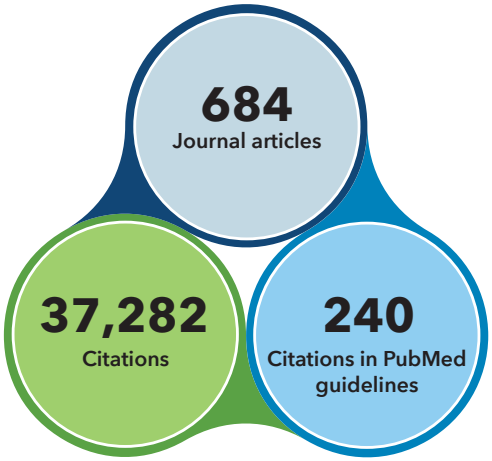
Kaiser Permanente Research Brief

Obesity

This brief summarizes the contributions of Kaiser Permanente Research since 2007 on the topic of obesity, including risk factors, strategies for improving member health and well-being, and translation of research into policy and practice.

Obesity is a common but serious health condition defined by high weight relative to a person's height. Weight-to-height ratios are measured using the BMI (or body mass index) scale. In general, a BMI of 18.5 to 24.9 is considered a healthy weight. BMIs in the range of 25 to 29.9 are classified as overweight, and BMIs of 30 or greater are classified as obese.[1] According to the National Center for Health Statistics, more than 42% of U.S. adults are obese,[2] and obesity prevalence among children age 2 to 19 is 18.5%.[3]

Kaiser Permanente publications related to obesity since 2007



Source: Kaiser Permanente Publications Library and Scite metrics, as of November 29, 2021.

Obesity 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 680 articles related to obesity since 2007.[4] Together, these articles have been cited over 37,000 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 – lets us contribute generalizable knowledge on obesity, 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

Kaiser Permanente researchers have contributed to understanding the risk of developing obesity, as well as the other health risks that people with obesity face.

Who is at risk for developing obesity?

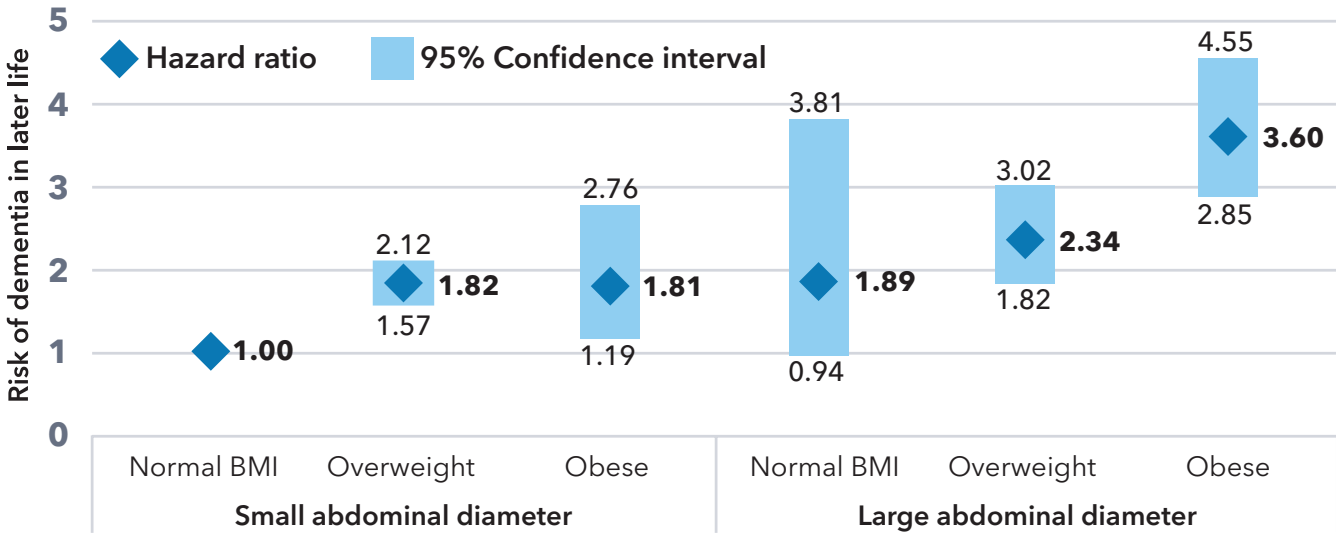
Obesity risk is present throughout a person's lifespan, and no one is immune to obesity. Our researchers have identified a host of specific risk factors for overweight and obesity. These include food-related factors (such as eating patterns, the food and food culture at home and in the community, and availability or affordability of healthy and unhealthy eating options),[5-14] physical activity behaviors and sedentary time (for example, television and screen time),[15] and genetic factors.[16-20] For children, growing up in a household with overweight and obese adults is a risk factor.[21;22] Kaiser Permanente scientists have also linked the quality of infants' diets with their risks for overweight and obesity in early childhood.[23] Recent data also suggest a significant increase in pediatric obesity during the COVID-19 pandemic.[24] Obesity is also associated with factors for which the causal pathway is not entirely clear, such as sleep duration and sleep quality.[25-29]

Obesity prevalence is higher among certain racial and ethnic populations, a difference that is attributed to a mix of genetic and nongenetic factors.[16;30-33]

What other health risks do people with obesity face?

People with obesity experience a range of health risks. Among the most pervasive and well-known are cardiovascular and metabolic diseases,[16;34-38] select cancers,[39-43] lower-extremity injuries,[44-47] breathing and sleep disturbances such as sleep apnea or chronic obstructive pulmonary disease,[16;39;48-53] and excess mortality,[54] including mortality associated with COVID-19.[55] In the Patient Outcomes Research to Advance Learning Network's overweight and obesity cohort,[56] and in other studies, our researchers have described specific cardiometabolic risks that are known to be frequently present among people who are overweight or obese. These include elevated blood pressure; elevated levels of low-density lipoprotein cholesterol (or LDL-C), triglycerides, fasting plasma glucose, and C-reactive protein; and low levels of high-density lipoprotein cholesterol (HDL-C or "good cholesterol").[57;58] Other research conducted by our scientists has found links between maternal obesity and excessive

Central obesity in midlife is an independent risk factor for dementia in later life. Compared to adults with normal BMI and small abdominal diameter, overweight and obese adults were more likely to develop dementia. For those with both obesity and large abdominal diameter, the risk of dementia was 3.6 times higher.[73]



gestational weight gain, and health risks[59-61] including gestational diabetes and persistent weight concerns for the mother after pregnancy,[62-64] as well as overweight and obesity in the child.[65-72]

Kaiser Permanente researchers are also contributing to knowledge about a host of newly emerging risks, such as the link between obesity and dementia, including Alzheimer's disease.[73-75] Other risks associated with obesity that our researchers have investigated include depression or social isolation,[16] anxiety,[76] experiences of bias and bullying,[16,77] and reduced quality of life and physical functioning.[46;78;79]

Obesity can also affect the treatment of other conditions. Kaiser Permanente researchers have described uncertainty in correct dosing of certain medications for obese people, such as chemotherapies[80] or heparin.[81] Women with obesity may also be less likely to complete recommended gynecologic cancer screening[82] and mammography.[83;84]

Improving Patient Outcomes

What strategies are effective in preventing obesity?

Preventing obesity is a critical strategy to curb the growth in the absolute numbers of people who are overweight and obese globally, which are projected to reach 2.16 billion and 1.12 billion respectively by 2030.[85] A nutritious diet and adequate physical activity are beneficial for people in all weight groups and contribute to obesity prevention.[86;87] Researchers have also linked inadequate sleep with obesity, suggesting another behavioral factor in preventing obesity.[27;28]

Our researchers have contributed to the growing evidence supporting methods to encourage behavior change and weight maintenance, irrespective of weight status.[88-91] Kaiser Permanente physicians and researchers have implemented "Exercise as a Vital Sign" within the organization's electronic health record system, which incorporates physical activity questions into every routine outpatient visit and prompts clinicians to offer brief counseling to maintain healthy behaviors and modify unhealthy ones.[92-96] However, there are many barriers to consistently screening for physical activity and delivering the brief intervention,[96] and further work is needed to improve consistent follow-through.

Strategies for weight maintenance and weight loss

One special population in which weight control is of heightened importance is pregnant women. Our scientists have found that pregnant women, regardless of their prepregnancy weight, often do not receive advice regarding physical activity from their health care providers.[97] Among women who are already overweight or obese, Kaiser Permanente researchers have studied interventions designed for weight loss before becoming pregnant,[98] as well as dietary interventions during pregnancy to limit gestational weight gain.[99;100]

How does early identification of obesity affect outcomes?

Routine screening is used to identify people who are overweight or obese, and is recommended for children, adolescents, and adults based on the availability of effective treatments.[16;101;102] Early identification of unhealthy weight gain may have additional importance because there is evidence that the human body adapts to and defends its excess weight, counteracting calorie restrictions and other dietary changes.[103;104] Furthermore, after obesity has persisted for some time, biological adaptations are triggered that act on fat storage capacity and dopamine signaling, which helps control the brain's reward

and pleasure centers, triggering food overconsumption.[103] As such, the treatment of obesity grows increasingly difficult the longer obesity has persisted.

What are the key factors in effective treatment of obesity?

People who are overweight or obese can modify their behaviors, habits, and environment to improve their health in many ways.[105] For people with obesity and other common co-occurring conditions, even a very modest amount of weight loss can have important health benefits. For example, studies have found that weight loss is associated with declines in stress and depression,[106] with improved blood pressure,[107] with improvements in symptoms among obese adults with asthma,[108] and with reduced risks for some forms of cancer.[109]

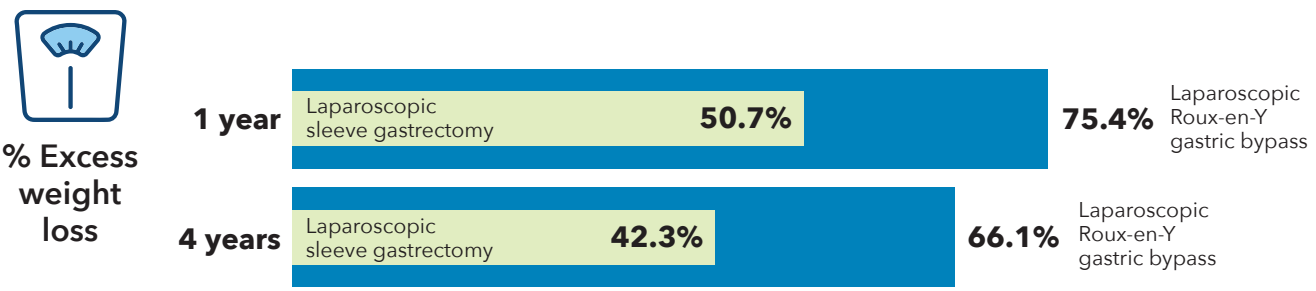
Behavior change: For people who are overweight or obese, dietary changes are a key factor in weight loss.[9;110-112] In particular, adopting low-carbohydrate diets,[111] decreasing intake of other energy-dense foods,[110] and reducing consumption of liquid calories (such as from sugar-sweetened beverages)[9] can be effective dietary strategies. These changes can be combined with increased intake of fruits and vegetables, low-fat dairy products, and other foods low in energy density and high in fiber.[112]

Increasing physical activity — in combination with nutritional changes — can also contribute to weight loss and weight maintenance.[113;114] Moreover, physical activity is important for people with obesity even if it doesn't result in weight loss. Our researchers have shown that people who are both obese and active are healthier in terms of important cardiometabolic factors than people who are obese and inactive.[115]

Our researchers have studied a range of evidence-based behavioral interventions to address obesity — such as the Diabetes Prevention Program, Weight Watchers, and others[116-118] — and have concluded that there is strong support for the efficacy and effectiveness of such programs.[119] Some of the key behavior changes taught in these programs that are associated with maintaining a significant amount of weight loss over time include food and physical activity journaling; cooking most meals at home (not eating out); weighing oneself regularly (daily or every other day); and setting a baseline for physical activity that is 2 to 3 times more than the standard recommendation of 30 minutes per day/5 days per week.[113;120-126] Patients have also reported that social support is key for weight maintenance, leading to the recommendation that weight loss programs consider involving family and friends to support long-term success.[122;127]

Surgical approaches: Weight-loss surgeries are a complement to behavior change approaches for treating obesity.[128] Our researchers have shown that, for people with obesity and diabetes, bariatric surgery was associated with substantial weight loss compared to nonsurgical approaches, and also resulted in better odds of diabetes remission[129] and reduced risks

Older adults who had gastric bypass experienced greater weight loss at 1 and 4 years than those who had sleeve gastrectomy. However, the complication rate for gastric bypass was higher (30.5% vs. 15.4%).[138]



for microvascular complications of diabetes,[130] cardiovascular or cerebrovascular events,[131] and some types of obesity-related cancer.[132;133] Kaiser Permanente researchers have described the comparative effectiveness and complication rates of various types of weight-loss surgeries,[134-137] and described differences in outcomes according to procedure type, age at time of surgery, level of obesity before surgery, and other factors.[138-141] The benefits of bariatric surgery appear to be durable over time for many, but not all, patients.[142-144] However, there is evidence of differences between racial and ethnic groups in outcomes after bariatric surgery (such as resolution of metabolic syndrome and overall weight loss), and evidence that surgery is more effective for younger and less obese patients.[145-147]

Children: Screening and early intervention are particularly important in children, since obesity during childhood and adolescence is predictive of obesity as an adult.[148] Treatment of obesity in children differs from treatment of adults, because children are often reliant on others (parents, other family members, or school staff) for their nutrition, access to or engagement in physical activity, and other factors.

Our researchers have conducted a number of studies testing models to improve physical activity and nutrition in schools,[149-151] developed an instrument for assessing the home environment,[152] tested phone counseling for parents of overweight children,[153] and created other parent-focused approaches.[154] In recent years, evidence to support effectiveness of behavioral interventions for weight management among children and adolescents has emerged, and routine screening for obesity in youth is now recommended.[16;101]

Translating Research Into Policy and Practice

Kaiser Permanente is a learning health care organization that works to systematically use research to inform and improve practice both within and outside Kaiser Permanente. Research, clinical, and operational partners within Kaiser Permanente have tested a range of interventions to reduce the risk of obesity and improve outcomes for people with obesity. We have reviewed the evidence for intensive behavioral weight-loss counseling programs delivered in person and by telephone, and by a range of interventionists, such as primary care providers, dietitians, and medical assistants.[155-160] We have implemented "Exercise as a Vital Sign"[92-96] in our electronic health record system, and continue to encourage clinicians to engage with patients of all weights to promote healthy habits. Kaiser Permanente has also invested in community health initiatives that promote obesity-prevention policies and environmental changes in the communities we serve.[161-165] More recently, we have studied the implementation of a program aimed at improving physical activity among patients following bariatric surgery,[166] as well as a lifestyle-based telehealth intervention to reduce excess gestational weight gain during pregnancy.[167] Our researchers have participated in studies assessing obesity prevention programs based in the workplace and at schools, as well as community-level environmental and policy changes such as healthier offerings in vending machines and cafeterias.[161;162;168-172] These studies have suggested that site-based interventions must be high intensity to be effective at a population level.[165]

Kaiser Permanente's research on obesity since 2007 has been cited 240 times in consensus statements and clinical practice guidelines. Guidelines citing our research have been published by a wide range of entities, including the American Society for Metabolic and Bariatric Surgery, the American Association of Clinical Endocrinology, and the American Heart Association. In addition, our researchers and clinician scientists have directly contributed as authors of guidelines for the management of overweight and obesity,[102;173-176] routine assessment of physical activity in health care,[96] and screening for obesity in children and adolescents.[16;101] Kaiser Permanente has also participated in the Obesity Medicine Education Collaborative, an effort to improve medical education related to obesity management through the development of new standards and benchmarks.[177] Our scientists are also leaders of the National Institutes of Health's Environmental Influences on Child Health Outcomes program, a long-term national initiative investigating relationships between factors in a child's early life and the subsequent devel-

opment of obesity.[178] Finally, researchers in our Colorado Region are participants in the Childhood Obesity Data Initiative, an effort to further research in pediatric obesity by integrating electronic health record data from multiple community-based health care organizations.[179;180]

Kaiser Permanente's 185 research scientists and 1,530 support staff are based at 9 research centers. There are currently 2,355 studies underway, including clinical trials. Since 2007 our research scientists have published more than 19,000 articles in peer reviewed journals. Kaiser Permanente currently serves approximately 12.5 million members in 8 states and the District of Columbia.

This brief was written by Nicholas P. Emptage, Anna C. Davis, and Elizabeth A. McGlynn. It is available online from about.kaiserpermanente.org/our-story/health-research/research-briefs. The authors wish to thank the following researchers for their contributions to the development of this brief: David E. Arterburn and Deborah R. Young.

References

1. Centers for Disease Control and Prevention. Defining Adult Overweight and Obesity. 2016; https://www.cdc.gov/obesity/adult/defining.html. Accessed July 30, 2018.
2. Hales CM, Carroll MD, Fryar CD, Ogden CL. Prevalence of Obesity and Severe Obesity Among Adults: United States, 2017-2018. *NCHS Data Brief.* 2020(360):1-8.
3. Centers for Disease Control and Prevention. Childhood Obesity Facts. 2018; https://www.cdc.gov/obesity/data/childhood.html Accessed July 30, 2018.
4. Kaiser Permanente Publications Library (KPPL) Search conducted on November 29, 2021 using search term: (dc.title:BMI OR dc.title:obese OR dc.title:obesity OR dc.title:overweight OR dc.subject.mesh:obesity) AND dc.type:"Journal Article" AND dc.date.issued:[2007 2022].
5. Leung CW, Laraia BA, Kelly M, et al. The influence of neighborhood food stores on change in young girls' body mass index. *Am J Prev Med.* 2011;41(1):43-51.
6. Jones-Smith JC, Karter AJ, Warton EM, et al. Obesity and the food environment: income and ethnicity differences among people with diabetes: the Diabetes Study of Northern California (DISTANCE). *Diabetes Care.* 2013;36(9):2697-2705.
7. Karanja N, Aickin M, Lutz T, et al. A community-based intervention to prevent obesity beginning at birth among American Indian children: study design and rationale for the PTOTS study. *J Prim Prev.* 2012;33(4):161-174.
8. Beck AL, Tschann J, Butte NF, et al. Association of beverage consumption with obesity in Mexican American children. *Public Health Nutr.* 2014;17(2):338-344.
9. Chen L, Appel LJ, Loria C, et al. Reduction in consumption of sugar-sweetened beverages is associated with weight loss: the PREMIER trial. *Am J Clin Nutr.* 2009;89(5):1299-1306.
10. Zhu Y, Olsen SF, Mendola P, et al. Maternal consumption of artificially sweetened beverages during pregnancy, and offspring growth through 7 years of age: a prospective cohort study. *Int J Epidemiol.* 2017;46(5):1499-1508.
11. Penilla C, Tschann JM, Deardorff J, et al. Fathers' feeding practices and children's weight status in Mexican American families. *Appetite.* 2017;117:109-116.
12. Laraia BA, Downing JM, Zhang YT, et al. Food Environment and Weight Change: Does Residential Mobility Matter?: The Diabetes Study of Northern California (DISTANCE). *Am J Epidemiol.* 2017;185(9):743-750.
13. Gupta S, Rose CM, Buszkiewicz J, et al. Characterizing Percent Energy from Ultra-Processed Foods by Participant Demographics, Diet Quality, and Diet Cost Findings from the Seattle Obesity Study SOS III. *Br J Nutr.* 2021;126(5):773-781.
14. Arias-Gastélum M, Lindberg NM, Leo MC, et al. Dietary Patterns with Healthy and Unhealthy Traits Among Overweight/Obese Hispanic Women with or at High Risk for Type 2 Diabetes. *J Racial Ethn Health Disparities.* 2021;8(2):293-303.
15. Gordon-Larsen P, Boone-Heinonen J, Sidney S, et al. Active commuting and cardiovascular disease risk: the CARDIA study. *Arch Intern Med.* 2009;169(13):1216-1223.
16. Grossman DC, Bibbins-Domingo K, Curry SJ, et al. Screening for Obesity in Children and Adolescents: US Preventive Services Task Force Recommendation Statement. *Jama.* 2017;317(23):2417-2426.
17. Justice AE, Winkler TW, Feitosa MF, et al. Genome-wide meta-analysis of 241,258 adults accounting for smoking behaviour identifies novel loci for obesity traits. *Nat Commun.* 2017;8:14977.
18. Nead KT, Li A, Wehner MR, et al. Contribution of common non-synonymous variants in PCSK1 to body mass index variation and risk of obesity: a systematic review and meta-analysis with evidence from up to 331 175 individuals. *Hum Mol Genet.* 2015;24(12):3582-3594.
19. Locke AE, Kahali B, Berndt SI, et al. Genetic studies of body mass index yield new insights for obesity biology. *Nature.* 2015;518(7538):197-206.
20. Turcot V, Lu Y, Highland HM, et al. Protein-altering variants associated with body mass index implicate pathways that control energy intake and expenditure in obesity. *Nat Genet.* 2018;50(1):26-41.
21. Sun A, Cheng J, Bui Q, et al. Home-Based and Technology-Centered Childhood Obesity Prevention for Chinese Mothers With Preschool-Aged Children. *J Transcult Nurs.* 2017:1043659617719139.
22. Martinson BC, VazquezBenitez G, Patnode CD, et al. Obesogenic family types identified through latent profile analysis. *Ann Behav Med.* 2011;42(2):210-220.
23. Vandyousefi S, Davis JN, Gunderson EP. Association of infant diet with subsequent obesity at 2-5 years among children exposed to gestational diabetes: the SWIFT study. *Diabetologia.* 2021;64(5):1121-1132.
24. Woolford SJ, Sidell M, Li X, et al. Changes in Body Mass Index Among Children and Adolescents During the COVID-19 Pandemic. *Jama.* 2021;326(14):1434-1436.
25. Brown MA, Goodwin JL, Silva GE, et al. The Impact of Sleep-Disordered Breathing on Body Mass Index (BMI): The Sleep Heart Health Study (SHHS). *Southwest J Pulm Crit Care.* 2011;3:159-168.

26. Martinez SM, Tschann JM, Butte NF, et al. Short Sleep Duration Is Associated With Eating More Carbohydrates and Less Dietary Fat in Mexican American Children. *Sleep.* 2017;40(2):zsw057.
27. Martinez SM, Tschann JM, Greenspan LC, et al. Is it time for bed? Short sleep duration increases risk of obesity in Mexican American children. *Sleep Med.* 2014;15(12):1484-1489.
28. Patel SR, Blackwell T, Redline S, et al. The association between sleep duration and obesity in older adults. *Int J Obes (Lond).* 2008;32(12):1825-1834.
29. Thomson CA, Morrow KL, Flatt SW, et al. Relationship between sleep quality and quantity and weight loss in women participating in a weight-loss intervention trial. *Obesity (Silver Spring).* 2012;20(7):1419-1425.
30. Kumanyika SK, Whitt-Glover MC, Gary TL, et al. Expanding the obesity research paradigm to reach African American communities. *Prev Chronic Dis.* 2007;4(4):A112.
31. Ng MCY, Graff M, Lu Y, et al. Discovery and fine-mapping of adiposity loci using high density imputation of genome-wide association studies in individuals of African ancestry: African Ancestry Anthropometry Genetics Consortium. *PLoS Genet.* 2017;13(4):e1006719.
32. Balasubramanian BA, Garcia MP, Corley DA, et al. Racial/ethnic differences in obesity and comorbidities between safety-net- and non safety-net integrated health systems. *Medicine (Baltimore).* 2017;96(11):e6326.
33. Young DR, Koebnick C, Hsu JY. Sociodemographic associations of 4-year overweight and obese incidence among a racially diverse cohort of healthy weight 18-year-olds. *Pediatr Obes.* 2017;12(6):502-510.
34. Koebnick C, Smith N, Coleman KJ, et al. Prevalence of extreme obesity in a multiethnic cohort of children and adolescents. *J Pediatr.* 2010;157(1):26-31.e22.
35. Savji N, Meijers WC, Bartz TM, et al. The Association of Obesity and Cardiometabolic Traits With Incident HFpEF and HFrEF. *JACC Heart Fail.* 2018;6(8):701-709.
36. Lindstrom S, Germain M, Crous-Bou M, et al. Assessing the causal relationship between obesity and venous thromboembolism through a Mendelian Randomization study. *Hum Genet.* 2017;136(7):897-902.
37. Zhu Y, Sidell MA, Arterburn D, et al. Racial/Ethnic Disparities in the Prevalence of Diabetes and Prediabetes by BMI: Patient Outcomes Research To Advance Learning (PORTAL) Multisite Cohort of Adults in the U.S. *Diabetes Care.* 2019;42(12):2211-2219.
38. Patel KV, Metzinger M, Park B, et al. Longitudinal Associations of Fitness and Obesity in Young Adulthood With Right Ventricular Function and Pulmonary Artery Systolic Pressure in Middle Age: The CARDIA Study. *J Am Heart Assoc.* 2021;10(7):e016968.
39. Ogunmoroti O, Allen NB, Cushman M, et al. Association Between Life's Simple 7 and Noncardiovascular Disease: The Multi-Ethnic Study of Atherosclerosis. *J Am Heart Assoc.* 2016;5(10):e003954.
40. Thomson CA, Crane TE, Garcia DO, et al. Association between Dietary Energy Density and Obesity-Associated Cancer: Results from the Women's Health Initiative. *J Acad Nutr Diet.* 2018;118(4):617-626.
41. Thrift AP, Gong J, Peters U, et al. Mendelian Randomization Study of Body Mass Index and Colorectal Cancer Risk. *Cancer Epidemiol Biomarkers Prev.* 2015;24(7):1024-1031.
42. Thrift AP, Shaheen NJ, Gammon MD, et al. Obesity and risk of esophageal adenocarcinoma and Barrett's esophagus: a Mendelian randomization study. *J Natl Cancer Inst.* 2014;106(11):dju252.
43. Clarke MA, Fetterman B, Cheung LC, et al. Epidemiologic Evidence That Excess Body Weight Increases Risk of Cervical Cancer by Decreased Detection of Precancer. *J Clin Oncol.* 2018;36(12):1184-1191.
44. Kessler J, Koebnick C, Smith N, Adams A. Childhood obesity is associated with increased risk of most lower extremity fractures. *Clin Orthop Relat Res.* 2013;471(4):1199-1207.
45. Kessler JI, Jacobs JC, Jr., Cannamela PC, et al. Childhood Obesity is Associated With Osteochondritis Dissecans of the Knee, Ankle, and Elbow in Children and Adolescents. *J Pediatr Orthop.* 2018;38(5):e296-e299.
46. Nielson CM, Marshall LM, Adams AL, et al. BMI and fracture risk in older men: the osteoporotic fractures in men study (MrOS). *J Bone Miner Res.* 2011;26(3):496-502.
47. Adams AL, Kessler JI, Deramerian K, et al. Associations between childhood obesity and upper and lower extremity injuries. *Inj Prev.* 2013;19(3):191-197.
48. Black MH, Zhou H, Takayanagi M, et al. Increased asthma risk and asthma-related health care complications associated with childhood obesity. *Am J Epidemiol.* 2013;178(7):1120-1128.
49. Borrell LN, Nguyen EA, Roth LA, et al. Childhood obesity and asthma control in the GALA II and SAGE II studies. *Am J Respir Crit Care Med.* 2013;187(7):697-702.
50. Mosen DM, Schatz M, Magid DJ, Camargo CA, Jr. The relationship between obesity and asthma severity and control in adults. *J Allergy Clin Immunol.* 2008;122(3):507-511.e506.
51. Quinto KB, Zuraw BL, Poon KY, et al. The association of obesity and asthma severity and control in children. *J Allergy Clin Immunol.* 2011;128(5):964-969.
52. Schatz M, Zeiger RS, Yang SJ, et al. Prospective Study on the Relationship of Obesity to Asthma Impairment and Risk. *J Allergy Clin Immunol Pract.* 2015;3(4):560-565.e561.
53. Schatz M, Zeiger RS, Zhang F, et al. Overweight/obesity and risk of seasonal asthma exacerbations. *J Allergy Clin Immunol Pract.* 2013;1(6):618-622.

54. Sun Y, Liu B, Snetselaar LG, et al. Association of Normal-Weight Central Obesity With All-Cause and Cause-Specific Mortality Among Postmenopausal Women. *JAMA Netw Open.* 2019;2(7):e197337.

55. Tartof SY, Qian L, Hong V, et al. Obesity and Mortality Among Patients Diagnosed With COVID-19: Results From an Integrated Health Care Organization. *Ann Intern Med.* 2020;173(10):773-781.

56. Young DR, Waitzfelder BA, Arterburn D, et al. The Patient Outcomes Research To Advance Learning (PORTAL) Network Adult Overweight and Obesity Cohort: Development and Description. *JMIR Res Protoc.* 2016;5(2):e87.

57. Wildman RP, Muntner P, Reynolds K, et al. The obese without cardiometabolic risk factor clustering and the normal weight with cardiometabolic risk factor clustering: prevalence and correlates of 2 phenotypes among the US population (NHANES 1999-2004). *Arch Intern Med.* 2008;168(15):1617-1624.

58. 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. *Prev Chronic Dis.* 2017;14:E22.

59. Sharp GC, Salas LA, Monnereau C, et al. Maternal BMI at the start of pregnancy and offspring epigenome-wide DNA methylation: findings from the pregnancy and childhood epigenetics (PACE) consortium. *Hum Mol Genet.* 2017;26(20):4067-4085.

60. Kim SS, Mendola P, Zhu Y, et al. Spontaneous and indicated preterm delivery risk is increased among overweight and obese women without prepregnancy chronic disease. *Bjog.* 2017;124(11):1708-1716.

61. Badon SE, Dublin S, Nance N, et al. Gestational weight gain and adverse pregnancy outcomes by pre-pregnancy BMI category in women with chronic hypertension: A cohort study. *Pregnancy Hypertens.* 2020;23:27-33.

62. Vesco KK, Dietz PM, Rizzo J, et al. Excessive gestational weight gain and postpartum weight retention among obese women. *Obstet Gynecol.* 2009;114(5):1069-1075.

63. Gunderson EP. Childbearing and obesity in women: weight before, during, and after pregnancy. *Obstet Gynecol Clin North Am.* 2009;36(2):317-332.

64. Zhu Y, Hedderson MM, Quesenberry CP, et al. Central Obesity Increases the Risk of Gestational Diabetes Partially Through Increasing Insulin Resistance. *Obesity (Silver Spring).* 2019;27(1):152-160.

65. Sridhar SB, Darbinian J, Ehrlich SF, et al. Maternal gestational weight gain and offspring risk for childhood overweight or obesity. *Am J Obstet Gynecol.* 2014;211(3):259.e251-258.

66. Hillier TA, Pedula KL, Schmidt MM, et al. Childhood obesity and metabolic imprinting: the ongoing effects of maternal hyperglycemia. *Diabetes Care.* 2007;30(9):2287-2292.

67. Hillier TA, Pedula KL, Vesco KK, et al. Impact of Maternal Glucose and Gestational Weight Gain on Child Obesity over the First Decade of Life in Normal Birth Weight Infants. *Matern Child Health J.* 2016;20(8):1559-1568.

68. Bider-Canfield Z, Martinez MP, Wang X, et al. Maternal obesity, gestational diabetes, breastfeeding and childhood overweight at age 2 years. *Pediatr Obes.* 2017;12(2):171-178.

69. Zhu Y, Olsen SF, Mendola P, et al. Maternal dietary intakes of refined grains during pregnancy and growth through the first 7 y of life among children born to women with gestational diabetes. *Am J Clin Nutr.* 2017;106(1):96-104.

70. Lowe WL, Scholtens DM, Lowe LP, et al. Association of Gestational Diabetes With Maternal Disorders of Glucose Metabolism and Childhood Adiposity. *Jama.* 2018;320(10):1005-1016.

71. Page KA, Luo S, Wang X, et al. Children Exposed to Maternal Obesity or Gestational Diabetes Mellitus During Early Fetal Development Have Hypothalamic Alterations That Predict Future Weight Gain. *Diabetes Care.* 2019;42(8):1473-1480.

72. Wang X, Martinez MP, Chow T, Xiang AH. BMI growth trajectory from ages 2 to 6 years and its association with maternal obesity, diabetes during pregnancy, gestational weight gain, and breastfeeding. *Pediatr Obes.* 2020;15(2):e12579.

73. Whitmer RA. The epidemiology of adiposity and dementia. *Curr Alzheimer Res.* 2007;4(2):117-122.

74. Whitmer RA, Gustafson DR, Barrett-Connor E, et al. Central obesity and increased risk of dementia more than three decades later. *Neurology.* 2008;71(14):1057-1064.

75. Zeki Al Hazzouri A, Haan MN, Whitmer RA, et al. Central obesity, leptin and cognitive decline: the Sacramento Area Latino Study on Aging. *Dement Geriatr Cogn Disord.* 2012;33(6):400-409.

76. Alves JM, Yunker AG, DeFendis A, et al. BMI status and associations between affect, physical activity and anxiety among U.S. children during COVID-19. *Pediatr Obes.* 2021;16(9):e12786.

77. Dutton GR, Lewis TT, Durant N, et al. Perceived weight discrimination in the CARDIA study: differences by race, sex, and weight status. *Obesity (Silver Spring).* 2014;22(2):530-536.

78. Rillamas-Sun E, LaCroix AZ, Waring ME, et al. Obesity and late-age survival without major disease or disability in older women. *JAMA Intern Med.* 2014;174(1):98-106.

79. Bentley TG, Palta M, Paulsen AJ, et al. Race and gender associations between obesity and nine health-related quality-of-life measures. *Qual Life Res.* 2011;20(5):665-674.

80. Bandera EV, Lee VS, Rodriguez-Rodriguez L, et al. Impact of Chemotherapy Dosing on Ovarian Cancer Survival According to Body Mass Index. *JAMA Oncol.* 2015;1(6):737-745.

81. Clark NP. Low-molecular-weight heparin use in the obese, elderly, and in renal insufficiency. *Thromb Res.* 2008;123 Suppl 1:S58-61.

82. Guirguis-Blake JM, Henderson JT, Perdue LA, Whitlock EP. Screening for Gynecologic Conditions With Pelvic Examination: A Systematic Review for the U.S. Preventive Services Task Force. *Rockville (MD): Agency for Healthcare Research and Quality (US).* 2017: Report No.: 15-05220-EF-05221.

83. Feldstein AC, Perrin N, Rosales AG, et al. Patient Barriers to Mammography Identified During a Reminder Program. *J Womens Health (Larchmt).* 2011;20(3):421-428.

84. Kempe KL, Larson RS, Shetterley S, Wilkinson A. Breast cancer screening in an insured population: whom are we missing? *Perm J.* 2013;17(1):38-44.

85. Kelly T, Yang W, Chen CS, et al. Global burden of obesity in 2005 and projections to 2030. *Int J Obes (Lond).* 2008;32(9):1431-1437.

86. Fitzpatrick SL, Stevens VJ. Adult obesity management in primary care, 2008-2013. *Prev Med.* 2017;99:128-133.

87. Barone Gibbs B, Pettee Gabriel K, Carnethon MR, et al. Sedentary Time, Physical Activity, and Adiposity: Cross-sectional and Longitudinal Associations in CARDIA. *Am J Prev Med.* 2017;53(6):764-771.

88. Piercy KL, Dorn JM, Fulton JE, et al. Opportunities for public health to increase physical activity among youths. *Am J Public Health.* 2015;105(3):421-426.

89. Young DR, Spengler JO, Frost N, et al. Promoting physical activity through the shared use of school recreational spaces: a policy statement from the American Heart Association. *Am J Public Health.* 2014;104(9):1583-1588.

90. Schneider M, DeBar L, Calingo A, et al. The Effect of a Communications Campaign on Middle School Students' Nutrition and Physical Activity: Results of the HEALTHY Study. *J Health Commun.* 2013;18(6):649-667.

91. Tsai AG, Bessesen DH. Obesity. *Ann Intern Med.* 2019;170(5):ITC33-ITC48.

92. Grant RW, Schmittdiel JA, Neugebauer RS, et al. Exercise as a Vital Sign: A Quasi-Experimental Analysis of a Health System Intervention to Collect Patient-Reported Exercise Levels. *J Gen Intern Med.* 2014;29(2):341-348.

93. Sallis RE, Matuszak JM, Baggish AL, et al. Call to Action on Making Physical Activity Assessment and Prescription a Medical Standard of Care. *Curr Sports Med Rep.* 2016;15(3):207-214.

94. Young DR, Coleman KJ, Ngor E, et al. Associations between physical activity and cardiometabolic risk factors assessed in a southern california health care system, 2010-2012. *Prev Chronic Dis.* 2014;11:E219.

95. 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.

96. 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.

97. Santo EC, Forbes PW, Oken E, Belfort MB. Determinants of physical activity frequency and provider advice during pregnancy. *BMC Pregnancy Childbirth.* 2017;17(1):286.

98. LeBlanc ES, Vesco KK, Funk KL, et al. Prepare, a randomized trial to promote and evaluate weight loss among overweight and obese women planning pregnancy: Study design and rationale. *Contemp Clin Trials.* 2016;49:174-180.

99. 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).* 2014;22(9):1989-1996.

100. Barroso CS, Yockey A, Degon E, et al. Efficacious lifestyle interventions for appropriate gestational weight gain in women with overweight or obesity set in the health care system: a scoping review. *J Matern Fetal Neonatal Med.* 2021.

101. O'Connor EA, Evans CV, Burda BU, et al. Screening for Obesity and Intervention for Weight Management in Children and Adolescents: Evidence Report and Systematic Review for the US Preventive Services Task Force. *Jama.* 2017;317(23):2427-2444.

102. 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. *J Am Coll Cardiol.* 2014;63(25 Pt B):2985-3023.

103. Ochner CN, Tsai AG, Kushner RF, Wadden TA. Treating obesity seriously: when recommendations for lifestyle change confront biological adaptations. *Lancet Diabetes Endocrinol.* 2015;3(4):232-234.

104. Tsai AG, Histon T, Kyle TK, et al. Evidence of a gap in understanding obesity among physicians. *Obes Sci Pract.* 2018;4(1):46-51.

105. Tucker S, Bramante C, Conroy M, et al. The Most Undertreated Chronic Disease: Addressing Obesity in Primary Care Settings. *Curr Obes Rep.* 2021;10(3):396-408.

106. Elder CR, Gullion CM, Funk KL, et al. Impact of sleep, screen time, depression and stress on weight change in the intensive weight loss phase of the LIFE study. *Int J Obes (Lond).* 2012;36(1):86-92.

107. Obarzanek E, Vollmer WM, Lin P-H, et al. Effects of Individual Components of Multiple Behavior Changes: The PREMIER Trial. *Am J Health Behav.* 2007;31(5):545-560.

108. Ma J, Strub P, Camargo CA, Jr., et al. The Breathe Easier through Weight Loss Lifestyle (BE WELL) Intervention: a randomized controlled trial. *BMC Pulm Med.* 2010;10:16.

109. Luo J, Chlebowski RT, Hendryx M, et al. Intentional Weight Loss and Endometrial Cancer Risk. *J Clin Oncol.* 2017;35(11):1189-1193.

110. Ledikwe JH, Rolls BJ, Smiciklas-Wright H, et al. Reductions in dietary energy density are associated with weight loss in overweight and obese participants in the PREMIER trial. *Am J Clin Nutr.* 2007;85(5):1212-1221.

111. Bazzano LA, Hu T, Reynolds K, et al. Effects of low-carbohydrate and low-fat diets: a randomized trial. *Ann Intern Med.* 2014;161(5):309-318.

112. Champagne CM, Broyles ST, Moran LD, et al. Dietary intakes associated with successful weight loss and maintenance during the Weight Loss Maintenance trial. *J Am Diet Assoc.* 2011;111(12):1826-1835.

113. Hollis JF, Gullion CM, Stevens VJ, et al. Weight loss during the intensive intervention phase of the weight-loss maintenance trial. *Am J Prev Med.* 2008;35(2):118-126.

114. Matson TE, Renz AD, Takemoto ML, et al. Acceptability of a sitting reduction intervention for older adults with obesity. *BMC Public Health.* 2018;18(1):706.

115. Patel AV, Bernstein L, Deka A, et al. Leisure time spent sitting in relation to total mortality in a prospective cohort of US adults. *Am J Epidemiol.* 2010;172(4):419-429.

116. Estabrooks PA, Wilson KE, McGuire TJ, et al. A Quasi-Experiment to Assess the Impact of a Scalable, Community-Based Weight Loss Program: Combining Reach, Effectiveness, and Cost. *J Gen Intern Med.* 2017;32(Suppl 1):24-31.

117. Rock CL, Flatt SW, Sherwood NE, et al. Effect of a free prepared meal and incentivized weight loss program on weight loss and weight loss maintenance in obese and overweight women: a randomized controlled trial. *Jama.* 2010;304(16):1803-1810.

118. Bachman KH, Histon TM, Remmers C. Obesity in the kaiser permanente patient population and positive outcomes of online weight-management programs. *Perm J.* 2007;11(2):25-30.

119. Masheb RM, Chan SH, Raffa SD, et al. State of the art conference on weight management in VA: Policy and research recommendations for advancing behavioral interventions. *J Gen Intern Med.* 2017;32(Suppl 1):74-78.

120. Bartfield JK, Stevens VJ, Jerome GJ, et al. Behavioral transitions and weight change patterns within the PREMIER trial. *Obesity (Silver Spring).* 2011;19(8):1609-1615.

121. Annesi JJ, Whitaker AC. Weight loss and psychologic gain in obese women-participants in a supported exercise intervention. *Perm J.* 2008;12(3):36-45.

122. Fitzpatrick SL, Hill-Briggs F. Strategies for Sustained Weight Management: Perspectives From African American Patients With Type 2 Diabetes. *Diabetes Educ.* 2017;43(3):304-310.

123. Funk KL, Stevens VJ, Appel LJ, et al. Associations of internet website use with weight change in a long-term weight loss maintenance program. *J Med Internet Res.* 2010;12(3):e29.

124. Svetkey LP, Stevens VJ, Brantley PJ, et al. Comparison of strategies for sustaining weight loss: the weight loss maintenance randomized controlled trial. *Jama.* 2008;299(10):1139-1148.

125. Coughlin JW, Gullion CM, Brantley PJ, et al. Behavioral mediators of treatment effects in the weight loss maintenance trial. *Ann Behav Med.* 2013;46(3):369-381.

126. Fitzpatrick SL, Bandeen-Roche K, Stevens VJ, et al. Examining behavioral processes through which lifestyle interventions promote weight loss: results from PREMIER. *Obesity (Silver Spring).* 2014;22(4):1002-1007.

127. Brantley PJ, Stewart DW, Myers VH, et al. Psychosocial predictors of weight regain in the weight loss maintenance trial. *J Behav Med.* 2014;37(6):1155-1168.

128. Arterburn DE, Telem DA, Kushner RF, Courcoulas AP. Benefits and Risks of Bariatric Surgery in Adults: A Review. *Jama.* 2020;324(9):879-887.

129. Arterburn D, Bogart A, Coleman KJ, et al. Comparative effectiveness of bariatric surgery vs. nonsurgical treatment of type 2 diabetes among severely obese adults. *Obes Res Clin Pract.* 2013;7(4):e258-268.

130. O'Brien R, Johnson E, Haneuse S, et al. Microvascular Outcomes in Patients With Diabetes After Bariatric Surgery Versus Usual Care: A Matched Cohort Study. *Ann Intern Med.* 2018;169(5):300-310.

131. Fisher DP, Johnson E, Haneuse S, et al. Association Between Bariatric Surgery and Macrovascular Disease Outcomes in Patients With Type 2 Diabetes and Severe Obesity. *Jama.* 2018;320(15):1570-1582.

132. Schauer DP, Feigelson HS, Koebnick C, et al. Bariatric Surgery and the Risk of Cancer in a Large Multisite Cohort. *Ann Surg.* 2019;269(1):95-101.

133. Feigelson HS, Caan B, Weinmann S, et al. Bariatric Surgery is Associated With Reduced Risk of Breast Cancer in Both Premenopausal and Postmenopausal Women. *Ann Surg.* 2020;272(6):1053-1059.

134. Arterburn D, Wellman R, Emiliano A, et al. Comparative Effectiveness and Safety of Bariatric Procedures for Weight Loss: A PCORnet Cohort Study. *Ann Intern Med.* 2018;169(11):741-750.

135. Inge TH, Coley RY, Bazzano LA, et al. Comparative effectiveness of bariatric procedures among adolescents: the PCORnet bariatric study. *Surg Obes Relat Dis.* 2018;14(9):1374-1386.

136. Howard R, Chao GF, Yang J, et al. Comparative Safety of Sleeve Gastrectomy and Gastric Bypass Up to 5 Years After Surgery in Patients With Severe Obesity. *JAMA Surg.* 2021.

137. Courcoulas AP, Johnson E, Arterburn DE, et al. Reduction in Long-term Mortality after Sleeve Gastrectomy and Gastric Bypass Compared to Non-surgical Patients with Severe Obesity. *Ann Surg.* 2021.

138. Casillas RA, Kim B, Fischer H, et al. Comparative effectiveness of sleeve gastrectomy versus Roux-en-Y gastric bypass for weight loss and safety outcomes in older adults. *Surg Obes Relat Dis.* 2017;13(9):1476-1483.

139. Schauer DP, Arterburn DE, Livingston EH, et al. Impact of bariatric surgery on life expectancy in severely obese patients with diabetes: a decision analysis. *Ann Surg.* 2015;261(5):914-919.

140. Arterburn D, Powers JD, Toh S, et al. Comparative effectiveness of laparoscopic adjustable gastric banding vs laparoscopic gastric bypass. *JAMA Surg.* 2014;149(12):1279-1287.

141. Gandotra C, Basam M, Mahajan A, et al. Characteristics and resolution of hypertension in obese African American bariatric cohort. *Sci Rep.* 2021;11(1):1683.

142. Arterburn DE, Bogart A, Sherwood NE, et al. A multisite study of long-term remission and relapse of type 2 diabetes mellitus following gastric bypass. *Obes Surg.* 2013;23(1):93-102.

143. Coleman KJ, Haneuse S, Johnson E, et al. Long-term Microvascular Disease Outcomes in Patients With Type 2 Diabetes After Bariatric Surgery: Evidence for the Legacy Effect of Surgery. *Diabetes Care.* 2016;39(8):1400-1407.

144. Thomas DD, Anderson WA, Apovian CM, et al. Weight Recidivism After Roux-en-Y Gastric Bypass Surgery: An 11-Year Experience in a Multiethnic Medical Center. *Obesity (Silver Spring).* 2019;27(2):217-225.

145. Coleman KJ, Brookey J. Gender and racial/ethnic background predict weight loss after Roux-en-Y gastric bypass independent of health and lifestyle behaviors. *Obes Surg.* 2014;24(10):1729-1736.

146. Coleman KJ, Huang YC, Hendee F, et al. Three-year weight outcomes from a bariatric surgery registry in a large integrated healthcare system. *Surg Obes Relat Dis.* 2014;10(3):396-403.

147. Coleman KJ, Huang YC, Koebnick C, et al. Metabolic syndrome is less likely to resolve in Hispanics and non-Hispanic blacks after bariatric surgery. *Ann Surg.* 2014;259(2):279-285.

148. Lo JC, Maring B, Chandra M, et al. Prevalence of obesity and extreme obesity in children aged 3-5 years. *Pediatr Obes.* 2014;9(3):167-175.

149. Coleman KJ, Geller KS, Rosenkranz RR, Dzewaltowski DA. Physical activity and healthy eating in the after-school environment. *J Sch Health.* 2008;78(12):633-640.

150. Coleman KJ, Shordon M, Caparosa SL, et al. The healthy options for nutrition environments in schools (Healthy ONES) group randomized trial: using implementation models to change nutrition policy and environments in low income schools. *Int J Behav Nutr Phys Act.* 2012;9:80.

151. Dzewaltowski DA, Rosenkranz RR, Geller KS, et al. HOP'N after-school project: an obesity prevention randomized controlled trial. *Int J Behav Nutr Phys Act.* 2010;7:90.

152. Gattshall ML, Shoup JA, Marshall JA, et al. Validation of a survey instrument to assess home environments for physical activity and healthy eating in overweight children. *Int J Behav Nutr Phys Act.* 2008;5:3.

153. Estabrooks PA, Shoup JA, Gattshall M, et al. Automated telephone counseling for parents of overweight children: a randomized controlled trial. *Am J Prev Med.* 2009;36(1):35-42.

154. Haines J, Rifas-Shiman SL, Gross D, et al. Randomized trial of a prevention intervention that embeds weight-related messages within a general parenting program. *Obesity (Silver Spring).* 2016;24(1):191-199.

155. Tsai AG, Remmert JE, Butryn ML, Wadden TA. Treatment of Obesity in Primary Care. *Med Clin North Am.* 2018;102(1):35-47.

156. Wadden TA, Butryn ML, Hong PS, Tsai AG. Behavioral treatment of obesity in patients encountered in primary care settings: a systematic review. *Jama.* 2014;312(17):1779-1791.

157. Whitlock EP, O'Connor EA, Williams SB, et al. Effectiveness of weight management interventions in children: a targeted systematic review for the USPSTF. *Pediatrics.* 2010;125(2):e396-418.

158. Schmittdiel JA, Adams SR, Goler N, et al. The impact of telephonic wellness coaching on weight loss: A "Natural Experiments for Translation in Diabetes (NEXT-D)" study. *Obesity (Silver Spring).* 2017;25(2):352-356.

159. Krishnaswami A, Ashok R, Sidney S, et al. Real-World Effectiveness of a Medically Supervised Weight Management Program in a Large Integrated Health Care Delivery System: Five-Year Outcomes. *Perm J.* 2018;22.

160. Tronieri JS, Wadden TA, Chao AM, Tsai AG. Primary Care Interventions for Obesity: Review of the Evidence. *Curr Obes Rep.* 2019;8(2):128-136.

161. Cheadle A, Atiedu A, Rauzon S, et al. A Community-Level Initiative to Prevent Obesity: Results From Kaiser Permanente's Healthy Eating Active Living Zones Initiative in California. *Am J Prev Med.* 2018;54(5s2):S150-s159.

162. Cheadle A, Schwartz PM, Rauzon S, et al. The Kaiser Permanente Community Health Initiative: overview and evaluation design. *Am J Public Health.* 2010;100(11):2111-2113.

163. Kramer L, Schwartz P, Cheadle A, et al. Promoting policy and environmental change using photovoice in the Kaiser Permanente Community Health Initiative. *Health Promot Pract.* 2010;11(3):332-339.

164. Kramer L, Schwartz P, Cheadle A, Rauzon S. Using photovoice as a participatory evaluation tool in Kaiser Permanente's Community Health Initiative. *Health Promot Pract.* 2013;14(5):686-694.

165. Woodward-Lopez G, Kao J, Kuo ES, et al. Changes in Consumer Purchases in Stores Participating in an Obesity Prevention Initiative. *Am J Prev Med.* 2018;54(5S2):S160-S169.

166. Coleman KJ, Caparosa SL, Nichols JF, et al. Understanding the Capacity for Exercise in Post-Bariatric Patients. *Obes Surg.* 2017;27(1):51-58.

167. Ferrara A, Hedderson MM, Brown SD, et al. A telehealth lifestyle intervention to reduce excess gestational weight gain in pregnant women with overweight or obesity (GLOW): a randomised, parallel-group, controlled trial. *Lancet Diabetes Endocrinol.* 2020;8(6):490-500.

168. Pratt CA, Fernandez ID, Stevens VJ. Introduction and overview of worksite studies. *Obesity (Silver Spring).* 2007;15 Suppl 1:1s-3s.

169. Pratt CA, Lemon SC, Fernandez ID, et al. Design characteristics of worksite environmental interventions for obesity prevention. *Obesity (Silver Spring).* 2007;15(9):2171-2180.

170. Cheadle A, Rauzon S, Spring R, et al. Kaiser Permanente's Community Health Initiative in Northern California: evaluation findings and lessons learned. *Am J Health Promot.* 2012;27(2):e59-68.

171. Williams AE, Stevens VJ, Albright CL, et al. The results of a 2-year randomized trial of a worksite weight management intervention. *Am J Health Promot.* 2014;28(5):336-339.

172. Williams AE, Vogt TM, Stevens VJ, et al. Work, Weight, and Wellness: the 3W Program: a worksite obesity prevention and intervention trial. *Obesity (Silver Spring).* 2007;15 Suppl 1:16s-26s.

173. Bray GA, Heisel WE, Afshin A, et al. The Science of Obesity Management: An Endocrine Society Scientific Statement. *Endocr Rev.* 2018;39(2):79-132.

174. Force USPST, Curry SJ, Krist AH, et al. Behavioral Weight Loss Interventions to Prevent Obesity-Related Morbidity and Mortality in Adults: US Preventive Services Task Force Recommendation Statement. *Jama.* 2018;320(11):1163-1171.

175. LeBlanc ES, Patnode CD, Webber EM, et al. Behavioral and Pharmacotherapy Weight Loss Interventions to Prevent Obesity-Related Morbidity and Mortality in Adults: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *Jama.* 2018;320(11):1172-1191.

176. Barnett TA, Kelly AS, Young DR, et al. Sedentary Behaviors in Today's Youth: Approaches to the Prevention and Management of Childhood Obesity: A Scientific Statement From the American Heart Association. *Circulation.* 2018;138(11):e142-e159.

177. Kushner RF, Horn DB, Butsch WS, et al. Development of Obesity Competencies for Medical Education: A Report from the Obesity Medicine Education Collaborative. *Obesity (Silver Spring).* 2019;27(7):1063-1067.

178. Tylavsky FA, Ferrara A, Catellier DJ, et al. Understanding childhood obesity in the US: the NIH environmental influences on child health outcomes (ECHO) program. *Int J Obes (Lond).* 2020;44(3):617-627.

179. King RJ, Heisey-Grove DM, Garrett N, et al. The Childhood Obesity Data Initiative: A Case Study in Implementing Clinical-Community Infrastructure Enhancements to Support Health Services Research and Public Health. *J Public Health Manag Pract.* 2021.

180. Kraus EM, Scott KA, Zucker R, et al. A Governance Framework to Integrate Longitudinal Clinical and Community Data in a Distributed Data Network: The Childhood Obesity Data Initiative. *J Public Health Manag Pract.* 2021.