[

{

"id": "study006",

"title": "Sex and race differences in cardiovascular disease development",

"population": "female and male",

"age\_range": "adult",

"condition": "cardiovascular disease",

"treatment": "general risk assessment",

"outcome": "CVD risk and presentation differ between sexes and across ethnicities; women are more likely to experience microvascular dysfunction and non-obstructive disease.",

"recommendation": "Sex-specific diagnostic criteria and risk assessment tools should be used to improve detection and management of CVD in women.",

"tags": ["cardiovascular", "diagnosis", "sex differences", "microvascular disease", "women"],

"source": "https://doi.org/10.31083/RCM26430"

},

{

"id": "study007",

"title": "Exercise and arterial stiffness: sex-specific benefits",

"population": "female and male",

"age\_range": "adult",

"condition": "arterial stiffness, CVD risk",

"treatment": "aerobic and resistance exercise",

"outcome": "Exercise reduces arterial stiffness in both sexes, but the degree and type of benefit may vary by sex and menopausal status.",

"recommendation": "Exercise prescriptions should be tailored to sex and hormonal status to maximize cardiovascular benefits.",

"tags": ["exercise", "arterial stiffness", "postmenopause", "sex differences", "vascular health"],

"source": "https://doi.org/10.31083/RCM26430"

},

{

"id": "study008",

"title": "Gut microbiota, exercise, and sex in cardiovascular risk",

"population": "female and male",

"age\_range": "adult",

"condition": "cardiovascular disease",

"treatment": "exercise",

"outcome": "Exercise alters gut microbiota composition, improving inflammatory and metabolic profiles that affect CVD risk differently in men and women.",

"recommendation": "Sex-specific effects of exercise on microbiota should be considered in personalized prevention strategies.",

"tags": ["microbiota", "exercise", "inflammation", "sex-specific", "CVD prevention"],

"source": "https://doi.org/10.31083/RCM26430"

},

{

"id": "study009",

"title": "Estrogen loss, exercise motivation, and CVD risk in women",

"population": "female",

"age\_range": "perimenopausal to postmenopausal",

"condition": "CVD prevention",

"treatment": "exercise adherence",

"outcome": "Estrogen loss reduces motivation to exercise in women, which correlates with increased CVD risk post-menopause.",

"recommendation": "Motivational and behavioral support for physical activity is especially important for women during and after menopause.",

"tags": ["motivation", "estrogen", "postmenopause", "CVD", "behavioral health"],

"source": "https://doi.org/10.31083/RCM26430"

}

]

[

{

"id": 1,

"title": "Men have larger hearts and higher oxygen-carrying capacity than women",

"population": "Healthy post-pubertal men and women",

"age\_range": "Adolescents and adults (post-puberty)",

"condition": "Cardiovascular physiology (exercise capacity)",

"treatment": "N/A",

"outcome": "By adulthood, male hearts are about 30% larger than female hearts (due to greater myocyte hypertrophy), resulting in higher stroke volume. Males also have higher blood hemoglobin concentrations than females, giving them greater oxygen-carrying capacity. Maximal heart rate shows no significant sex difference.",

"recommendation": "Consider intrinsic sex-based physiological differences when assessing aerobic fitness or designing training programs; men's larger cardiac output may confer performance advantages, while women might reach similar relative intensities with smaller cardiac dimensions.",

"tags": ["sex differences", "heart size", "stroke volume", "hemoglobin", "exercise physiology"],

"source": "&#8203;:contentReference[oaicite:0]{index=0}&#8203;:contentReference[oaicite:1]{index=1}"

},

{

"id": 2,

"title": "Men exhibit greater muscle strength but faster fatigue than women",

"population": "Adult men and women",

"age\_range": "Adults (post-puberty)",

"condition": "Muscular strength and endurance",

"treatment": "N/A",

"outcome": "Males develop larger muscle fibers and greater absolute muscle strength compared to females. However, men are often more fatigable than women during sustained or repeated isometric muscle contractions at similar relative intensity. Notably, capillary density in muscle is similar between sexes despite men having more capillaries per fiber (due to larger fiber size).",

"recommendation": "In exercise and rehabilitation programs, account for sex differences in muscle performance: women may have an advantage in endurance for sustained efforts, whereas men may generate higher peak force but fatigue sooner.",

"tags": ["sex differences", "muscle strength", "endurance", "fatigue", "exercise"],

"source": "&#8203;:contentReference[oaicite:2]{index=2}"

},

{

"id": 3,

"title": "Estrogen loss reduces women's exercise motivation and coincides with higher CVD risk",

"population": "Women (pre- vs post-menopausal)",

"age\_range": "Middle-aged and older adult women",

"condition": "Exercise motivation and CVD risk",

"treatment": "N/A",

"outcome": "Estrogen plays a significant role in regulating physical activity motivation in females. Research shows that estrogen deficiency (such as at menopause) leads to reduced melanocortin-4 signaling in the brain, lowering the drive to exercise. Importantly, menopause (when estrogen levels drop) is also the time when women's cardiovascular disease risk markedly increases, potentially leaving post-menopausal women at high CVD risk and less inclined to engage in exercise.",

"recommendation": "Encourage and support exercise in women approaching or after menopause, possibly through interventions to counteract the drop in intrinsic exercise motivation. Recognize that post-menopausal women face rising CVD risk and targeted strategies (exercise programs, hormone therapy evaluation, education) may be needed to mitigate risk.",

"tags": ["sex differences", "estrogen", "menopause", "exercise motivation", "CVD risk"],

"source": "&#8203;:contentReference[oaicite:3]{index=3}&#8203;:contentReference[oaicite:4]{index=4}"

},

{

"id": 4,

"title": "Sex-based differences in adult gut microbiome composition",

"population": "Adult men and women",

"age\_range": "Adults",

"condition": "Gut microbiota composition",

"treatment": "N/A",

"outcome": "Many studies report differences in gut microbiota between men and women. For example, women tend to have higher levels of certain Firmicutes (like Clostridium genus), whereas men have higher levels of Bacteroidetes (such as Prevotella genus) and Firmicutes like Lactobacillus. Men also often exhibit lower overall gut microbial diversity compared to women. However, not all studies find these differences; sex disparities in microbiome composition can be context-dependent and may be altered by factors like diet.",

"recommendation": "Incorporate sex as a factor in microbiome research and when considering probiotic or dietary interventions. What constitutes a 'healthy' microbiome may differ by sex, so personalized approaches should account for these composition and diversity differences.",

"tags": ["sex differences", "gut microbiota", "microbiome diversity", "Firmicutes", "Bacteroidetes"],

"source": "&#8203;:contentReference[oaicite:5]{index=5}"

},

{

"id": 5,

"title": "Sex differences in gut microbiota emerge from birth",

"population": "Human infants (female vs male)",

"age\_range": "Newborns and infants",

"condition": "Early-life gut microbiota development",

"treatment": "N/A",

"outcome": "Sex influences the gut microbiome even in early life. Studies show that female infants (for example, those born to asthmatic mothers) are more likely to have higher abundance of Bacteroidaceae family bacteria, whereas male infants tend to harbor more Lactobacillus in their gut. These differences suggest that from birth, males and females may develop distinct microbial communities, potentially affecting early development in a sex-dependent manner.",

"recommendation": "Monitor and consider sex-specific patterns in the infant gut microbiome. Early nutritional or probiotic interventions might be tailored by sex to support optimal microbiota development, especially in infants at risk (e.g., with maternal conditions like asthma).",

"tags": ["sex differences", "infant microbiome", "gut microbiota", "early development"],

"source": "&#8203;:contentReference[oaicite:6]{index=6}"

},

{

"id": 6,

"title": "Infant gut microbiome linked to temperament differs by sex",

"population": "Infants (male vs female)",

"age\_range": "Infancy",

"condition": "Gut microbiota and behavior",

"treatment": "N/A",

"outcome": "Research indicates sex-specific relationships between gut microbes and infant behavior. In a study of 300 infants, male babies with gut communities enriched in Bifidobacterium (Actinobacteria phylum) and Clostridiaceae (Firmicutes phylum) displayed a more positive temperament. In contrast, female infants whose gut microbiota had higher levels of Veillonella were observed to be more risk-averse in temperament. This suggests the gut-brain-behavior axis in early life may operate differently in boys versus girls.",

"recommendation": "Consider the potential influence of gut microbiota on early neurodevelopment and behavior in a sex-specific manner. Interventions to modulate the microbiome (like probiotics) in infancy could potentially have different effects on male and female behavioral outcomes.",

"tags": ["sex differences", "gut-brain axis", "infant temperament", "microbiome"],

"source": "&#8203;:contentReference[oaicite:7]{index=7}"

},

{

"id": 7,

"title": "Sex-specific microbiome changes associated with childhood obesity",

"population": "Pre-pubertal children (girls and boys)",

"age\_range": "Children (pre-adolescence)",

"condition": "Obesity and gut microbiota",

"treatment": "N/A",

"outcome": "Gut microbiota differences by sex can be modulated by metabolic status in childhood. A study found that normal-weight pre-pubertal girls had higher relative abundance of Bacteroidota phylum bacteria compared to obese girls of the same age, whereas these differences were not observed between normal-weight and obese boys. Obese girls in that cohort also exhibited hormonal differences (such as larger adrenal glands and lower estrogen levels) compared to normal-weight girls, implicating an interplay between gut microbes, sex hormones, and metabolic health in females.",

"recommendation": "Screen for gut microbiome alterations in children with obesity, with attention to sex-specific patterns. Early lifestyle or dietary interventions for childhood obesity might need to consider these sex-related microbiota and hormonal differences, especially in girls at risk of obesity-related complications.",

"tags": ["sex differences", "gut microbiota", "childhood obesity", "hormones", "metabolic health"],

"source": "&#8203;:contentReference[oaicite:8]{index=8}"

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{

"id": 8,

"title": "Puberty hormones drive divergence in male vs female gut microbiomes",

"population": "Adolescents (post-puberty) and animal models",

"age\_range": "Adolescence (pubertal period)",

"condition": "Gut microbiota changes during puberty",

"treatment": "N/A",

"outcome": "During puberty, rising sex hormones cause gut microbiomes of males and females to diverge more significantly. For instance, in human teenage twin pairs, opposite-sex twins had more dissimilar gut microbiota compositions compared to same-sex twins during puberty, indicating a hormone-driven effect. Animal studies reinforce this: female mice show significant changes in microbiome diversity after puberty compared to males, and castrated male mice no longer exhibit the usual sex-specific microbiome differences (highlighting testosterone's role). Conversely, giving testosterone to gonadectomized male mice prevents those microbial changes. Similarly, removing ovarian hormones in female mice (ovariectomy) alters the microbiota (e.g., reducing Proteobacteria, increasing Akkermansia), underscoring that both male and female sex hormones shape the gut ecosystem at puberty.",

"recommendation": "Treat puberty as a critical window for microbiome development. Future research or interventions (such as dietary guidance or probiotic use) might be timed around puberty and possibly differentiated for boys and girls to support healthy microbiome maturation under the influence of sex hormones.",

"tags": ["sex differences", "puberty", "gut microbiome", "sex hormones", "testosterone", "estrogen"],

"source": "&#8203;:contentReference[oaicite:9]{index=9}&#8203;:contentReference[oaicite:10]{index=10}&#8203;:contentReference[oaicite:11]{index=11}"

},

{

"id": 9,

"title": "Specific gut bacteria vary by sex in adults",

"population": "Adult men and women",

"age\_range": "Adults",

"condition": "Gut microbiota composition",

"treatment": "N/A",

"outcome": "In adult populations, certain gut bacterial taxa have been identified to differ between sexes. For example, one study in Japanese adults found that men had a higher abundance of Prevotellaceae (a family in the Bacteroidetes phylum), whereas women had more Ruminococcaceae (a family in the Firmicutes phylum). Another study reported that adult men had higher levels of Bacteroides and Prevotella genera compared to women. These findings support the notion of inherent sex-related differences in the gut microbial community structure in adulthood.",

"recommendation": "When evaluating gut microbiome profiles, consider the patient's sex as a factor that might influence the presence or abundance of specific microbes. Personalized nutrition or microbiome-targeted therapies could be optimized by recognizing these sex-specific microbial patterns.",

"tags": ["sex differences", "gut microbiota", "Prevotellaceae", "Ruminococcaceae", "adult microbiome"],

"source": "&#8203;:contentReference[oaicite:12]{index=12}&#8203;:contentReference[oaicite:13]{index=13}"

},

{

"id": 10,

"title": "Sex differences in gut microbiome narrow in older age",

"population": "Older adults (post-menopausal women and age-matched men)",

"age\_range": "Older adulthood (around and after menopause)",

"condition": "Gut microbiota and aging",

"treatment": "N/A",

"outcome": "Sex-related differences in gut microbiota tend to become less pronounced in the elderly. As men and women age and their sex hormone levels converge, their gut microbial profiles also become more similar. For instance, research comparing men and post-menopausal women found differences in the gut bacteria phyla ratio (Firmicutes to Bacteroidetes) and in saccharolytic (carbohydrate-fermenting) activity between sexes. The greatest microbiome differences were observed when comparing pre-menopausal women to post-menopausal women, and pre-menopausal women to men, suggesting that the drop in estrogen with menopause contributes to microbiota shifts. In essence, after menopause, women's gut microbiome increasingly resembles that of men of the same age.",

"recommendation": "In geriatric care and research, consider that sex-based microbiome differences may diminish. Pay attention to hormonal status (e.g., menopausal state) when examining gut health in older patients, and explore whether interventions like probiotics might need to be adjusted for post-menopausal women versus younger women.",

"tags": ["sex differences", "gut microbiota", "aging", "menopause", "microbiome"],

"source": "&#8203;:contentReference[oaicite:14]{index=14}&#8203;:contentReference[oaicite:15]{index=15}"

},

{

"id": 11,

"title": "Women are less likely than men to meet physical activity guidelines",

"population": "U.S. adults (men vs women across races and incomes)",

"age\_range": "Adults (≥18 years)",

"condition": "Physical activity levels",

"treatment": "N/A",

"outcome": "Epidemiological data reveal a sex disparity in exercise participation. Overall, men are more likely to meet recommended guidelines for both aerobic and muscle-strengthening activity than women. For example, in 2020, about 30.5% of non-Hispanic White men achieved the recommended activity levels, compared to only 24.3% of White women, with similar gaps observed in other ethnic groups. Across all racial/ethnic categories and across income levels, a higher percentage of men met the physical activity guidelines than women. Women, especially those in lower income brackets, had the lowest compliance with the recommended physical activity levels.",

"recommendation": "Public health initiatives should target increasing physical activity in women, particularly in communities with socioeconomic disadvantages. Tailored programs addressing barriers that women face in exercise (childcare, safety, cultural expectations) and promoting inclusive fitness opportunities could help close the gender gap in physical activity.",

"tags": ["sex differences", "exercise participation", "physical activity guidelines", "epidemiology"],

"source": "&#8203;:contentReference[oaicite:16]{index=16}&#8203;:contentReference[oaicite:17]{index=17}"

},

{

"id": 12,

"title": "Women gain greater cardiovascular mortality benefit from exercise than men",

"population": "Adults engaging in exercise (men vs women)",

"age\_range": "Adults",

"condition": "Exercise training outcomes",

"treatment": "Exercise training (aerobic)",

"outcome": "Men and women respond differently to exercise training. Women may experience a smaller improvement in certain cardiovascular fitness parameters from exercise (i.e., a blunted physiological training response compared to men). Despite this, women derive a greater relative reduction in cardiovascular mortality risk from the same amount of exercise as men. In other words, even if women's cardiorespiratory fitness gains are modest, their protection against heart disease and related mortality with regular exercise is higher. Furthermore, female athletes have a lower risk of exercise-related cardiac complications (like coronary calcification, left ventricular fibrosis, arrhythmias, and sudden cardiac death) compared to male athletes given similar training exposure.",

"recommendation": "Encourage exercise for both sexes, noting that women stand to gain substantial protective benefits for heart health. Fitness professionals and clinicians should not be discouraged by potentially smaller fitness gains in women, as the health impact (in terms of reduced CVD events and mortality) is significant. Also, be vigilant about different cardiac risks in male athletes and ensure preventive screenings accordingly.",

"tags": ["sex differences", "exercise training", "CVD prevention", "mortality benefit", "athlete heart"],

"source": "&#8203;:contentReference[oaicite:18]{index=18}&#8203;:contentReference[oaicite:19]{index=19}"

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{

"id": 13,

"title": "Sex hormones influence cardiovascular risk in men and women",

"population": "Older adults (postmenopausal women and older men)",

"age\_range": "Middle-aged and older adults",

"condition": "Hormonal levels and CVD risk",

"treatment": "N/A",

"outcome": "Endogenous sex hormones (estrogen and testosterone) impact cardiovascular risk in both sexes. Studies indicate that in older men, low estrogen levels are associated with higher risk of coronary heart disease and increased CVD mortality. Conversely, in postmenopausal women, lower testosterone levels correlate with greater risk of ischemic cardiovascular disease and major adverse cardiac events. As women age and particularly after menopause, their risk of CVD accelerates, narrowing the gap with men. Notably, cardiovascular disease is the leading cause of death in women across all ages, and in recent years hospitalizations and mortality due to CVD have been rising among younger and middle-aged women as well, despite the traditional view of estrogen being cardioprotective.",

"recommendation": "Do not underestimate cardiovascular risk in women, even at younger ages. Clinicians should monitor changes in hormone levels in both men and women as part of cardiovascular risk assessment in older patients. Strategies such as lifestyle modification or hormone replacement (when appropriate) should be considered to address hormone-related risk factors, and public health messaging should reinforce that women need to be proactive about heart disease prevention throughout their life span.",

"tags": ["sex differences", "hormones", "estrogen", "testosterone", "CVD risk"],

"source": "&#8203;:contentReference[oaicite:20]{index=20}&#8203;:contentReference[oaicite:21]{index=21}"

},

{

"id": 14,

"title": "Gender bias in cardiovascular care leads to worse outcomes for women",

"population": "Women vs men with cardiovascular symptoms or events",

"age\_range": "Adults",

"condition": "Cardiovascular disease management",

"treatment": "Bias in treatment (healthcare delivery)",

"outcome": "Women have historically been under-recognized and undertreated in cardiovascular care, contributing to poorer outcomes. For instance, symptoms of heart attack in women are often labeled \"atypical\" because they differ from male norms, leading some providers to misdiagnose or downplay women's cardiac symptoms. Younger women with chest pain may face skepticism (the erroneous assumption that \"a woman cannot be having a heart attack\"). As a result, women experience longer delays in emergency departments, are more likely to be misdiagnosed or have their symptoms dismissed, and are less often prescribed appropriate medications or referred to cardiac rehabilitation after events. These disparities in care contribute to women having higher complication rates and worse recovery after myocardial infarction compared to men.",

"recommendation": "Improve provider education and awareness of sex-specific manifestations of heart disease to avoid misdiagnosis. Ensure equitable application of guideline-recommended therapies for women. Hospitals and clinics should implement strategies to reduce implicit bias, such as protocols for chest pain evaluation that account for sex differences, and actively refer women to secondary prevention programs like cardiac rehab.",

"tags": ["gender differences", "healthcare disparities", "CVD outcomes", "women's health", "bias"],

"source": "&#8203;:contentReference[oaicite:22]{index=22}&#8203;:contentReference[oaicite:23]{index=23}"

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{

"id": 15,

"title": "Sex-specific patterns in heart failure and coronary artery disease",

"population": "Men vs women with heart disease",

"age\_range": "Adults",

"condition": "Heart failure and coronary artery disease",

"treatment": "N/A",

"outcome": "Men and women tend to develop different cardiovascular disease phenotypes. Women are more likely than men to develop heart failure with preserved ejection fraction (HFpEF), often accompanied by concentric left ventricular remodeling. In coronary artery disease, women are more prone to microvascular and endothelial dysfunction, whereas men more commonly exhibit obstructive plaque in large vessels. These differences contribute to distinct presentations and outcomes in acute coronary syndromes between the sexes.",

"recommendation": "Adopt sex-specific diagnostic and management strategies in cardiology. For example, consider screening women for microvascular angina or diastolic dysfunction (HFpEF) earlier, and tailor treatments (like heart failure management or angina therapies) to address the prevalent mechanisms in women versus men.",

"tags": ["sex differences", "heart failure", "HFpEF", "coronary microvascular disease", "CAD"],

"source": "&#8203;:contentReference[oaicite:24]{index=24}"

},

{

"id": 16,

"title": "Women show different vascular aging patterns than men",

"population": "Men vs women (cardiovascular aging)",

"age\_range": "Middle-aged and older adults",

"condition": "Arterial stiffness and hemodynamics",

"treatment": "N/A",

"outcome": "There are sex-specific differences in how the cardiovascular system ages. Women tend to experience greater effects from wave reflections in arteries, leading to higher central blood pressure load for a given peripheral pressure, which can contribute to left ventricular diastolic dysfunction. Studies have found that the relationship between arterial stiffness and adverse cardiac changes (like increases in left ventricular mass and diastolic dysfunction) is stronger in women than in men. Additionally, large artery stiffness (a marker of vascular aging) increases more after menopause, and an elevated arterial stiffness is linked to roughly twice the risk of cardiovascular mortality in women compared to men.",

"recommendation": "Assess arterial stiffness and central hemodynamics as part of cardiovascular risk evaluation, especially in postmenopausal women. Interventions that reduce arterial stiffness (e.g., exercise, antihypertensive therapy) may be particularly beneficial for women to prevent heart failure with preserved ejection fraction and other sequelae of increased hemodynamic load.",

"tags": ["sex differences", "vascular aging", "arterial stiffness", "hemodynamics", "postmenopausal"],

"source": "&#8203;:contentReference[oaicite:25]{index=25}&#8203;:contentReference[oaicite:26]{index=26}"

},

{

"id": 17,

"title": "Women have greater cardiovascular reactivity to mental stress",

"population": "Men vs women",

"age\_range": "Adults",

"condition": "Mental stress-induced cardiovascular effects",

"treatment": "N/A",

"outcome": "Psychosocial stress can trigger cardiovascular changes, and these responses differ by sex. Research shows that women exhibit greater myocardial ischemia (reduced blood flow to the heart) and peripheral endothelial dysfunction when under mental stress compared to men. Moreover, such stress-induced cardiovascular disturbances are associated with higher incidence of major adverse cardiovascular events, but notably this association is seen in women and not in men. This suggests that mental stress may be a more significant trigger for heart problems in women.",

"recommendation": "In clinical practice, pay attention to stress and emotional factors as part of cardiovascular risk assessment, especially for female patients. Stress management interventions (like cognitive-behavioral therapy, meditation, or exercise) might be particularly important for women to improve endothelial function and reduce the risk of stress-related cardiac events.",

"tags": ["sex differences", "mental stress", "myocardial ischemia", "endothelial dysfunction", "psychosocial factors"],

"source": "&#8203;:contentReference[oaicite:27]{index=27}"

},

{

"id": 18,

"title": "Female-specific factors elevate women's cardiovascular risk",

"population": "Women (various life stages)",

"age\_range": "Adults (especially women of reproductive age and beyond)",

"condition": "Female-specific and female-predominant CVD risk factors",

"treatment": "N/A",

"outcome": "In addition to traditional risk factors, women face unique risk factors for cardiovascular disease rooted in biological sex and gender. Female-specific reproductive factors (such as adverse pregnancy outcomes like preeclampsia, gestational diabetes, preterm birth, or conditions like early menopause, polycystic ovary syndrome, and endometriosis) have been linked to higher later-life CVD risk. Women also have a higher prevalence of certain conditions that elevate CVD risk, including autoimmune diseases, migraine, fibromyalgia, postural orthostatic tachycardia syndrome (POTS), osteoporosis, breast cancer treatments, irritable bowel syndrome, and psychosocial factors like history of abuse, intimate partner violence, PTSD, anxiety, and depression. Each of these factors is associated with increased inflammation, oxidative stress, vascular dysfunction (e.g., endothelial dysfunction, arterial stiffness), and ultimately a higher risk of hypertension, atherosclerosis, heart failure, and stroke in women.",

"recommendation": "Clinicians should systematically evaluate female patients for sex-specific risk factors (e.g., pregnancy history, early menopause) and conditions more common in women, incorporating them into CVD risk stratification. Preventive care for women should be broadened to address these factors — for instance, aggressive risk factor control in women with a history of preeclampsia or autoimmune disease. Research and guidelines should continue evolving to include these female-specific risk enhancers when managing women's heart health.",

"tags": ["women's health", "sex-specific risk factors", "pregnancy complications", "autoimmune disease", "CVD prevention"],

"source": "&#8203;:contentReference[oaicite:28]{index=28}&#8203;:contentReference[oaicite:29]{index=29}&#8203;:contentReference[oaicite:30]{index=30}"

}

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{

"id": "study100",

"title": "Blood Pressure Trajectories and Cardiovascular Risks in Women",

"population": "Women",

"age\_range": "Adult, especially postmenopausal",

"condition": "Arterial hypertension",

"treatment": "N/A",

"outcome": "Women experience steeper blood pressure increases pre-menopause and more significant declines in control with age. Higher blood pressure is more strongly associated with cardiovascular outcomes in women than in men.",

"recommendation": "Consider lower diagnostic and treatment thresholds for hypertension in women, especially during the menopausal transition.",

"tags": ["blood pressure", "cardiovascular disease", "women", "menopause"],

"source": "Arterial Hypertension in Women: State of the Art and Knowledge Gaps"

},

{

"id": "study101",

"title": "Epidemiology of Hypertension in Women",

"population": "Women",

"age\_range": "Adult",

"condition": "Arterial hypertension",

"treatment": "N/A",

"outcome": "Hypertension is underdiagnosed and undertreated in women, with control rates as low as 23%. The prevalence increases sharply after age 30 and exceeds that of men in postmenopausal periods.",

"recommendation": "Enhance screening and treatment strategies for hypertension in women, particularly as they approach middle age and beyond.",

"tags": ["hypertension", "women", "epidemiology", "treatment"],

"source": "Arterial Hypertension in Women: State of the Art and Knowledge Gaps"

},

{

"id": "study102",

"title": "Pathophysiology of Hypertension and Cardiovascular Disease in Women",

"population": "Women",

"age\_range": "Adult, especially older adults",

"condition": "Arterial hypertension",

"treatment": "N/A",

"outcome": "Estrogen's cardioprotective effects include enhancing vasodilation and reducing hypertension stress. Menarche, reproduction, menopause, and sex hormones significantly affect women's cardiovascular health.",

"recommendation": "Incorporate factors such as menarche, reproductive history, and menopause into risk assessments and management strategies for hypertension in women.",

"tags": ["pathophysiology", "estrogen", "cardiovascular health", "women"],

"source": "Arterial Hypertension in Women: State of the Art and Knowledge Gaps"

},

{

"id": "study103",

"title": "Clinical Implications and Gaps in Hypertension Management for Women",

"population": "Women",

"age\_range": "Adult",

"condition": "Arterial hypertension",

"treatment": "N/A",

"outcome": "Current clinical guidelines do not adequately address the unique aspects of hypertension in women, leading to gaps in treatment efficacy and health outcomes.",

"recommendation": "Update clinical guidelines to reflect the specific needs and physiological responses of women with hypertension.",

"tags": ["clinical guidelines", "hypertension management", "women", "health outcomes"],

"source": "Arterial Hypertension in Women: State of the Art and Knowledge Gaps"

}

]

[

{

"id": "study200",

"title": "Sex-Specific Mechanisms in Vascular Aging",

"population": "Elderly men and women",

"age\_range": "Senior",

"condition": "Vascular aging",

"treatment": "N/A",

"outcome": "Vascular aging manifests differently between sexes, influencing the prevalence, progression, and outcomes of age-related vascular diseases, including atherosclerosis and microvascular diseases.",

"recommendation": "Tailored therapeutic strategies should be developed to address sex-specific vascular aging pathways to improve clinical outcomes for elderly patients.",

"tags": ["vascular aging", "sex differences", "cardiovascular disease"],

"source": "GeroScience (2025) 47:301–337"

},

{

"id": "study201",

"title": "Role of Estrogen in Vascular Health",

"population": "Postmenopausal women",

"age\_range": "Postmenopausal",

"condition": "Vascular health",

"treatment": "N/A",

"outcome": "Estrogen decreases post-menopause, leading to increased vascular aging risks such as endothelial dysfunction and microvascular rarefaction.",

"recommendation": "Consideration of hormonal replacement therapy or other interventions that can mitigate the loss of estrogen's protective effects on vascular health.",

"tags": ["estrogen", "vascular health", "postmenopausal"],

"source": "GeroScience (2025) 47:301–337"

},

{

"id": "study202",

"title": "Inflammation and Vascular Aging",

"population": "Elderly men and women",

"age\_range": "Senior",

"condition": "Vascular aging",

"treatment": "N/A",

"outcome": "Chronic low-grade inflammation exacerbates vascular aging, contributing to the progression of atherosclerosis and other vascular diseases.",

"recommendation": "Anti-inflammatory treatments should be tailored by sex to effectively manage inflammation-induced vascular aging.",

"tags": ["inflammation", "vascular aging", "atherosclerosis"],

"source": "GeroScience (2025) 47:301–337"

}

]

[

{

"id": "study300",

"title": "Sex Differences in Hypertension Prevalence and Outcomes",

"population": "Adult men and women",

"age\_range": "Adult",

"condition": "Hypertension",

"treatment": "N/A",

"outcome": "Women experience a sharper incline in blood pressure from the third decade of life and are at higher risk of developing adverse cardiovascular outcomes at lower blood pressure thresholds than men.",

"recommendation": "Consider lower blood pressure thresholds for diagnosing and treating hypertension in women to prevent cardiovascular disease.",

"tags": ["hypertension", "sex differences", "cardiovascular outcomes", "blood pressure management"],

"source": "Current Hypertension Reports (2022)"

},

{

"id": "study301",

"title": "Impact of Hypertensive Disorders in Pregnancy on Long-term Hypertension",

"population": "Women with history of hypertensive disorders during pregnancy",

"age\_range": "Post-pregnancy",

"condition": "Hypertension",

"treatment": "Monitoring and management of blood pressure post-pregnancy",

"outcome": "Hypertensive disorders during pregnancy, such as gestational hypertension and pre-eclampsia, significantly increase the risk of chronic hypertension later in life.",

"recommendation": "Implement regular long-term blood pressure monitoring and management for women with a history of hypertensive disorders in pregnancy.",

"tags": ["gestational hypertension", "pre-eclampsia", "chronic hypertension", "women"],

"source": "Current Hypertension Reports (2022)"

},

{

"id": "study302",

"title": "Role of Sex Hormones and RAAS in Hypertension",

"population": "Adult men and women",

"age\_range": "Adult",

"condition": "Hypertension",

"treatment": "Consideration of hormone replacement therapy",

"outcome": "The interaction between sex hormones and the renin-angiotensin-aldosterone system (RAAS) plays a crucial role in the sex-specific development of hypertension.",

"recommendation": "Tailor hypertension treatment by considering the influence of sex hormones, particularly in postmenopausal women and men with altered androgen status.",

"tags": ["RAAS", "sex hormones", "hypertension", "blood pressure regulation"],

"source": "Current Hypertension Reports (2022)"

},

{

"id": "study303",

"title": "Sex-specific Outcomes and Management of Hypertension",

"population": "Adult men and women",

"age\_range": "Adult",

"condition": "Hypertension",

"treatment": "Tailored hypertension management",

"outcome": "Women have a higher relative risk of cardiovascular events associated with hypertension than men, indicating the need for sex-specific management strategies.",

"recommendation": "Develop and implement sex-specific guidelines for hypertension management to improve outcomes in women.",

"tags": ["hypertension management", "sex-specific treatment", "cardiovascular risk"],

"source": "Current Hypertension Reports (2022)"

}

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[

{

"id": "study400",

"title": "2018 ESC/ESH Guidelines for Hypertension Management",

"population": "Adults with hypertension",

"age\_range": "Adult",

"condition": "Arterial hypertension",

"treatment": "Lifestyle interventions, drug therapy",

"outcome": "Comprehensive guidelines for the management of hypertension, emphasizing the importance of blood pressure control through lifestyle interventions and pharmacological treatment to reduce the risk of cardiovascular diseases.",

"recommendation": "Implement routine screening for hypertension in adults, employ risk assessment tools like SCORE for cardiovascular risk, and adhere to specific treatment thresholds and targets as outlined for different patient groups including older adults and those with comorbidities.",

"tags": ["hypertension", "ESC/ESH guidelines", "blood pressure control", "cardiovascular risk"],

"source": "European Society of Hypertension and European Society of Cardiology"

},

{

"id": "study401",

"title": "Role of Out-of-office Blood Pressure Monitoring",

"population": "Adults with suspected hypertension",

"age\_range": "Adult",

"condition": "Hypertension diagnosis",

"treatment": "24-h ABPM or HBPM",

"outcome": "Out-of-office blood pressure monitoring (ABPM or HBPM) is emphasized for accurate diagnosis, detecting white-coat and masked hypertension, and monitoring treatment effectiveness.",

"recommendation": "Utilize ABPM or HBPM to confirm hypertension diagnosis and monitor ongoing management, particularly in cases where office blood pressure measurements may not reflect true blood pressure levels.",

"tags": ["ABPM", "HBPM", "blood pressure monitoring", "hypertension diagnosis"],

"source": "European Society of Hypertension and European Society of Cardiology"

},

{

"id": "study402",

"title": "Importance of Cardiovascular Risk Assessment",

"population": "Adults with hypertension",

"age\_range": "Adult",

"condition": "Cardiovascular risk assessment",

"treatment": "Risk assessment using SCORE",

"outcome": "Cardiovascular risk factors often cluster with hypertension, necessitating comprehensive risk assessments to tailor treatment strategies effectively.",

"recommendation": "Perform formal cardiovascular risk assessment using tools like the SCORE system to guide management strategies and identify patients at high risk who may benefit from more aggressive treatment.",

"tags": ["cardiovascular risk", "SCORE system", "risk assessment"],

"source": "European Society of Hypertension and European Society of Cardiology"

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{

"id": "study403",

"title": "Hypertension Treatment and Management Guidelines",

"population": "Adults with hypertension",

"age\_range": "Adult",

"condition": "Hypertension treatment",

"treatment": "Pharmacological and lifestyle interventions",

"outcome": "Updated guidelines recommend initiating pharmacological treatment in conjunction with lifestyle modifications based on the patient’s overall cardiovascular risk and hypertension grade.",

"recommendation": "Adopt a combination of lifestyle modifications and pharmacological treatment from the onset of treatment to enhance efficacy and patient adherence, and consider patient-specific factors when setting treatment goals.",

"tags": ["hypertension treatment", "lifestyle changes", "pharmacotherapy"],

"source": "European Society of Hypertension and European Society of Cardiology"

}

]