung, and Blood Institute Workshop Report. *JAMA cardiology.* 2023;8(2):182-191.

315. Anaya G, Pettee Gabriel K, St-Onge MP, et al. Optimal Instruments for Measurement of Dietary Intake, Physical Activity, and Sleep Among Adults in Population-Based Studies: Report of a National Heart, Lung, and Blood Institute Workshop. *Journal of the American Heart Association.* 2024;13(21):e035818.

316. Bozkurt B, Fonarow GC, Goldberg LR, et al. Cardiac Rehabilitation for Patients With Heart Failure: JACC Expert Panel. *Journal of the American College of Cardiology.* 2021;77(11):1454-1469.

317. Brettler JW, Arcila GPG, Aumala T, et al. Drivers and scorecards to improve hypertension control in primary care practice: Recommendations from the HEARTS in the Americas Innovation Group. *Lancet regional health Americas.* 2022;9:None.

318. Ordunez P, Campbell NRC, Giraldo Arcila GP, et al. HEARTS in the Americas: innovations for improving hypertension and cardiovascular disease risk management in primary care. *Revista panamericana de salud publica = Pan American journal of public health.* 2022;46:e96.

319. Rosende A, DiPette DJ, Martinez R, Brettler JW, Rodriguez G, Zuniga E, Ordunez P. HEARTS in the Americas clinical pathway. Strengthening the decision support system to improve hypertension and cardiovascular disease risk management in primary care settings. *Frontiers in cardiovascular medicine.* 2023;10:1102482.

320. Goff DC, Khan SS, Lloyd-Jones D, et al. Bending the Curve in Cardiovascular Disease Mortality: Bethesda + 40 and Beyond. *Circulation.* 2021;143(8):837-851.

321. Fremont A, Kim AY, Bailey K, et al. One In Five Fewer Heart Attacks: Impact, Savings, And Sustainability In San Diego County Collaborative. *Health affairs (Project Hope).* 2018;37(9):1457-1465.

322. Cheadle A, Rosaschi M, Burden D, et al. A Community-Wide Collaboration to Reduce Cardiovascular Disease Risk: The Hearts of Sonoma County Initiative. *Preventing chronic disease.* 2019;16:E89.

323. Frieden TR, Jaffe MG. Saving 100 million lives by improving global treatment of hypertension and reducing cardiovascular disease risk factors. *Journal of clinical hypertension (Greenwich, Conn).* 2018(Greenwich).

324. Ayanian JZ, Landon BE, Newhouse JP, Zaslavsky AM. Racial and ethnic disparities among enrollees in Medicare Advantage plans. *The New England journal of medicine.* 2014;371(24):2288-2297.

325. Kaiser Permanente Joins the U.S. Department of Health and Human Services, the Centers for Disease Control and Prevention, and the Centers for Medicare and Medicaid Services on the Million Hearts Initiative [press release]. September 13, 2011.

326. Kaiser Permanente Colorado Hailed as Hypertension Control Champion [press release]. September 17, 2012.

327. Kaiser Permanente Northern California Recognized as 'Million Hearts Hypertension Control Champion' [press release]. February 5, 2014.

328. Kaiser Permanente Georgia Named 2015 Million Hearts® Hypertension Control Champion [press release]. May 13, 2016.

329. Gold R, Hollombe C, Bunce A, et al. Study protocol for "Study of Practices Enabling Implementation and Adaptation in the Safety Net (SPREAD-NET)": a pragmatic trial comparing implementation strategies. *Implementation science : IS.* 2015;10:144.