

Atherosclerosis Risk Factors: Systematic Review with

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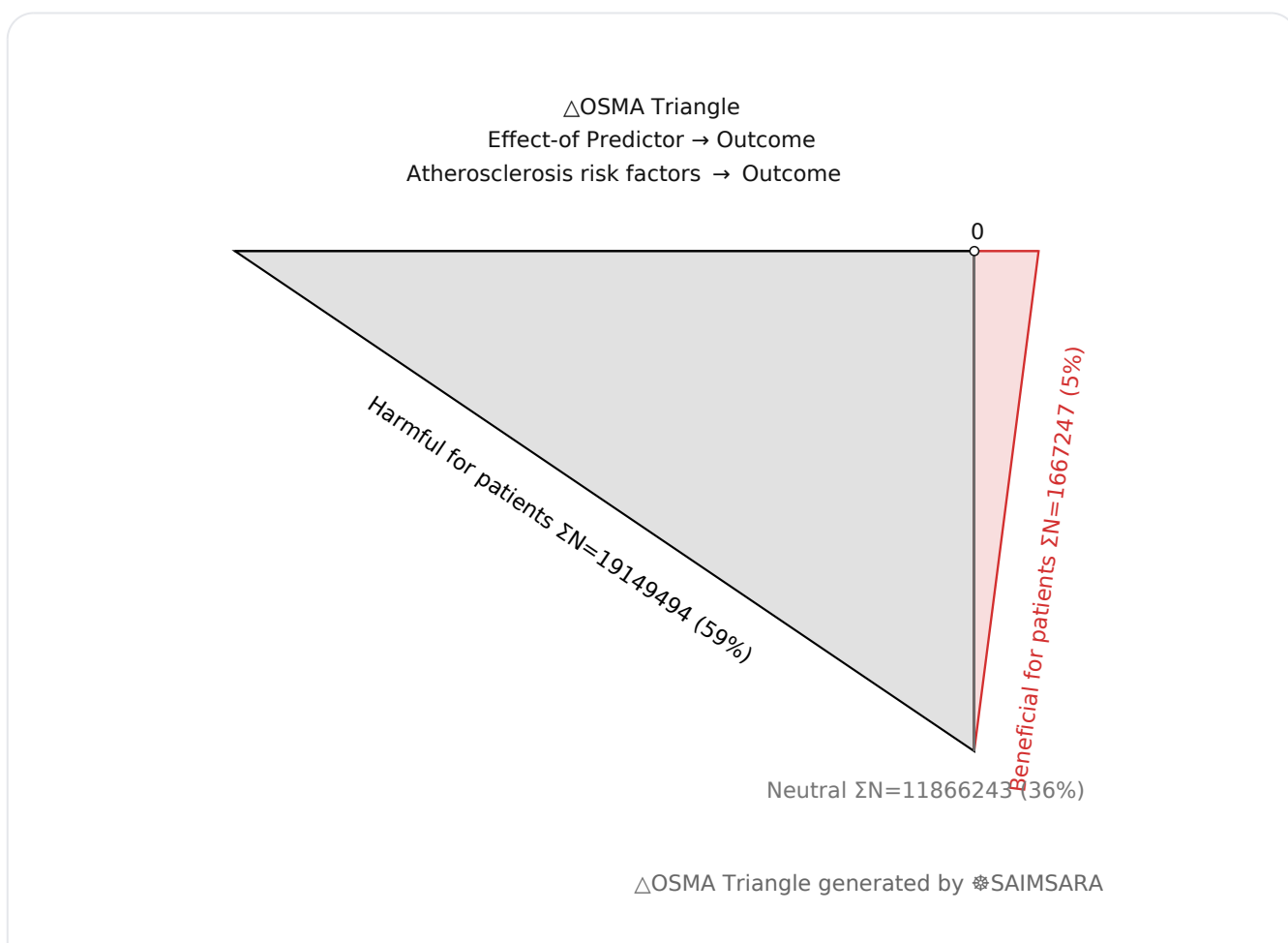
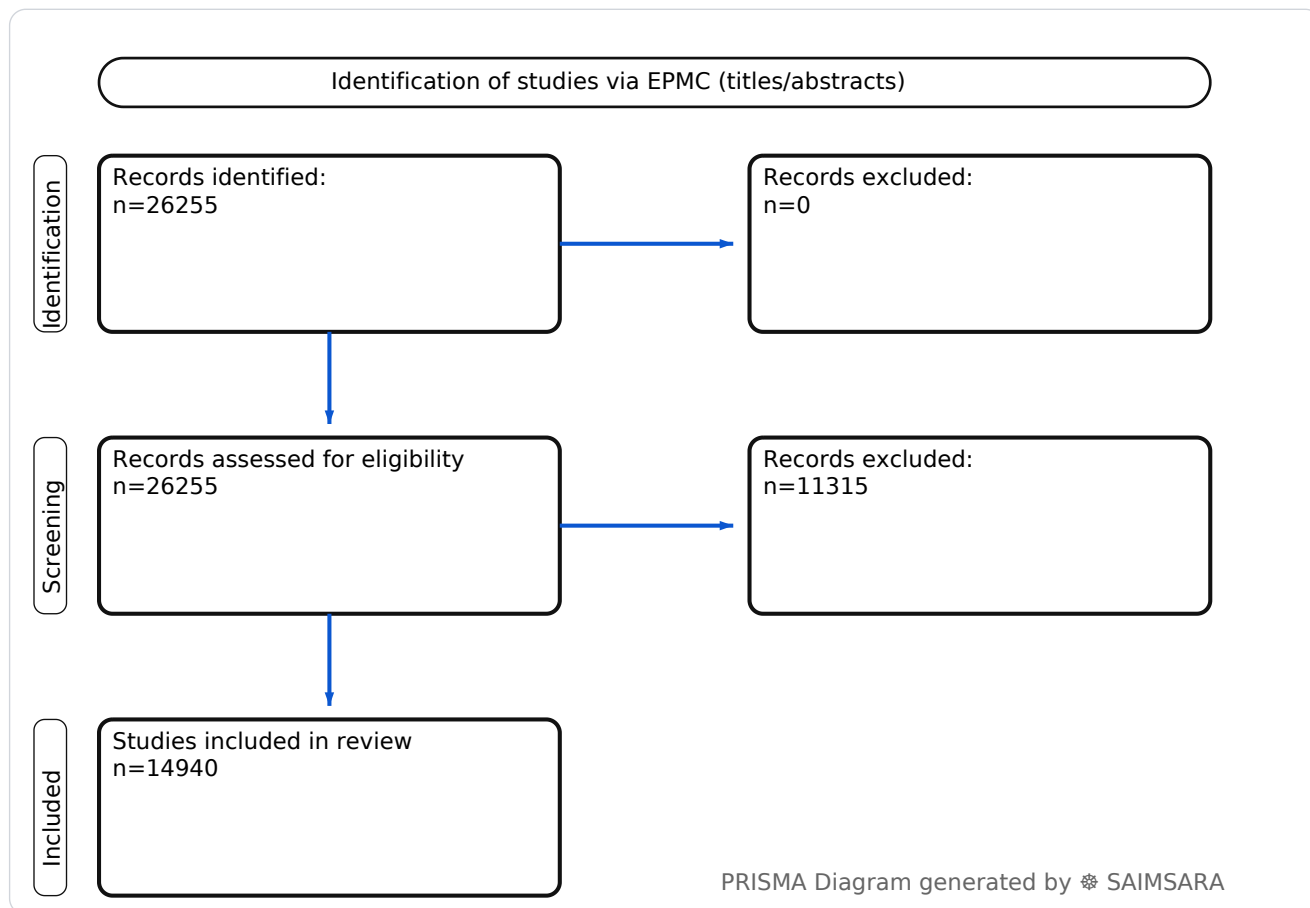
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Abstract: The aim of this paper is to systematically review and synthesize the current evidence on atherosclerosis risk factors, encompassing traditional cardiovascular risk factors, inflammatory and metabolic pathways, genetic predispositions, environmental influences, and associated comorbidities, to identify key themes and research gaps. The review utilises 14940 studies with 32682984 total participants (naïve ΣN). In a large prospective population study, traditional risk factors for atherosclerosis demonstrated consistent impact across different arterial territories, with elevated LDL-C associated with an aHR of 1.35 (95% CI, 1.24-1.46), high SBP with an aHR of 1.29 (95% CI, 1.22-1.37), and smoking with an aHR of 1.69 (95% CI, 1.56-1.82) for incident cardiovascular events. These findings are largely generalizable to diverse adult populations, although the heterogeneity of study designs and outcome metrics limits the certainty of a single, overarching quantitative summary. Clinicians should prioritize early and comprehensive management of traditional risk factors, while researchers should focus on validating emerging biomarkers and understanding the complex interplay of genetic, inflammatory, and environmental factors to develop personalized prevention strategies.

Keywords: Atherosclerosis; Cardiovascular risk factors; Traditional risk factors; Hypertension; Diabetes mellitus; Smoking; Dyslipidemia; Obesity; Inflammation; Preclinical atherosclerosis

Review Stats

- Generated: 2026-02-14 02:26:54 CET
- Plan: Pro (expanded craft tokens; source: Europe PMC)
- Source: Europe PMC
- Scope: Titles/Abstracts (tiab)
- Keyword Gate: Fuzzy ($\geq 60\%$ of required terms, minimum 2 terms matched in title/abstract)
- Total Abstracts/Papers: 26255
- Downloaded Abstracts/Papers: 26255
- Included original Abstracts/Papers: 14940
- Total study participants (naïve ΣN): 32682984



Outcome-Sentiment Meta-Analysis (OSMA): (LLM-only)

Frame: Effect-of Predictor → Outcome • *Source:* Europe PMC

Outcome: Outcome Typical timepoints: 10-y, 5-y. Reported metrics: %, CI, p.

Common endpoints: Common endpoints: complications, mortality, functional.

Predictor: Atherosclerosis risk factors — exposure/predictor. Doses/units seen: 10 ml, 21.1 mg, 894g, 50 mg, 5l, 2 mg.... Routes seen: oral, intravenous, subcutaneous, im.... Typical comparator: healthy controls, those without cvrfs, other racial and ethnic groups, the noncancer population....

- **1) Beneficial for patients** — Outcome with Atherosclerosis risk factors — [44], [55], [66], [244], [247], [249], [258], [278], [313], [365], [367], [373], [418], [458], [475], [531], [562], [568], [572], [575], [589], [648], [653], [670], [845], [850], [858], [933], [1088], [1096], [1102], [1109], [1177], [1296], [1324], [1333], [1371], [1380], [1407], [1563], [1802], [1896], [1963], [1977], [1980], [2054], [2141], [2146], [2152], [2184], [2252], [2253], [2260], [2293], [2492], [2502], [2508], [2515], [2519], [2610], [2621], [2630], [2680], [2718], [2725], [2744], [2749], [2809], [2834], [2947], [2958], [2964], [2969], [2995], [3030], [3059], [3066], [3074], [3076], [3078], [3102], [3126], [3135], [3197], [3209], [3353], [3360], [3381], [3444], [3446], [3451], [3456], [3464], [3478], [3479], [3521], [3573], [3589], [3650], [3654], [3662], [3676], [3678], [3685], [3705], [3745], [3802], [3845], [3849], [3866], [4009], [4016], [4116], [4123], [4127], [4142], [4145], [4159], [4162], [4293], [4294], [4295], [4300], [4301], [4311], [4316], [4319], [4344], [4355], [4370], [4374], [4469], [4566], [4575], [4584], [4588], [4757], [4783], [4797], [4843], [4864], [4865], [4919], [4946], [4955], [4994], [5000], [5005], [5037], [5074], [5102], [5118], [5160], [5191], [5264], [5318], [5328], [5334], [5371], [5392], [5415], [5417], [5483], [5494], [5525], [5665], [5803], [5807], [5815], [5844], [6032], [6039], [6049], [6268], [6297], [6341], [6369], [6378], [6402], [6404], [6424], [6429], [6433], [6437], [6442], [6458], [6471], [6472], [6546], [6552], [6697], [6700], [6775], [6916], [6919], [7000], [7011], [7069], [7096], [7098], [7286], [7292], [7295], [7297], [7303], [7341], [7342], [7529], [7558], [7605], [7687], [7691], [7699], [7707], [7709], [7851], [7911], [7912], [7933], [7936], [7940], [7946], [7949], [7966], [8034], [8087], [8096], [8164], [8179], [8185], [8186], [8205], [8212], [8215], [8217], [8239], [8257], [8263], [8277], [8319], [8327], [8386], [8463], [8473], [8475], [8476], [8492], [8505], [8508], [8514], [8545], [8676], [8678], [8682], [8683], [8700], [8705], [8708], [8709], [8726], [8728], [8729], [8749], [8760], [8820], [8864], [8880], [8912], [8916], [8932], [8986], [9092], [9093], [9094], [9099], [9123], [9124], [9129], [9138], [9150], [9198], [9252], [9254], [9273], [9276], [9284], [9286], [9289], [9290], [9291], [9294], [9370], [9373], [9403], [9414], [9451], [9453], [9459], [9464], [9508], [9537], [9620], [9749],

[9778], [9834], [10178], [10195], [10219], [10365], [10373], [10402], [10407], [10507], [10512], [10601], [10615], [10617], [10622], [10664], [10670], [10694], [10757], [10831], [10837], [10845], [10851], [10852], [10857], [10949], [11032], [11042], [11048], [11056], [11057], [11065], [11166], [11167], [11177], [11182], [11282], [11297], [11309], [11355], [11404], [11412], [11420], [11479], [11524], [11537], [11615], [11629], [11702], [11715], [11732], [11740], [11743], [11745], [11775], [11825], [11826], [11839], [11843], [11850], [11889], [11914], [11938], [12005], [12044], [12046], [12109], [12113], [12114], [12116], [12125], [12148], [12341], [12352], [12360], [12425], [12448], [12454], [12455], [12471], [12475], [12501], [12588], [12603], [12621], [12623], [12628], [12630], [12635], [12652], [12653], [12660], [12702], [12722], [12725], [12736], [12740], [12748], [12749], [12750], [12788], [12804], [12805], [12809], [12932], [12943], [12944], [12959], [13015], [13055], [13083], [13093], [13130], [13141], [13154], [13390], [13548], [13558], [13646], [13715], [13749], [13832], [13833], [13836], [13846], [13852], [13853], [13855], [13896], [13897], [13911], [13913], [13915], [13916], [14021], [14028], [14031], [14033], [14037], [14038], [14113], [14117], [14253], [14298], [14364], [14560], [14602], [14610], [14683], [14690], [14692], [14698], [14699], [14715], [14716], [14727], [14740], [14745] — ΣN=1667247

- **2) Harmful for patients** — Outcome with Atherosclerosis risk factors — [2], [5], [8], [13], [15], [16], [17], [18], [21], [22], [26], [27], [28], [31], [32], [33], [34], [35], [37], [38], [42], [47], [48], [51], [52], [53], [54], [56], [57], [58], [59], [60], [83], [88], [90], [92], [94], [95], [97], [98], [99], [100], [101], [102], [103], [104], [105], [106], [108], [110], [112], [113], [114], [116], [118], [119], [121], [122], [123], [124], [126], [127], [128], [129], [130], [131], [132], [133], [134], [135], [136], [137], [138], [139], [140], [141], [143], [144], [145], [147], [148], [150], [184], [185], [188], [190], [191], [194], [195], [207], [228], [241], [243], [246], [248], [250], [251], [252], [253], [254], [255], [256], [257], [260], [261], [262], [263], [266], [267], [268], [269], [270], [271], [272], [273], [274], [275], [276], [277], [279], [280], [281], [282], [283], [284], [285], [286], [287], [288], [289], [290], [291], [292], [293], [294], [296], [298], [299], [300], [301], [302], [303], [304], [305], [306], [307], [308], [309], [310], [311], [312], [314], [315], [317], [319], [320], [321], [323], [325], [326], [327], [328], [329], [330], [332], [337], [338], [340], [341], [342], [343], [344], [345], [350], [351], [353], [354], [355], [356], [357], [358], [359], [360], [362], [363], [366], [369], [372], [374], [380], [383], [385], [386], [390], [394], [396], [401], [404], [405], [406], [407], [409], [410], [413], [414], [415], [419], [424], [425], [427], [428], [432], [435], [438], [439], [440], [441], [442], [443], [444], [445], [446], [447], [448], [450], [452], [454], [455], [456], [460], [461], [462], [463], [464], [465], [467], [468], [469], [471], [472], [474], [476], [477], [478], [479], [480], [481], [484], [485], [486], [487], [488], [489], [490], [491], [492], [494],

[495], [496], [497], [498], [499], [500], [501], [502], [503], [505], [507], [508], [511], [513], [514], [520], [521], [522], [523], [524], [525], [527], [529], [533], [538], [539], [540], [541], [542], [545], [547], [549], [551], [552], [553], [554], [555], [556], [557], [558], [560], [561], [563], [565], [566], [567], [571], [573], [574], [576], [577], [578], [579], [580], [582], [583], [585], [586], [587], [588], [590], [592], [593], [595], [596], [597], [598], [600], [601], [602], [603], [604], [606], [610], [611], [612], [613], [614], [615], [616], [617], [620], [622], [623], [624], [626], [627], [628], [629], [630], [631], [632], [633], [634], [635], [636], [638], [639], [640], [641], [642], [643], [644], [645], [646], [647], [649], [650], [651], [652], [654], [655], [656], [657], [658], [659], [660], [661], [662], [663], [664], [665], [666], [667], [668], [669], [673], [674], [675], [676], [678], [679], [682], [683], [685], [686], [687], [688], [689], [691], [692], [694], [696], [697], [700], [701], [702], [703], [704], [705], [706], [708], [709], [710], [712], [714], [716], [717], [719], [720], [723], [724], [728], [729], [730], [731], [732], [734], [735], [736], [737], [742], [743], [744], [745], [746], [747], [750], [751], [752], [753], [754], [755], [756], [757], [758], [759], [761], [762], [763], [764], [765], [767], [769], [770], [771], [772], [777], [778], [779], [780], [783], [784], [785], [786], [790], [792], [793], [795], [796], [797], [798], [800], [802], [804], [806], [808], [812], [813], [814], [815], [816], [817], [819], [820], [821], [823], [824], [825], [826], [827], [828], [829], [830], [831], [832], [833], [835], [836], [837], [838], [839], [840], [843], [846], [847], [848], [851], [852], [853], [855], [856], [857], [859], [860], [861], [862], [863], [865], [869], [871], [873], [874], [875], [876], [877], [878], [879], [881], [883], [884], [885], [886], [887], [888], [889], [890], [893], [894], [895], [896], [897], [898], [899], [900], [901], [903], [908], [909], [913], [914], [915], [916], [917], [918], [920], [925], [926], [927], [928], [936], [937], [938], [939], [941], [943], [944], [946], [947], [948], [949], [953], [954], [955], [957], [959], [991], [992], [994], [995], [996], [997], [1000], [1001], [1004], [1007], [1009], [1010], [1011], [1012], [1013], [1014], [1017], [1018], [1020], [1023], [1024], [1025], [1026], [1028], [1033], [1037], [1039], [1045], [1048], [1051], [1055], [1057], [1059], [1060], [1062], [1063], [1064], [1066], [1067], [1069], [1071], [1072], [1074], [1076], [1077], [1079], [1080], [1082], [1084], [1085], [1087], [1089], [1090], [1091], [1092], [1093], [1094], [1095], [1097], [1100], [1101], [1104], [1105], [1107], [1108], [1111], [1112], [1113], [1114], [1116], [1117], [1118], [1119], [1121], [1122], [1123], [1124], [1125], [1126], [1127], [1128], [1129], [1130], [1132], [1133], [1134], [1135], [1136], [1137], [1139], [1140], [1141], [1143], [1144], [1146], [1147], [1149], [1150], [1151], [1153], [1155], [1156], [1157], [1158], [1159], [1160], [1165], [1167], [1168], [1169], [1170], [1171], [1172], [1173], [1174], [1175], [1176], [1178], [1179], [1180], [1181], [1182], [1186], [1187], [1188], [1189], [1190], [1191], [1192], [1193], [1195], [1196], [1197], [1198], [1199], [1200], [1201], [1202], [1203], [1205], [1206], [1207], [1208], [1209], [1210], [1211], [1212], [1213], [1214], [1215], [1216],

[1217], [1223], [1224], [1225], [1228], [1230], [1232], [1234], [1236], [1237], [1238], [1240], [1241], [1243], [1244], [1245], [1246], [1248], [1249], [1250], [1251], [1252], [1253], [1255], [1260], [1263], [1268], [1269], [1270], [1276], [1279], [1297], [1298], [1300], [1301], [1302], [1305], [1306], [1307], [1308], [1309], [1310], [1311], [1312], [1315], [1316], [1319], [1320], [1323], [1325], [1326], [1327], [1328], [1329], [1334], [1335], [1336], [1337], [1339], [1342], [1343], [1345], [1346], [1347], [1348], [1351], [1352], [1353], [1354], [1355], [1356], [1358], [1361], [1362], [1364], [1365], [1366], [1367], [1368], [1369], [1370], [1373], [1374], [1376], [1378], [1379], [1381], [1382], [1383], [1384], [1385], [1386], [1389], [1390], [1392], [1394], [1396], [1397], [1398], [1399], [1400], [1401], [1402], [1403], [1404], [1405], [1406], [1409], [1410], [1411], [1416], [1417], [1419], [1420], [1426], [1427], [1428], [1429], [1431], [1433], [1434], [1437], [1438], [1439], [1441], [1442], [1445], [1446], [1450], [1452], [1453], [1454], [1457], [1458], [1459], [1461], [1462], [1463], [1465], [1467], [1468], [1470], [1471], [1472], [1473], [1474], [1475], [1476], [1477], [1479], [1480], [1481], [1482], [1483], [1485], [1487], [1488], [1489], [1490], [1491], [1492], [1493], [1494], [1495], [1497], [1498], [1500], [1501], [1502], [1504], [1507], [1508], [1509], [1510], [1513], [1514], [1517], [1518], [1520], [1521], [1525], [1526], [1528], [1529], [1531], [1532], [1534], [1536], [1537], [1538], [1539], [1542], [1544], [1545], [1546], [1547], [1548], [1550], [1551], [1553], [1555], [1558], [1560], [1565], [1567], [1568], [1569], [1572], [1573], [1574], [1575], [1576], [1577], [1578], [1579], [1585], [1586], [1587], [1588], [1590], [1591], [1596], [1597], [1600], [1601], [1602], [1604], [1605], [1606], [1607], [1608], [1609], [1611], [1612], [1613], [1616], [1620], [1621], [1623], [1624], [1625], [1626], [1627], [1631], [1632], [1637], [1638], [1639], [1640], [1641], [1642], [1643], [1645], [1646], [1647], [1648], [1649], [1650], [1651], [1655], [1657], [1659], [1660], [1661], [1662], [1666], [1668], [1673], [1674], [1675], [1677], [1680], [1682], [1683], [1686], [1687], [1690], [1693], [1699], [1700], [1704], [1706], [1707], [1710], [1711], [1712], [1713], [1716], [1720], [1722], [1723], [1727], [1732], [1733], [1736], [1741], [1742], [1743], [1744], [1746], [1747], [1751], [1752], [1755], [1756], [1757], [1758], [1759], [1760], [1761], [1764], [1765], [1768], [1769], [1770], [1771], [1772], [1773], [1774], [1775], [1776], [1777], [1778], [1779], [1780], [1782], [1783], [1784], [1790], [1792], [1794], [1798], [1799], [1800], [1808], [1812], [1814], [1815], [1817], [1820], [1821], [1823], [1824], [1825], [1826], [1828], [1830], [1862], [1863], [1870], [1871], [1873], [1875], [1877], [1881], [1883], [1884], [1885], [1886], [1888], [1891], [1892], [1893], [1895], [1897], [1898], [1900], [1901], [1902], [1903], [1904], [1905], [1906], [1908], [1909], [1911], [1912], [1913], [1914], [1915], [1916], [1917], [1918], [1919], [1922], [1923], [1924], [1925], [1926], [1927], [1928], [1930], [1931], [1932], [1933], [1934], [1935], [1936], [1937], [1938], [1939], [1940], [1941], [1942], [1943], [1944], [1945], [1946], [1947], [1952], [1957], [1958], [1959], [1961], [1962], [1964], [1965], [1966],

[1968], [1969], [1971], [1972], [1973], [1974], [1975], [1988], [1989], [1992], [1993], [1994], [1995], [1998], [2000], [2001], [2005], [2006], [2007], [2009], [2042], [2043], [2044], [2045], [2049], [2050], [2051], [2052], [2053], [2055], [2060], [2062], [2063], [2075], [2084], [2090], [2092], [2099], [2101], [2102], [2108], [2109], [2110], [2111], [2112], [2113], [2116], [2117], [2119], [2120], [2121], [2122], [2125], [2127], [2130], [2134], [2135], [2138], [2139], [2142], [2143], [2145], [2147], [2148], [2149], [2150], [2153], [2155], [2157], [2158], [2159], [2160], [2163], [2166], [2169], [2170], [2173], [2174], [2175], [2181], [2182], [2183], [2186], [2187], [2188], [2189], [2194], [2197], [2198], [2199], [2203], [2204], [2206], [2207], [2208], [2210], [2213], [2215], [2216], [2220], [2221], [2227], [2230], [2232], [2234], [2237], [2238], [2239], [2241], [2242], [2245], [2249], [2251], [2255], [2256], [2261], [2262], [2266], [2267], [2268], [2275], [2281], [2287], [2288], [2292], [2296], [2298], [2299], [2300], [2302], [2304], [2306], [2307], [2308], [2311], [2313], [2319], [2320], [2324], [2325], [2326], [2327], [2330], [2331], [2333], [2335], [2337], [2338], [2339], [2340], [2344], [2345], [2346], [2347], [2348], [2351], [2352], [2354], [2355], [2356], [2357], [2359], [2361], [2362], [2363], [2364], [2365], [2367], [2369], [2370], [2374], [2375], [2376], [2378], [2379], [2380], [2384], [2385], [2386], [2387], [2388], [2389], [2390], [2391], [2392], [2393], [2395], [2397], [2398], [2399], [2400], [2401], [2402], [2403], [2404], [2411], [2412], [2413], [2415], [2416], [2418], [2419], [2420], [2422], [2424], [2425], [2428], [2429], [2430], [2432], [2433], [2437], [2443], [2444], [2445], [2446], [2447], [2448], [2449], [2450], [2451], [2455], [2456], [2457], [2458], [2460], [2463], [2464], [2469], [2470], [2472], [2478], [2479], [2489], [2490], [2491], [2493], [2494], [2495], [2496], [2499], [2501], [2503], [2504], [2505], [2506], [2507], [2510], [2511], [2512], [2513], [2514], [2518], [2520], [2522], [2523], [2524], [2525], [2527], [2529], [2530], [2531], [2532], [2534], [2537], [2538], [2540], [2541], [2542], [2543], [2545], [2546], [2550], [2563], [2571], [2574], [2575], [2581], [2582], [2583], [2584], [2585], [2587], [2588], [2589], [2592], [2593], [2597], [2598], [2599], [2600], [2601], [2604], [2605], [2606], [2607], [2609], [2611], [2615], [2616], [2618], [2619], [2625], [2626], [2627], [2628], [2633], [2634], [2637], [2639], [2640], [2642], [2646], [2647], [2648], [2649], [2650], [2652], [2653], [2658], [2661], [2662], [2665], [2666], [2667], [2668], [2669], [2672], [2675], [2676], [2677], [2678], [2681], [2682], [2683], [2684], [2685], [2686], [2687], [2688], [2689], [2690], [2691], [2692], [2693], [2696], [2697], [2698], [2700], [2701], [2702], [2703], [2704], [2706], [2707], [2708], [2709], [2710], [2712], [2713], [2714], [2715], [2716], [2717], [2720], [2722], [2724], [2726], [2727], [2728], [2729], [2730], [2731], [2732], [2734], [2735], [2738], [2739], [2740], [2742], [2745], [2747], [2748], [2752], [2753], [2755], [2760], [2791], [2792], [2793], [2794], [2795], [2797], [2798], [2799], [2800], [2806], [2807], [2810], [2811], [2815], [2817], [2819], [2822], [2825], [2826], [2827], [2828], [2829], [2830], [2831], [2833], [2835], [2836], [2837], [2841], [2842], [2843],

[2845], [2846], [2849], [2850], [2890], [2891], [2894], [2899], [2900], [2904], [2911], [2915], [2917], [2918], [2919], [2920], [2922], [2923], [2925], [2926], [2927], [2928], [2929], [2930], [2931], [2932], [2933], [2934], [2936], [2937], [2938], [2940], [2941], [2944], [2945], [2946], [2951], [2952], [2953], [2954], [2959], [2960], [2961], [2965], [2970], [2974], [2976], [2978], [2979], [2980], [2981], [2984], [2985], [2987], [2989], [2990], [2991], [2992], [2993], [2994], [2997], [2998], [3003], [3006], [3009], [3010], [3012], [3014], [3015], [3017], [3018], [3021], [3023], [3025], [3027], [3028], [3029], [3031], [3032], [3033], [3035], [3037], [3038], [3039], [3040], [3043], [3044], [3045], [3046], [3047], [3048], [3049], [3051], [3052], [3053], [3055], [3056], [3057], [3058], [3061], [3063], [3064], [3067], [3068], [3069], [3070], [3073], [3075], [3077], [3079], [3080], [3083], [3084], [3085], [3086], [3087], [3089], [3090], [3092], [3093], [3094], [3096], [3098], [3100], [3101], [3104], [3105], [3109], [3110], [3111], [3112], [3113], [3114], [3115], [3118], [3120], [3122], [3123], [3125], [3127], [3128], [3129], [3136], [3139], [3140], [3141], [3142], [3144], [3148], [3149], [3150], [3151], [3152], [3153], [3158], [3159], [3162], [3163], [3164], [3165], [3168], [3170], [3171], [3172], [3173], [3174], [3175], [3178], [3179], [3180], [3182], [3183], [3184], [3185], [3187], [3190], [3192], [3193], [3194], [3195], [3196], [3200], [3202], [3203], [3205], [3206], [3208], [3210], [3211], [3214], [3215], [3218], [3224], [3226], [3228], [3229], [3230], [3232], [3233], [3236], [3237], [3238], [3239], [3240], [3241], [3243], [3244], [3246], [3249], [3250], [3251], [3252], [3257], [3258], [3259], [3260], [3261], [3263], [3264], [3265], [3266], [3267], [3269], [3270], [3271], [3272], [3273], [3274], [3275], [3277], [3278], [3279], [3281], [3286], [3287], [3288], [3289], [3290], [3293], [3294], [3295], [3296], [3298], [3299], [3300], [3302], [3303], [3306], [3307], [3309], [3310], [3318], [3321], [3322], [3323], [3325], [3330], [3331], [3332], [3333], [3334], [3335], [3336], [3337], [3339], [3340], [3341], [3343], [3344], [3345], [3346], [3347], [3348], [3349], [3350], [3352], [3354], [3355], [3356], [3357], [3358], [3359], [3361], [3364], [3366], [3367], [3368], [3369], [3370], [3371], [3372], [3375], [3376], [3377], [3378], [3379], [3380], [3382], [3384], [3385], [3387], [3390], [3394], [3395], [3399], [3400], [3402], [3405], [3408], [3412], [3417], [3418], [3419], [3421], [3422], [3424], [3425], [3426], [3427], [3429], [3430], [3431], [3432], [3433], [3434], [3435], [3438], [3439], [3440], [3441], [3442], [3445], [3448], [3449], [3450], [3452], [3453], [3454], [3455], [3457], [3460], [3461], [3463], [3465], [3466], [3467], [3468], [3469], [3470], [3471], [3473], [3474], [3476], [3477], [3480], [3481], [3482], [3483], [3484], [3486], [3487], [3489], [3490], [3491], [3492], [3494], [3495], [3496], [3497], [3498], [3500], [3502], [3503], [3504], [3506], [3507], [3508], [3512], [3513], [3514], [3515], [3516], [3517], [3518], [3522], [3525], [3526], [3528], [3529], [3530], [3531], [3532], [3533], [3534], [3538], [3539], [3540], [3541], [3542], [3544], [3545], [3546], [3547], [3553], [3554], [3555], [3557], [3558], [3559], [3560], [3562], [3563], [3564], [3565], [3566], [3567], [3568], [3570],

[3572], [3575], [3577], [3578], [3580], [3582], [3584], [3590], [3597], [3598], [3599], [3600], [3602], [3603], [3607], [3609], [3610], [3611], [3613], [3614], [3617], [3618], [3619], [3620], [3625], [3626], [3629], [3630], [3631], [3632], [3633], [3634], [3637], [3638], [3639], [3640], [3641], [3642], [3643], [3644], [3645], [3646], [3647], [3648], [3649], [3652], [3653], [3656], [3657], [3658], [3659], [3660], [3671], [3675], [3677], [3681], [3682], [3683], [3684], [3687], [3688], [3690], [3692], [3693], [3695], [3697], [3698], [3699], [3701], [3702], [3708], [3710], [3711], [3713], [3714], [3715], [3716], [3717], [3720], [3722], [3726], [3728], [3729], [3731], [3733], [3735], [3738], [3746], [3748], [3752], [3753], [3754], [3756], [3758], [3759], [3760], [3761], [3762], [3763], [3764], [3765], [3766], [3767], [3768], [3769], [3770], [3771], [3772], [3774], [3775], [3776], [3779], [3780], [3782], [3786], [3787], [3789], [3790], [3791], [3792], [3793], [3794], [3796], [3797], [3799], [3803], [3804], [3805], [3806], [3807], [3809], [3810], [3812], [3813], [3814], [3815], [3818], [3819], [3820], [3821], [3822], [3824], [3825], [3826], [3828], [3829], [3830], [3831], [3832], [3833], [3834], [3836], [3837], [3838], [3839], [3841], [3844], [3846], [3850], [3851], [3852], [3856], [3857], [3859], [3860], [3863], [3865], [3870], [3871], [3877], [3880], [3882], [3883], [3884], [3888], [3889], [3890], [3891], [3892], [3894], [3896], [3897], [3898], [3899], [3900], [3901], [3903], [3906], [3909], [3910], [3912], [3915], [3917], [3918], [3923], [3925], [3926], [3927], [3930], [3931], [3932], [3938], [3939], [3940], [3946], [3948], [3949], [3950], [3953], [3955], [3957], [3961], [3962], [3963], [3964], [3965], [3966], [3967], [3968], [3970], [3971], [3974], [3975], [3976], [3977], [3978], [3979], [3980], [3981], [3983], [3984], [3985], [3988], [3989], [3990], [3991], [3992], [3993], [3994], [3995], [3996], [3999], [4000], [4001], [4004], [4005], [4006], [4008], [4010], [4011], [4012], [4013], [4014], [4015], [4017], [4019], [4020], [4021], [4023], [4025], [4026], [4027], [4028], [4030], [4031], [4032], [4033], [4034], [4035], [4037], [4038], [4040], [4042], [4046], [4051], [4052], [4053], [4055], [4056], [4057], [4058], [4059], [4060], [4061], [4064], [4065], [4066], [4067], [4068], [4071], [4072], [4075], [4079], [4080], [4081], [4085], [4087], [4088], [4090], [4091], [4094], [4096], [4097], [4098], [4099], [4101], [4103], [4104], [4105], [4108], [4109], [4110], [4112], [4113], [4115], [4117], [4118], [4119], [4120], [4122], [4126], [4128], [4129], [4130], [4131], [4132], [4133], [4134], [4135], [4136], [4137], [4138], [4139], [4140], [4141], [4146], [4148], [4149], [4150], [4151], [4152], [4154], [4155], [4156], [4165], [4168], [4169], [4171], [4172], [4178], [4179], [4181], [4184], [4187], [4188], [4190], [4191], [4193], [4194], [4196], [4198], [4199], [4200], [4201], [4202], [4205], [4207], [4209], [4210], [4212], [4213], [4214], [4216], [4217], [4225], [4228], [4229], [4231], [4232], [4234], [4235], [4236], [4239], [4241], [4244], [4245], [4246], [4248], [4249], [4250], [4251], [4252], [4253], [4257], [4259], [4261], [4263], [4264], [4265], [4267], [4270], [4272], [4275], [4276], [4277], [4278], [4280], [4281], [4282], [4283], [4284], [4285], [4286], [4288], [4289], [4290], [4296], [4302],

[4304], [4305], [4306], [4307], [4312], [4323], [4324], [4325], [4327], [4329], [4332], [4333], [4337], [4338], [4341], [4342], [4345], [4347], [4349], [4351], [4352], [4356], [4358], [4360], [4362], [4363], [4366], [4368], [4369], [4371], [4372], [4373], [4375], [4379], [4381], [4382], [4385], [4386], [4388], [4390], [4392], [4394], [4395], [4397], [4401], [4403], [4405], [4406], [4407], [4408], [4409], [4410], [4411], [4412], [4413], [4414], [4416], [4417], [4419], [4420], [4421], [4422], [4423], [4424], [4425], [4426], [4428], [4429], [4430], [4431], [4432], [4433], [4434], [4435], [4436], [4437], [4439], [4440], [4441], [4442], [4444], [4445], [4447], [4448], [4449], [4450], [4451], [4452], [4454], [4455], [4457], [4458], [4459], [4461], [4462], [4464], [4465], [4466], [4467], [4468], [4470], [4471], [4474], [4475], [4476], [4477], [4478], [4480], [4482], [4483], [4484], [4485], [4487], [4490], [4491], [4493], [4496], [4497], [4498], [4501], [4504], [4507], [4508], [4511], [4512], [4514], [4515], [4516], [4517], [4518], [4519], [4520], [4521], [4523], [4524], [4525], [4526], [4527], [4528], [4529], [4530], [4531], [4532], [4533], [4534], [4535], [4536], [4537], [4538], [4539], [4540], [4541], [4542], [4543], [4544], [4545], [4546], [4547], [4549], [4550], [4551], [4552], [4555], [4556], [4558], [4559], [4561], [4562], [4564], [4565], [4567], [4568], [4569], [4570], [4571], [4572], [4573], [4574], [4576], [4577], [4578], [4579], [4580], [4581], [4582], [4583], [4585], [4586], [4587], [4589], [4590], [4591], [4594], [4596], [4598], [4600], [4601], [4602], [4603], [4604], [4605], [4606], [4607], [4608], [4609], [4610], [4611], [4612], [4613], [4616], [4617], [4618], [4619], [4620], [4622], [4625], [4626], [4627], [4628], [4632], [4634], [4635], [4636], [4637], [4643], [4644], [4645], [4646], [4647], [4649], [4650], [4651], [4652], [4654], [4655], [4657], [4658], [4659], [4660], [4661], [4663], [4665], [4666], [4667], [4668], [4669], [4670], [4671], [4672], [4674], [4675], [4676], [4677], [4678], [4680], [4681], [4682], [4683], [4685], [4686], [4690], [4691], [4693], [4694], [4695], [4696], [4698], [4702], [4703], [4704], [4705], [4706], [4707], [4710], [4711], [4712], [4713], [4714], [4715], [4717], [4718], [4719], [4720], [4721], [4725], [4726], [4727], [4728], [4729], [4730], [4737], [4741], [4742], [4743], [4745], [4746], [4747], [4749], [4750], [4751], [4752], [4753], [4754], [4755], [4756], [4758], [4760], [4761], [4764], [4766], [4771], [4773], [4774], [4778], [4779], [4780], [4781], [4782], [4785], [4786], [4788], [4789], [4791], [4793], [4794], [4795], [4798], [4799], [4800], [4801], [4802], [4804], [4805], [4807], [4809], [4811], [4815], [4816], [4818], [4820], [4821], [4823], [4824], [4825], [4826], [4827], [4830], [4831], [4834], [4835], [4837], [4840], [4841], [4842], [4844], [4845], [4848], [4850], [4851], [4853], [4855], [4857], [4858], [4859], [4860], [4867], [4868], [4869], [4870], [4874], [4877], [4881], [4882], [4883], [4887], [4889], [4890], [4891], [4893], [4894], [4895], [4896], [4897], [4904], [4906], [4908], [4910], [4911], [4912], [4913], [4914], [4915], [4916], [4917], [4918], [4920], [4921], [4926], [4927], [4928], [4929], [4931], [4932], [4934], [4935], [4937], [4941], [4942], [4944], [4945], [4947], [4950], [4951], [4952], [4953], [4957], [4961], [4966],

[4967], [4968], [4969], [4978], [4980], [4984], [4985], [4987], [4988], [4989], [4992], [4993], [4995], [4996], [4997], [4998], [4999], [5002], [5003], [5004], [5006], [5011], [5012], [5013], [5014], [5015], [5016], [5018], [5019], [5020], [5021], [5022], [5023], [5024], [5025], [5026], [5028], [5029], [5030], [5031], [5034], [5035], [5038], [5039], [5040], [5071], [5072], [5073], [5076], [5077], [5078], [5079], [5080], [5081], [5082], [5083], [5085], [5087], [5088], [5091], [5093], [5094], [5095], [5097], [5098], [5099], [5100], [5101], [5103], [5108], [5109], [5111], [5112], [5113], [5114], [5115], [5117], [5120], [5121], [5122], [5123], [5124], [5125], [5127], [5128], [5129], [5130], [5132], [5137], [5138], [5140], [5142], [5144], [5145], [5148], [5149], [5152], [5153], [5155], [5156], [5157], [5158], [5162], [5164], [5165], [5166], [5168], [5169], [5170], [5172], [5174], [5175], [5176], [5178], [5180], [5182], [5185], [5186], [5189], [5190], [5192], [5193], [5194], [5195], [5196], [5197], [5198], [5199], [5200], [5202], [5203], [5205], [5206], [5207], [5209], [5210], [5213], [5216], [5217], [5219], [5220], [5222], [5224], [5226], [5227], [5228], [5229], [5231], [5232], [5234], [5235], [5238], [5240], [5242], [5243], [5244], [5245], [5246], [5250], [5251], [5252], [5253], [5256], [5257], [5258], [5259], [5260], [5261], [5263], [5266], [5267], [5268], [5271], [5273], [5274], [5275], [5276], [5278], [5283], [5285], [5291], [5292], [5294], [5296], [5297], [5298], [5300], [5302], [5307], [5308], [5309], [5311], [5312], [5313], [5314], [5315], [5319], [5320], [5321], [5322], [5323], [5324], [5325], [5327], [5329], [5330], [5331], [5332], [5333], [5335], [5336], [5337], [5338], [5339], [5344], [5345], [5346], [5350], [5351], [5352], [5355], [5356], [5359], [5360], [5362], [5364], [5366], [5367], [5369], [5378], [5379], [5380], [5381], [5384], [5385], [5387], [5389], [5393], [5396], [5398], [5399], [5400], [5401], [5402], [5403], [5404], [5405], [5406], [5408], [5410], [5411], [5412], [5416], [5418], [5419], [5420], [5421], [5422], [5425], [5426], [5427], [5428], [5429], [5430], [5431], [5432], [5435], [5436], [5438], [5439], [5443], [5445], [5447], [5448], [5449], [5450], [5451], [5454], [5455], [5456], [5457], [5458], [5459], [5460], [5461], [5463], [5466], [5467], [5469], [5474], [5475], [5476], [5477], [5478], [5480], [5481], [5484], [5485], [5489], [5492], [5493], [5495], [5496], [5497], [5498], [5499], [5500], [5501], [5504], [5505], [5506], [5508], [5509], [5510], [5512], [5513], [5514], [5515], [5517], [5518], [5520], [5530], [5533], [5535], [5536], [5537], [5539], [5541], [5542], [5543], [5546], [5547], [5548], [5549], [5551], [5553], [5554], [5555], [5556], [5557], [5558], [5561], [5562], [5564], [5566], [5567], [5568], [5570], [5571], [5573], [5574], [5575], [5576], [5585], [5587], [5588], [5593], [5594], [5598], [5599], [5600], [5602], [5603], [5605], [5606], [5610], [5613], [5614], [5615], [5617], [5618], [5619], [5620], [5622], [5623], [5625], [5626], [5628], [5629], [5630], [5631], [5632], [5633], [5634], [5635], [5636], [5638], [5639], [5640], [5641], [5643], [5644], [5646], [5648], [5649], [5650], [5652], [5653], [5656], [5658], [5659], [5662], [5663], [5666], [5669], [5671], [5672], [5675], [5676], [5679], [5680], [5681], [5684], [5686], [5687], [5689], [5690], [5691],

[5692], [5693], [5695], [5698], [5699], [5706], [5724], [5729], [5758], [5767], [5776], [5780], [5784], [5790], [5792], [5795], [5796], [5797], [5798], [5799], [5801], [5804], [5806], [5808], [5810], [5811], [5812], [5816], [5817], [5818], [5819], [5820], [5822], [5825], [5826], [5827], [5828], [5829], [5830], [5832], [5833], [5834], [5835], [5838], [5839], [5843], [5845], [5848], [5851], [5854], [5858], [5863], [5866], [5870], [5871], [5872], [5873], [5874], [5875], [5877], [5880], [5881], [5882], [5883], [5884], [5885], [5886], [5887], [5888], [5889], [5890], [5891], [5892], [5893], [5894], [5895], [5896], [5897], [5898], [5899], [5900], [5901], [5902], [5903], [5904], [5905], [5906], [5907], [5910], [5911], [5912], [5913], [5914], [5915], [5916], [5917], [5918], [5920], [5921], [5922], [5924], [5925], [5926], [5927], [5928], [5929], [5930], [5931], [5932], [5933], [5934], [5935], [5936], [5937], [5938], [5939], [5940], [5941], [5942], [5943], [5944], [5946], [5947], [5948], [5949], [5950], [5952], [5955], [5956], [5957], [5959], [5960], [5962], [5966], [5967], [5968], [5970], [5973], [5975], [5977], [5978], [5979], [5983], [5984], [5985], [5987], [5988], [5989], [5990], [5991], [5992], [5993], [5996], [5997], [5998], [6000], [6002], [6003], [6004], [6006], [6007], [6009], [6012], [6013], [6014], [6015], [6016], [6017], [6019], [6020], [6021], [6022], [6026], [6028], [6029], [6031], [6033], [6034], [6036], [6037], [6038], [6040], [6041], [6042], [6043], [6044], [6045], [6046], [6047], [6050], [6051], [6053], [6054], [6055], [6056], [6057], [6061], [6062], [6063], [6065], [6066], [6067], [6068], [6069], [6070], [6071], [6072], [6074], [6075], [6076], [6077], [6078], [6079], [6080], [6081], [6082], [6083], [6084], [6086], [6087], [6089], [6090], [6091], [6093], [6095], [6096], [6098], [6099], [6100], [6101], [6103], [6104], [6105], [6106], [6109], [6110], [6111], [6118], [6121], [6122], [6123], [6124], [6125], [6126], [6127], [6128], [6131], [6132], [6136], [6137], [6138], [6139], [6141], [6142], [6146], [6147], [6150], [6151], [6153], [6155], [6159], [6161], [6162], [6163], [6164], [6166], [6168], [6169], [6171], [6173], [6174], [6178], [6181], [6182], [6183], [6184], [6185], [6186], [6194], [6195], [6196], [6198], [6201], [6202], [6203], [6205], [6214], [6215], [6216], [6219], [6222], [6223], [6225], [6226], [6227], [6228], [6229], [6236], [6237], [6241], [6244], [6247], [6248], [6250], [6252], [6256], [6258], [6261], [6262], [6264], [6265], [6269], [6271], [6274], [6275], [6276], [6279], [6280], [6282], [6283], [6284], [6285], [6286], [6287], [6290], [6292], [6294], [6296], [6300], [6301], [6302], [6303], [6304], [6305], [6307], [6308], [6309], [6311], [6312], [6314], [6317], [6319], [6320], [6322], [6323], [6325], [6327], [6328], [6331], [6333], [6334], [6335], [6336], [6338], [6339], [6340], [6343], [6344], [6345], [6346], [6348], [6350], [6351], [6352], [6353], [6354], [6355], [6356], [6357], [6358], [6359], [6364], [6365], [6366], [6367], [6368], [6372], [6373], [6376], [6377], [6379], [6381], [6382], [6383], [6384], [6390], [6391], [6392], [6393], [6394], [6395], [6396], [6397], [6398], [6399], [6401], [6403], [6405], [6406], [6408], [6409], [6410], [6411], [6412], [6413], [6414], [6415], [6416], [6417], [6418], [6420], [6421], [6423], [6425], [6426], [6430], [6431], [6434],

[6435], [6436], [6438], [6439], [6440], [6441], [6443], [6444], [6445], [6446], [6450], [6452], [6454], [6455], [6456], [6457], [6459], [6460], [6463], [6467], [6468], [6473], [6475], [6476], [6477], [6480], [6486], [6487], [6488], [6489], [6491], [6493], [6494], [6496], [6498], [6499], [6500], [6501], [6502], [6503], [6505], [6507], [6511], [6512], [6513], [6514], [6515], [6516], [6518], [6520], [6521], [6522], [6523], [6525], [6526], [6527], [6528], [6530], [6531], [6532], [6533], [6535], [6536], [6537], [6538], [6539], [6540], [6541], [6543], [6544], [6545], [6547], [6548], [6550], [6553], [6554], [6556], [6557], [6558], [6560], [6562], [6564], [6566], [6567], [6568], [6569], [6570], [6577], [6579], [6582], [6583], [6584], [6585], [6587], [6590], [6593], [6596], [6597], [6602], [6605], [6606], [6607], [6608], [6612], [6613], [6614], [6619], [6622], [6623], [6625], [6626], [6627], [6628], [6629], [6630], [6632], [6641], [6642], [6652], [6656], [6661], [6662], [6668], [6673], [6676], [6679], [6680], [6681], [6685], [6686], [6688], [6691], [6692], [6694], [6695], [6696], [6702], [6703], [6705], [6706], [6707], [6708], [6709], [6710], [6711], [6712], [6713], [6717], [6718], [6719], [6720], [6721], [6722], [6723], [6724], [6729], [6731], [6732], [6733], [6734], [6736], [6738], [6740], [6742], [6745], [6746], [6748], [6751], [6754], [6756], [6758], [6761], [6765], [6768], [6769], [6770], [6771], [6772], [6774], [6776], [6779], [6791], [6793], [6809], [6810], [6811], [6812], [6813], [6814], [6815], [6816], [6817], [6818], [6820], [6822], [6823], [6824], [6825], [6826], [6827], [6828], [6829], [6833], [6835], [6837], [6838], [6839], [6840], [6842], [6844], [6845], [6848], [6849], [6850], [6851], [6852], [6853], [6854], [6855], [6856], [6857], [6858], [6859], [6860], [6862], [6863], [6865], [6866], [6867], [6869], [6870], [6871], [6872], [6873], [6874], [6875], [6876], [6877], [6878], [6879], [6880], [6881], [6883], [6885], [6886], [6887], [6888], [6889], [6890], [6891], [6892], [6893], [6894], [6895], [6897], [6899], [6900], [6901], [6903], [6904], [6905], [6906], [6907], [6908], [6910], [6912], [6914], [6915], [6918], [6921], [6922], [6923], [6924], [6926], [6927], [6928], [6929], [6930], [6961], [6963], [6964], [6965], [6966], [6967], [6969], [6970], [6972], [6973], [6975], [6976], [6977], [6978], [6980], [6981], [6982], [6983], [6984], [6986], [6987], [6988], [6989], [6990], [6992], [6994], [6995], [6996], [6997], [7004], [7005], [7009], [7010], [7012], [7013], [7015], [7016], [7017], [7019], [7020], [7021], [7022], [7023], [7024], [7028], [7029], [7031], [7034], [7035], [7041], [7042], [7046], [7047], [7048], [7050], [7055], [7056], [7057], [7059], [7060], [7062], [7065], [7066], [7068], [7070], [7072], [7073], [7077], [7078], [7080], [7087], [7088], [7091], [7092], [7093], [7095], [7097], [7100], [7102], [7104], [7106], [7107], [7109], [7114], [7119], [7124], [7125], [7126], [7127], [7128], [7129], [7131], [7132], [7134], [7135], [7138], [7139], [7140], [7141], [7142], [7144], [7145], [7146], [7147], [7148], [7149], [7150], [7151], [7153], [7154], [7155], [7156], [7158], [7159], [7160], [7161], [7162], [7163], [7164], [7165], [7166], [7168], [7169], [7170], [7171], [7172], [7173], [7175], [7177], [7178], [7180], [7181], [7183], [7185], [7187], [7188], [7189], [7190], [7191], [7192],

[7193], [7195], [7197], [7200], [7201], [7205], [7208], [7209], [7212], [7216], [7217], [7218], [7219], [7220], [7221], [7227], [7230], [7231], [7232], [7233], [7234], [7235], [7238], [7239], [7240], [7241], [7242], [7243], [7244], [7245], [7246], [7248], [7249], [7250], [7251], [7254], [7255], [7256], [7257], [7261], [7262], [7263], [7264], [7266], [7267], [7268], [7270], [7271], [7272], [7274], [7275], [7276], [7277], [7278], [7279], [7280], [7281], [7282], [7288], [7289], [7290], [7291], [7293], [7294], [7296], [7299], [7302], [7304], [7307], [7308], [7309], [7310], [7312], [7314], [7315], [7316], [7319], [7320], [7321], [7322], [7323], [7324], [7326], [7328], [7329], [7330], [7331], [7332], [7336], [7337], [7338], [7343], [7344], [7346], [7347], [7348], [7349], [7350], [7352], [7355], [7358], [7360], [7363], [7365], [7366], [7369], [7370], [7371], [7377], [7378], [7381], [7382], [7384], [7385], [7386], [7387], [7388], [7389], [7390], [7391], [7392], [7393], [7394], [7395], [7396], [7397], [7398], [7399], [7400], [7401], [7402], [7403], [7404], [7405], [7406], [7407], [7408], [7409], [7410], [7414], [7415], [7416], [7419], [7422], [7424], [7425], [7426], [7427], [7428], [7429], [7430], [7431], [7432], [7433], [7434], [7436], [7437], [7438], [7439], [7440], [7444], [7445], [7446], [7447], [7450], [7452], [7453], [7454], [7455], [7456], [7457], [7459], [7460], [7465], [7467], [7468], [7470], [7473], [7475], [7478], [7479], [7480], [7482], [7484], [7487], [7489], [7491], [7492], [7493], [7494], [7497], [7505], [7506], [7510], [7514], [7516], [7517], [7519], [7525], [7526], [7533], [7535], [7543], [7546], [7547], [7548], [7549], [7550], [7551], [7554], [7556], [7557], [7559], [7560], [7563], [7564], [7571], [7574], [7578], [7579], [7582], [7584], [7585], [7588], [7589], [7592], [7594], [7596], [7597], [7598], [7601], [7606], [7607], [7608], [7609], [7610], [7615], [7616], [7618], [7628], [7632], [7634], [7635], [7637], [7638], [7640], [7647], [7650], [7651], [7653], [7656], [7659], [7660], [7661], [7662], [7663], [7669], [7670], [7674], [7676], [7679], [7680], [7681], [7682], [7683], [7684], [7685], [7686], [7688], [7689], [7690], [7692], [7693], [7694], [7695], [7696], [7697], [7698], [7700], [7701], [7702], [7703], [7704], [7705], [7706], [7708], [7710], [7712], [7714], [7715], [7720], [7724], [7725], [7728], [7729], [7734], [7735], [7736], [7737], [7739], [7740], [7801], [7805], [7808], [7813], [7814], [7817], [7818], [7819], [7821], [7823], [7827], [7828], [7829], [7830], [7832], [7835], [7837], [7840], [7841], [7842], [7843], [7845], [7847], [7848], [7849], [7850], [7852], [7853], [7854], [7855], [7856], [7857], [7859], [7860], [7864], [7869], [7872], [7873], [7874], [7875], [7876], [7877], [7885], [7887], [7888], [7890], [7891], [7892], [7893], [7894], [7895], [7896], [7897], [7898], [7899], [7900], [7901], [7902], [7903], [7904], [7906], [7908], [7909], [7910], [7913], [7914], [7915], [7916], [7917], [7918], [7920], [7921], [7924], [7925], [7926], [7928], [7929], [7930], [7931], [7932], [7934], [7937], [7939], [7943], [7950], [7951], [7952], [7954], [7955], [7956], [7959], [7960], [7962], [7963], [7964], [7968], [7970], [7975], [7976], [7977], [7979], [7980], [7983], [7984], [7985], [7986], [7987], [7989], [7992], [7993], [7998], [7999], [8001], [8004], [8008], [8009], [8010],

[8011], [8017], [8019], [8020], [8021], [8023], [8024], [8025], [8026], [8027], [8028], [8029], [8030], [8032], [8035], [8036], [8037], [8038], [8040], [8043], [8049], [8051], [8053], [8055], [8056], [8057], [8058], [8059], [8062], [8064], [8065], [8066], [8068], [8081], [8085], [8089], [8091], [8092], [8095], [8098], [8112], [8117], [8118], [8125], [8130], [8133], [8136], [8138], [8140], [8142], [8144], [8145], [8146], [8148], [8150], [8151], [8152], [8153], [8155], [8156], [8158], [8159], [8165], [8166], [8167], [8168], [8169], [8170], [8171], [8172], [8173], [8174], [8175], [8176], [8177], [8178], [8182], [8183], [8187], [8192], [8194], [8195], [8196], [8198], [8200], [8201], [8202], [8203], [8204], [8206], [8207], [8208], [8209], [8210], [8211], [8213], [8222], [8225], [8227], [8228], [8229], [8230], [8232], [8234], [8235], [8238], [8240], [8247], [8248], [8249], [8252], [8254], [8255], [8258], [8259], [8260], [8261], [8262], [8264], [8265], [8268], [8269], [8271], [8272], [8273], [8274], [8275], [8276], [8279], [8280], [8281], [8287], [8288], [8293], [8294], [8295], [8296], [8297], [8298], [8305], [8306], [8307], [8308], [8311], [8314], [8315], [8316], [8317], [8318], [8320], [8321], [8322], [8323], [8324], [8325], [8326], [8328], [8329], [8330], [8332], [8333], [8337], [8338], [8339], [8340], [8371], [8372], [8374], [8376], [8377], [8378], [8381], [8384], [8385], [8389], [8394], [8396], [8400], [8402], [8403], [8405], [8407], [8408], [8410], [8411], [8412], [8413], [8414], [8417], [8418], [8421], [8422], [8423], [8424], [8426], [8427], [8428], [8429], [8430], [8461], [8462], [8464], [8465], [8466], [8467], [8468], [8469], [8470], [8471], [8472], [8478], [8481], [8482], [8483], [8484], [8486], [8487], [8488], [8490], [8491], [8493], [8495], [8497], [8499], [8500], [8501], [8503], [8507], [8510], [8511], [8513], [8515], [8516], [8517], [8518], [8519], [8520], [8522], [8523], [8524], [8528], [8529], [8530], [8533], [8534], [8535], [8536], [8538], [8539], [8540], [8541], [8542], [8543], [8544], [8548], [8571], [8575], [8577], [8580], [8611], [8612], [8613], [8614], [8615], [8616], [8617], [8618], [8619], [8620], [8621], [8622], [8626], [8628], [8629], [8630], [8631], [8632], [8638], [8639], [8641], [8643], [8644], [8646], [8647], [8648], [8649], [8650], [8651], [8652], [8653], [8654], [8655], [8656], [8657], [8658], [8659], [8661], [8665], [8666], [8667], [8668], [8670], [8672], [8673], [8674], [8675], [8679], [8680], [8681], [8684], [8685], [8686], [8687], [8688], [8689], [8690], [8691], [8692], [8693], [8694], [8695], [8696], [8697], [8698], [8699], [8701], [8702], [8703], [8704], [8706], [8707], [8710], [8711], [8712], [8713], [8714], [8718], [8719], [8720], [8721], [8722], [8723], [8724], [8725], [8727], [8732], [8734], [8735], [8736], [8737], [8738], [8739], [8740], [8741], [8742], [8743], [8744], [8745], [8746], [8748], [8752], [8754], [8757], [8758], [8761], [8762], [8764], [8765], [8766], [8767], [8768], [8771], [8773], [8774], [8775], [8777], [8778], [8779], [8780], [8782], [8783], [8784], [8786], [8787], [8788], [8789], [8790], [8792], [8794], [8795], [8796], [8797], [8800], [8803], [8804], [8806], [8807], [8808], [8809], [8810], [8814], [8815], [8817], [8854], [8855], [8856], [8857], [8860], [8861], [8862], [8863], [8867], [8868], [8869], [8871], [8872], [8874], [8875],

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- **3) No clear effect** — Outcome with Atherosclerosis risk factors — [1], [3], [4], [6], [7],
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[1194], [1204], [1218], [1219], [1220], [1221], [1222], [1226], [1227], [1229], [1231], [1233], [1235], [1239], [1242], [1247], [1254], [1256], [1257], [1258], [1259], [1261], [1262], [1264], [1265], [1266], [1267], [1271], [1272], [1273], [1274], [1275], [1277], [1278], [1280], [1281], [1282], [1283], [1284], [1285], [1286], [1287], [1288], [1289], [1290], [1291], [1292], [1293], [1294], [1295], [1299], [1303], [1304], [1313], [1314], [1317], [1318], [1321], [1322], [1330], [1331], [1332], [1338], [1340], [1341], [1344], [1349], [1350], [1357], [1359], [1360], [1363], [1372], [1375], [1377], [1387], [1388], [1391], [1393], [1395], [1408], [1412], [1413], [1414], [1415], [1418], [1421], [1422], [1423], [1424], [1425], [1430], [1432], [1435], [1436], [1440], [1443], [1444], [1447], [1448], [1449], [1451], [1455], [1456], [1460], [1464], [1466], [1469], [1478], [1484], [1486], [1496], [1499], [1503], [1505], [1506], [1511], [1512], [1515], [1516], [1519], [1522], [1523], [1524], [1527], [1530], [1533], [1535], [1540], [1541], [1543], [1549], [1552], [1554], [1556], [1557], [1559], [1561], [1562], [1564], [1566], [1570], [1571], [1580], [1581], [1582], [1583], [1584], [1589], [1592], [1593], [1594], [1595], [1598], [1599], [1603], [1610], [1614], [1615], [1617], [1618], [1619], [1622], [1628], [1629], [1630], [1633], [1634], [1635], [1636], [1644], [1652], [1653], [1654], [1656], [1658], [1663], [1664], [1665], [1667], [1669], [1670], [1671], [1672], [1676], [1678], [1679], [1681], [1684], [1685], [1688], [1689], [1691], [1692], [1694], [1695], [1696], [1697], [1698], [1701], [1702], [1703], [1705], [1708], [1709], [1714], [1715], [1717], [1718], [1719], [1721], [1724], [1725], [1726], [1728], [1729], [1730], [1731], [1734], [1735], [1737], [1738], [1739], [1740], [1745], [1748], [1749], [1750], [1753], [1754], [1762], [1763], [1766], [1767], [1781], [1785], [1786], [1787], [1788], [1789], [1791], [1793], [1795], [1796], [1797], [1801], [1803], [1804], [1805], [1806], [1807], [1809], [1810], [1811], [1813], [1816], [1818], [1819], [1822], [1827], [1829], [1831], [1832], [1833], [1834], [1835], [1836], [1837], [1838], [1839], [1840], [1841], [1842], [1843], [1844], [1845], [1846], [1847], [1848], [1849], [1850], [1851], [1852], [1853], [1854], [1855], [1856], [1857], [1858], [1859], [1860], [1861], [1864], [1865], [1866], [1867], [1868], [1869], [1872], [1874], [1876], [1878], [1879], [1880], [1882], [1887], [1889], [1890], [1894], [1899], [1907], [1910], [1920], [1921], [1929], [1948], [1949], [1950], [1951], [1953], [1954], [1955], [1956], [1960], [1967], [1970], [1976], [1978], [1979], [1981], [1982], [1983], [1984], [1985], [1986], [1987], [1990], [1991], [1996], [1997], [1999], [2002], [2003], [2004], [2008], [2010], [2011], [2012], [2013], [2014], [2015], [2016], [2017], [2018], [2019], [2020], [2021], [2022], [2023], [2024], [2025], [2026], [2027], [2028], [2029], [2030], [2031], [2032], [2033], [2034], [2035], [2036], [2037], [2038], [2039], [2040], [2041], [2046], [2047], [2048], [2056], [2057], [2058], [2059], [2061], [2064], [2065], [2066], [2067], [2068], [2069], [2070], [2071], [2072], [2073], [2074], [2076], [2077], [2078], [2079], [2080], [2081], [2082], [2083], [2085], [2086], [2087], [2088], [2089], [2091], [2093], [2094], [2095], [2096], [2097], [2098], [2100], [2103],

[2104], [2105], [2106], [2107], [2114], [2115], [2118], [2123], [2124], [2126], [2128], [2129], [2131], [2132], [2133], [2136], [2137], [2140], [2144], [2151], [2154], [2156], [2161], [2162], [2164], [2165], [2167], [2168], [2171], [2172], [2176], [2177], [2178], [2179], [2180], [2185], [2190], [2191], [2192], [2193], [2195], [2196], [2200], [2201], [2202], [2205], [2209], [2211], [2212], [2214], [2217], [2218], [2219], [2222], [2223], [2224], [2225], [2226], [2228], [2229], [2231], [2233], [2235], [2236], [2240], [2243], [2244], [2246], [2247], [2248], [2250], [2254], [2257], [2258], [2259], [2263], [2264], [2265], [2269], [2270], [2271], [2272], [2273], [2274], [2276], [2277], [2278], [2279], [2280], [2282], [2283], [2284], [2285], [2286], [2289], [2290], [2291], [2294], [2295], [2297], [2301], [2303], [2305], [2309], [2310], [2312], [2314], [2315], [2316], [2317], [2318], [2321], [2322], [2323], [2328], [2329], [2332], [2334], [2336], [2341], [2342], [2343], [2349], [2350], [2353], [2358], [2360], [2366], [2368], [2371], [2372], [2373], [2377], [2381], [2382], [2383], [2394], [2396], [2405], [2406], [2407], [2408], [2409], [2410], [2414], [2417], [2421], [2423], [2426], [2427], [2431], [2434], [2435], [2436], [2438], [2439], [2440], [2441], [2442], [2452], [2453], [2454], [2459], [2461], [2462], [2465], [2466], [2467], [2468], [2471], [2473], [2474], [2475], [2476], [2477], [2480], [2481], [2482], [2483], [2484], [2485], [2486], [2487], [2488], [2497], [2498], [2500], [2509], [2516], [2517], [2521], [2526], [2528], [2533], [2535], [2536], [2539], [2544], [2547], [2548], [2549], [2551], [2552], [2553], [2554], [2555], [2556], [2557], [2558], [2559], [2560], [2561], [2562], [2564], [2565], [2566], [2567], [2568], [2569], [2570], [2572], [2573], [2576], [2577], [2578], [2579], [2580], [2586], [2590], [2591], [2594], [2595], [2596], [2602], [2603], [2608], [2612], [2613], [2614], [2617], [2620], [2622], [2623], [2624], [2629], [2631], [2632], [2635], [2636], [2638], [2641], [2643], [2644], [2645], [2651], [2654], [2655], [2656], [2657], [2659], [2660], [2663], [2664], [2670], [2671], [2673], [2674], [2679], [2694], [2695], [2699], [2705], [2711], [2719], [2721], [2723], [2733], [2736], [2737], [2741], [2743], [2746], [2750], [2751], [2754], [2756], [2757], [2758], [2759], [2761], [2762], [2763], [2764], [2765], [2766], [2767], [2768], [2769], [2770], [2771], [2772], [2773], [2774], [2775], [2776], [2777], [2778], [2779], [2780], [2781], [2782], [2783], [2784], [2785], [2786], [2787], [2788], [2789], [2790], [2796], [2801], [2802], [2803], [2804], [2805], [2808], [2812], [2813], [2814], [2816], [2818], [2820], [2821], [2823], [2824], [2832], [2838], [2839], [2840], [2844], [2847], [2848], [2851], [2852], [2853], [2854], [2855], [2856], [2857], [2858], [2859], [2860], [2861], [2862], [2863], [2864], [2865], [2866], [2867], [2868], [2869], [2870], [2871], [2872], [2873], [2874], [2875], [2876], [2877], [2878], [2879], [2880], [2881], [2882], [2883], [2884], [2885], [2886], [2887], [2888], [2889], [2892], [2893], [2895], [2896], [2897], [2898], [2901], [2902], [2903], [2905], [2906], [2907], [2908], [2909], [2910], [2912], [2913], [2914], [2916], [2921], [2924], [2935], [2939], [2942], [2943], [2948], [2949], [2950], [2955], [2956], [2957], [2962], [2963], [2966], [2967], [2968], [2971],

[2972], [2973], [2975], [2977], [2982], [2983], [2986], [2988], [2996], [2999], [3000], [3001], [3002], [3004], [3005], [3007], [3008], [3011], [3013], [3016], [3019], [3020], [3022], [3024], [3026], [3034], [3036], [3041], [3042], [3050], [3054], [3060], [3062], [3065], [3071], [3072], [3081], [3082], [3088], [3091], [3095], [3097], [3099], [3103], [3106], [3107], [3108], [3116], [3117], [3119], [3121], [3124], [3130], [3131], [3132], [3133], [3134], [3137], [3138], [3143], [3145], [3146], [3147], [3154], [3155], [3156], [3157], [3160], [3161], [3166], [3167], [3169], [3176], [3177], [3181], [3186], [3188], [3189], [3191], [3198], [3199], [3201], [3204], [3207], [3212], [3213], [3216], [3217], [3219], [3220], [3221], [3222], [3223], [3225], [3227], [3231], [3234], [3235], [3242], [3245], [3247], [3248], [3253], [3254], [3255], [3256], [3262], [3268], [3276], [3280], [3282], [3283], [3284], [3285], [3291], [3292], [3297], [3301], [3304], [3305], [3308], [3311], [3312], [3313], [3314], [3315], [3316], [3317], [3319], [3320], [3324], [3326], [3327], [3328], [3329], [3338], [3342], [3351], [3362], [3363], [3365], [3373], [3374], [3383], [3386], [3388], [3389], [3391], [3392], [3393], [3396], [3397], [3398], [3401], [3403], [3404], [3406], [3407], [3409], [3410], [3411], [3413], [3414], [3415], [3416], [3420], [3423], [3428], [3436], [3437], [3443], [3447], [3458], [3459], [3462], [3472], [3475], [3485], [3488], [3493], [3499], [3501], [3505], [3509], [3510], [3511], [3519], [3520], [3523], [3524], [3527], [3535], [3536], [3537], [3543], [3548], [3549], [3550], [3551], [3552], [3556], [3561], [3569], [3571], [3574], [3576], [3579], [3581], [3583], [3585], [3586], [3587], [3588], [3591], [3592], [3593], [3594], [3595], [3596], [3601], [3604], [3605], [3606], [3608], [3612], [3615], [3616], [3621], [3622], [3623], [3624], [3627], [3628], [3635], [3636], [3651], [3655], [3661], [3663], [3664], [3665], [3666], [3667], [3668], [3669], [3670], [3672], [3673], [3674], [3679], [3680], [3686], [3689], [3691], [3694], [3696], [3700], [3703], [3704], [3706], [3707], [3709], [3712], [3718], [3719], [3721], [3723], [3724], [3725], [3727], [3730], [3732], [3734], [3736], [3737], [3739], [3740], [3741], [3742], [3743], [3744], [3747], [3749], [3750], [3751], [3755], [3757], [3773], [3777], [3778], [3781], [3783], [3784], [3785], [3788], [3795], [3798], [3800], [3801], [3808], [3811], [3816], [3817], [3823], [3827], [3835], [3840], [3842], [3843], [3847], [3848], [3853], [3854], [3855], [3858], [3861], [3862], [3864], [3867], [3868], [3869], [3872], [3873], [3874], [3875], [3876], [3878], [3879], [3881], [3885], [3886], [3887], [3893], [3895], [3902], [3904], [3905], [3907], [3908], [3911], [3913], [3914], [3916], [3919], [3920], [3921], [3922], [3924], [3928], [3929], [3933], [3934], [3935], [3936], [3937], [3941], [3942], [3943], [3944], [3945], [3947], [3951], [3952], [3954], [3956], [3958], [3959], [3960], [3969], [3972], [3973], [3982], [3986], [3987], [3997], [3998], [4002], [4003], [4007], [4018], [4022], [4024], [4029], [4036], [4039], [4041], [4043], [4044], [4045], [4047], [4048], [4049], [4050], [4054], [4062], [4063], [4069], [4070], [4073], [4074], [4076], [4077], [4078], [4082], [4083], [4084], [4086], [4089], [4092], [4093], [4095], [4100], [4102], [4106], [4107], [4111], [4114], [4121],

[4124], [4125], [4143], [4144], [4147], [4153], [4157], [4158], [4160], [4161], [4163], [4164], [4166], [4167], [4170], [4173], [4174], [4175], [4176], [4177], [4180], [4182], [4183], [4185], [4186], [4189], [4192], [4195], [4197], [4203], [4204], [4206], [4208], [4211], [4215], [4218], [4219], [4220], [4221], [4222], [4223], [4224], [4226], [4227], [4230], [4233], [4237], [4238], [4240], [4242], [4243], [4247], [4254], [4255], [4256], [4258], [4260], [4262], [4266], [4268], [4269], [4271], [4273], [4274], [4279], [4287], [4291], [4292], [4297], [4298], [4299], [4303], [4308], [4309], [4310], [4313], [4314], [4315], [4317], [4318], [4320], [4321], [4322], [4326], [4328], [4330], [4331], [4334], [4335], [4336], [4339], [4340], [4343], [4346], [4348], [4350], [4353], [4354], [4357], [4359], [4361], [4364], [4365], [4367], [4376], [4377], [4378], [4380], [4383], [4384], [4387], [4389], [4391], [4393], [4396], [4398], [4399], [4400], [4402], [4404], [4415], [4418], [4427], [4438], [4443], [4446], [4453], [4456], [4460], [4463], [4472], [4473], [4479], [4481], [4486], [4488], [4489], [4492], [4494], [4495], [4499], [4500], [4502], [4503], [4505], [4506], [4509], [4510], [4513], [4522], [4548], [4553], [4554], [4557], [4560], [4563], [4592], [4593], [4595], [4597], [4599], [4614], [4615], [4621], [4623], [4624], [4629], [4630], [4631], [4633], [4638], [4639], [4640], [4641], [4642], [4648], [4653], [4656], [4662], [4664], [4673], [4679], [4684], [4687], [4688], [4689], [4692], [4697], [4699], [4700], [4701], [4708], [4709], [4716], [4722], [4723], [4724], [4731], [4732], [4733], [4734], [4735], [4736], [4738], [4739], [4740], [4744], [4748], [4759], [4762], [4763], [4765], [4767], [4768], [4769], [4770], [4772], [4775], [4776], [4777], [4784], [4787], [4790], [4792], [4796], [4803], [4806], [4808], [4810], [4812], [4813], [4814], [4817], [4819], [4822], [4828], [4829], [4832], [4833], [4836], [4838], [4839], [4846], [4847], [4849], [4852], [4854], [4856], [4861], [4862], [4863], [4866], [4871], [4872], [4873], [4875], [4876], [4878], [4879], [4880], [4884], [4885], [4886], [4888], [4892], [4898], [4899], [4900], [4901], [4902], [4903], [4905], [4907], [4909], [4922], [4923], [4924], [4925], [4930], [4933], [4936], [4938], [4939], [4940], [4943], [4948], [4949], [4954], [4956], [4958], [4959], [4960], [4962], [4963], [4964], [4965], [4970], [4971], [4972], [4973], [4974], [4975], [4976], [4977], [4979], [4981], [4982], [4983], [4986], [4990], [4991], [5001], [5007], [5008], [5009], [5010], [5017], [5027], [5032], [5033], [5036], [5041], [5042], [5043], [5044], [5045], [5046], [5047], [5048], [5049], [5050], [5051], [5052], [5053], [5054], [5055], [5056], [5057], [5058], [5059], [5060], [5061], [5062], [5063], [5064], [5065], [5066], [5067], [5068], [5069], [5070], [5075], [5084], [5086], [5089], [5090], [5092], [5096], [5104], [5105], [5106], [5107], [5110], [5116], [5119], [5126], [5131], [5133], [5134], [5135], [5136], [5139], [5141], [5143], [5146], [5147], [5150], [5151], [5154], [5159], [5161], [5163], [5167], [5171], [5173], [5177], [5179], [5181], [5183], [5184], [5187], [5188], [5201], [5204], [5208], [5211], [5212], [5214], [5215], [5218], [5221], [5223], [5225], [5230], [5233], [5236], [5237], [5239], [5241], [5247], [5248], [5249], [5254], [5255], [5262], [5265], [5269], [5270],

[5272], [5277], [5279], [5280], [5281], [5282], [5284], [5286], [5287], [5288], [5289], [5290], [5293], [5295], [5299], [5301], [5303], [5304], [5305], [5306], [5310], [5316], [5317], [5326], [5340], [5341], [5342], [5343], [5347], [5348], [5349], [5353], [5354], [5357], [5358], [5361], [5363], [5365], [5368], [5370], [5372], [5373], [5374], [5375], [5376], [5377], [5382], [5383], [5386], [5388], [5390], [5391], [5394], [5395], [5397], [5407], [5409], [5413], [5414], [5423], [5424], [5433], [5434], [5437], [5440], [5441], [5442], [5444], [5446], [5452], [5453], [5462], [5464], [5465], [5468], [5470], [5471], [5472], [5473], [5479], [5482], [5486], [5487], [5488], [5490], [5491], [5502], [5503], [5507], [5511], [5516], [5519], [5521], [5522], [5523], [5524], [5526], [5527], [5528], [5529], [5531], [5532], [5534], [5538], [5540], [5544], [5545], [5550], [5552], [5559], [5560], [5563], [5565], [5569], [5572], [5577], [5578], [5579], [5580], [5581], [5582], [5583], [5584], [5586], [5589], [5590], [5591], [5592], [5595], [5596], [5597], [5601], [5604], [5607], [5608], [5609], [5611], [5612], [5616], [5621], [5624], [5627], [5637], [5642], [5645], [5647], [5651], [5654], [5655], [5657], [5660], [5661], [5664], [5667], [5668], [5670], [5673], [5674], [5677], [5678], [5682], [5683], [5685], [5688], [5694], [5696], [5697], [5700], [5701], [5702], [5703], [5704], [5705], [5707], [5708], [5709], [5710], [5711], [5712], [5713], [5714], [5715], [5716], [5717], [5718], [5719], [5720], [5721], [5722], [5723], [5725], [5726], [5727], [5728], [5730], [5731], [5732], [5733], [5734], [5735], [5736], [5737], [5738], [5739], [5740], [5741], [5742], [5743], [5744], [5745], [5746], [5747], [5748], [5749], [5750], [5751], [5752], [5753], [5754], [5755], [5756], [5757], [5759], [5760], [5761], [5762], [5763], [5764], [5765], [5766], [5768], [5769], [5770], [5771], [5772], [5773], [5774], [5775], [5777], [5778], [5779], [5781], [5782], [5783], [5785], [5786], [5787], [5788], [5789], [5791], [5793], [5794], [5800], [5802], [5805], [5809], [5813], [5814], [5821], [5823], [5824], [5831], [5836], [5837], [5840], [5841], [5842], [5846], [5847], [5849], [5850], [5852], [5853], [5855], [5856], [5857], [5859], [5860], [5861], [5862], [5864], [5865], [5867], [5868], [5869], [5876], [5878], [5879], [5908], [5909], [5919], [5923], [5945], [5951], [5953], [5954], [5958], [5961], [5963], [5964], [5965], [5969], [5971], [5972], [5974], [5976], [5980], [5981], [5982], [5986], [5994], [5995], [5999], [6001], [6005], [6008], [6010], [6011], [6018], [6023], [6024], [6025], [6027], [6030], [6035], [6048], [6052], [6058], [6059], [6060], [6064], [6073], [6085], [6088], [6092], [6094], [6097], [6102], [6107], [6108], [6112], [6113], [6114], [6115], [6116], [6117], [6119], [6120], [6129], [6130], [6133], [6134], [6135], [6140], [6143], [6144], [6145], [6148], [6149], [6152], [6154], [6156], [6157], [6158], [6160], [6165], [6167], [6170], [6172], [6175], [6176], [6177], [6179], [6180], [6187], [6188], [6189], [6190], [6191], [6192], [6193], [6197], [6199], [6200], [6204], [6206], [6207], [6208], [6209], [6210], [6211], [6212], [6213], [6217], [6218], [6220], [6221], [6224], [6230], [6231], [6232], [6233], [6234], [6235], [6238], [6239], [6240], [6242], [6243], [6245], [6246], [6249], [6251], [6253], [6254], [6255], [6257], [6259],

[6260], [6263], [6266], [6267], [6270], [6272], [6273], [6277], [6278], [6281], [6288], [6289], [6291], [6293], [6295], [6298], [6299], [6306], [6310], [6313], [6315], [6316], [6318], [6321], [6324], [6326], [6329], [6330], [6332], [6337], [6342], [6347], [6349], [6360], [6361], [6362], [6363], [6370], [6371], [6374], [6375], [6380], [6385], [6386], [6387], [6388], [6389], [6400], [6407], [6419], [6422], [6427], [6428], [6432], [6447], [6448], [6449], [6451], [6453], [6461], [6462], [6464], [6465], [6466], [6469], [6470], [6474], [6478], [6479], [6481], [6482], [6483], [6484], [6485], [6490], [6492], [6495], [6497], [6504], [6506], [6508], [6509], [6510], [6517], [6519], [6524], [6529], [6534], [6542], [6549], [6551], [6555], [6559], [6561], [6563], [6565], [6571], [6572], [6573], [6574], [6575], [6576], [6578], [6580], [6581], [6586], [6588], [6589], [6591], [6592], [6594], [6595], [6598], [6599], [6600], [6601], [6603], [6604], [6609], [6610], [6611], [6615], [6616], [6617], [6618], [6620], [6621], [6624], [6631], [6633], [6634], [6635], [6636], [6637], [6638], [6639], [6640], [6643], [6644], [6645], [6646], [6647], [6648], [6649], [6650], [6651], [6653], [6654], [6655], [6657], [6658], [6659], [6660], [6663], [6664], [6665], [6666], [6667], [6669], [6670], [6671], [6672], [6674], [6675], [6677], [6678], [6682], [6683], [6684], [6687], [6689], [6690], [6693], [6698], [6699], [6701], [6704], [6714], [6715], [6716], [6725], [6726], [6727], [6728], [6730], [6735], [6737], [6739], [6741], [6743], [6744], [6747], [6749], [6750], [6752], [6753], [6755], [6757], [6759], [6760], [6762], [6763], [6764], [6766], [6767], [6773], [6777], [6778], [6780], [6781], [6782], [6783], [6784], [6785], [6786], [6787], [6788], [6789], [6790], [6792], [6794], [6795], [6796], [6797], [6798], [6799], [6800], [6801], [6802], [6803], [6804], [6805], [6806], [6807], [6808], [6819], [6821], [6830], [6831], [6832], [6834], [6836], [6841], [6843], [6846], [6847], [6861], [6864], [6868], [6882], [6884], [6896], [6898], [6902], [6909], [6911], [6913], [6917], [6920], [6925], [6931], [6932], [6933], [6934], [6935], [6936], [6937], [6938], [6939], [6940], [6941], [6942], [6943], [6944], [6945], [6946], [6947], [6948], [6949], [6950], [6951], [6952], [6953], [6954], [6955], [6956], [6957], [6958], [6959], [6960], [6962], [6968], [6971], [6974], [6979], [6985], [6991], [6993], [6998], [6999], [7001], [7002], [7003], [7006], [7007], [7008], [7014], [7018], [7025], [7026], [7027], [7030], [7032], [7033], [7036], [7037], [7038], [7039], [7040], [7043], [7044], [7045], [7049], [7051], [7052], [7053], [7054], [7058], [7061], [7063], [7064], [7067], [7071], [7074], [7075], [7076], [7079], [7081], [7082], [7083], [7084], [7085], [7086], [7089], [7090], [7094], [7099], [7101], [7103], [7105], [7108], [7110], [7111], [7112], [7113], [7115], [7116], [7117], [7118], [7120], [7121], [7122], [7123], [7130], [7133], [7136], [7137], [7143], [7152], [7157], [7167], [7174], [7176], [7179], [7182], [7184], [7186], [7194], [7196], [7198], [7199], [7202], [7203], [7204], [7206], [7207], [7210], [7211], [7213], [7214], [7215], [7222], [7223], [7224], [7225], [7226], [7228], [7229], [7236], [7237], [7247], [7252], [7253], [7258], [7259], [7260], [7265], [7269], [7273], [7283], [7284], [7285], [7287], [7298], [7300], [7301], [7305], [7306],

[7311], [7313], [7317], [7318], [7325], [7327], [7333], [7334], [7335], [7339], [7340], [7345], [7351], [7353], [7354], [7356], [7357], [7359], [7361], [7362], [7364], [7367], [7368], [7372], [7373], [7374], [7375], [7376], [7379], [7380], [7383], [7411], [7412], [7413], [7417], [7418], [7420], [7421], [7423], [7435], [7441], [7442], [7443], [7448], [7449], [7451], [7458], [7461], [7462], [7463], [7464], [7466], [7469], [7471], [7472], [7474], [7476], [7477], [7481], [7483], [7485], [7486], [7488], [7490], [7495], [7496], [7498], [7499], [7500], [7501], [7502], [7503], [7504], [7507], [7508], [7509], [7511], [7512], [7513], [7515], [7518], [7520], [7521], [7522], [7523], [7524], [7527], [7528], [7530], [7531], [7532], [7534], [7536], [7537], [7538], [7539], [7540], [7541], [7542], [7544], [7545], [7552], [7553], [7555], [7561], [7562], [7565], [7566], [7567], [7568], [7569], [7570], [7572], [7573], [7575], [7576], [7577], [7580], [7581], [7583], [7586], [7587], [7590], [7591], [7593], [7595], [7599], [7600], [7602], [7603], [7604], [7611], [7612], [7613], [7614], [7617], [7619], [7620], [7621], [7622], [7623], [7624], [7625], [7626], [7627], [7629], [7630], [7631], [7633], [7636], [7639], [7641], [7642], [7643], [7644], [7645], [7646], [7648], [7649], [7652], [7654], [7655], [7657], [7658], [7664], [7665], [7666], [7667], [7668], [7671], [7672], [7673], [7675], [7677], [7678], [7711], [7713], [7716], [7717], [7718], [7719], [7721], [7722], [7723], [7726], [7727], [7730], [7731], [7732], [7733], [7738], [7741], [7742], [7743], [7744], [7745], [7746], [7747], [7748], [7749], [7750], [7751], [7752], [7753], [7754], [7755], [7756], [7757], [7758], [7759], [7760], [7761], [7762], [7763], [7764], [7765], [7766], [7767], [7768], [7769], [7770], [7771], [7772], [7773], [7774], [7775], [7776], [7777], [7778], [7779], [7780], [7781], [7782], [7783], [7784], [7785], [7786], [7787], [7788], [7789], [7790], [7791], [7792], [7793], [7794], [7795], [7796], [7797], [7798], [7799], [7800], [7802], [7803], [7804], [7806], [7807], [7809], [7810], [7811], [7812], [7815], [7816], [7820], [7822], [7824], [7825], [7826], [7831], [7833], [7834], [7836], [7838], [7839], [7844], [7846], [7858], [7861], [7862], [7863], [7865], [7866], [7867], [7868], [7870], [7871], [7878], [7879], [7880], [7881], [7882], [7883], [7884], [7886], [7889], [7905], [7907], [7919], [7922], [7923], [7927], [7935], [7938], [7941], [7942], [7944], [7945], [7947], [7948], [7953], [7957], [7958], [7961], [7965], [7967], [7969], [7971], [7972], [7973], [7974], [7978], [7981], [7982], [7988], [7990], [7991], [7994], [7995], [7996], [7997], [8000], [8002], [8003], [8005], [8006], [8007], [8012], [8013], [8014], [8015], [8016], [8018], [8022], [8031], [8033], [8039], [8041], [8042], [8044], [8045], [8046], [8047], [8048], [8050], [8052], [8054], [8060], [8061], [8063], [8067], [8069], [8070], [8071], [8072], [8073], [8074], [8075], [8076], [8077], [8078], [8079], [8080], [8082], [8083], [8084], [8086], [8088], [8090], [8093], [8094], [8097], [8099], [8100], [8101], [8102], [8103], [8104], [8105], [8106], [8107], [8108], [8109], [8110], [8111], [8113], [8114], [8115], [8116], [8119], [8120], [8121], [8122], [8123], [8124], [8126], [8127], [8128], [8129], [8131], [8132], [8134], [8135], [8137], [8139], [8141], [8143], [8147], [8149], [8154],

[8157], [8160], [8161], [8162], [8163], [8180], [8181], [8184], [8188], [8189], [8190], [8191], [8193], [8197], [8199], [8214], [8216], [8218], [8219], [8220], [8221], [8223], [8224], [8226], [8231], [8233], [8236], [8237], [8241], [8242], [8243], [8244], [8245], [8246], [8250], [8251], [8253], [8256], [8266], [8267], [8270], [8278], [8282], [8283], [8284], [8285], [8286], [8289], [8290], [8291], [8292], [8299], [8300], [8301], [8302], [8303], [8304], [8309], [8310], [8312], [8313], [8331], [8334], [8335], [8336], [8341], [8342], [8343], [8344], [8345], [8346], [8347], [8348], [8349], [8350], [8351], [8352], [8353], [8354], [8355], [8356], [8357], [8358], [8359], [8360], [8361], [8362], [8363], [8364], [8365], [8366], [8367], [8368], [8369], [8370], [8373], [8375], [8379], [8380], [8382], [8383], [8387], [8388], [8390], [8391], [8392], [8393], [8395], [8397], [8398], [8399], [8401], [8404], [8406], [8409], [8415], [8416], [8419], [8420], [8425], [8431], [8432], [8433], [8434], [8435], [8436], [8437], [8438], [8439], [8440], [8441], [8442], [8443], [8444], [8445], [8446], [8447], [8448], [8449], [8450], [8451], [8452], [8453], [8454], [8455], [8456], [8457], [8458], [8459], [8460], [8474], [8477], [8479], [8480], [8485], [8489], [8494], [8496], [8498], [8502], [8504], [8506], [8509], [8512], [8521], [8525], [8526], [8527], [8531], [8532], [8537], [8546], [8547], [8549], [8550], [8551], [8552], [8553], [8554], [8555], [8556], [8557], [8558], [8559], [8560], [8561], [8562], [8563], [8564], [8565], [8566], [8567], [8568], [8569], [8570], [8572], [8573], [8574], [8576], [8578], [8579], [8581], [8582], [8583], [8584], [8585], [8586], [8587], [8588], [8589], [8590], [8591], [8592], [8593], [8594], [8595], [8596], [8597], [8598], [8599], [8600], [8601], [8602], [8603], [8604], [8605], [8606], [8607], [8608], [8609], [8610], [8623], [8624], [8625], [8627], [8633], [8634], [8635], [8636], [8637], [8640], [8642], [8645], [8660], [8662], [8663], [8664], [8669], [8671], [8677], [8715], [8716], [8717], [8730], [8731], [8733], [8747], [8750], [8751], [8753], [8755], [8756], [8759], [8763], [8769], [8770], [8772], [8776], [8781], [8785], [8791], [8793], [8798], [8799], [8801], [8802], [8805], [8811], [8812], [8813], [8816], [8818], [8819], [8821], [8822], [8823], [8824], [8825], [8826], [8827], [8828], [8829], [8830], [8831], [8832], [8833], [8834], [8835], [8836], [8837], [8838], [8839], [8840], [8841], [8842], [8843], [8844], [8845], [8846], [8847], [8848], [8849], [8850], [8851], [8852], [8853], [8858], [8859], [8865], [8866], [8870], [8873], [8876], [8879], [8882], [8884], [8887], [8890], [8891], [8895], [8896], [8901], [8902], [8903], [8905], [8908], [8914], [8921], [8927], [8928], [8933], [8941], [8942], [8943], [8944], [8945], [8946], [8947], [8948], [8949], [8950], [8951], [8952], [8953], [8954], [8955], [8956], [8957], [8958], [8959], [8960], [8961], [8962], [8963], [8964], [8965], [8966], [8967], [8968], [8969], [8970], [8971], [8979], [8980], [8982], [8983], [8990], [8992], [8998], [8999], [9000], [9001], [9008], [9010], [9014], [9017], [9019], [9020], [9021], [9022], [9024], [9025], [9026], [9028], [9029], [9030], [9033], [9035], [9036], [9038], [9039], [9040], [9041], [9042], [9046], [9047], [9048], [9053], [9058], [9066], [9068], [9077], [9081], [9084], [9085], [9089], [9091], [9103],

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1) Introduction

Atherosclerosis, a chronic inflammatory disease characterized by lipid accumulation and vascular remodeling, remains a leading cause of cardiovascular disease (CVD) and its associated morbidities and mortalities globally [45, 60, 1552, 3791, 8218, 10467, 11085]. Understanding the multifaceted risk factors contributing to its initiation, progression, and clinical manifestation is paramount for effective prevention, early diagnosis, and targeted therapeutic interventions [1613, 177, 1806, 10885, 12309]. This paper synthesizes recent academic findings to provide a comprehensive overview of established, emerging, and contextual risk factors for atherosclerosis.

2) Aim

The aim of this paper is to systematically review and synthesize the current evidence on atherosclerosis risk factors, encompassing traditional cardiovascular risk factors, inflammatory and metabolic pathways, genetic predispositions, environmental influences, and associated comorbidities, to identify key themes and research gaps.

3) Methods

Systematic review with multilayer AI research agent: keyword normalization, retrieval & structuring, and paper synthesis (see SAIMSARA About section for details).

- **Bias:** Qualitatively inferred from study design fields. Cross-sectional studies may infer associations but cannot establish causality, while cohort studies offer stronger evidence for risk factors over time. Case-control studies are prone to recall bias. Retrospective designs

are limited by existing data. Mixed study designs vary in their inherent bias. Single case reports or animal studies provide limited generalizability.

4) Results

4.1 Study characteristics

The included studies comprise a diverse range of designs, primarily cohort (e.g., [1, 5, 10, 13, 21, 28, 47, 67, 93, 99, 103, 112, 126, 1704, 1732, 1797, 1830, 2026, 2037, 2040, 2059, 2092, 2116, 2349, 2464, 262, 268, 291, 3085, 3145, 3162, 3176, 3208, 3229, 3259, 3348, 3369, 3405, 3408, 3440, 3464, 3486, 3505, 3517, 3541, 3574, 3649, 3653, 3688, 3710, 3856, 3860, 3870, 3901, 3974, 3981, 3987, 4004, 4009, 4079, 4134, 4166, 4209, 4243, 4250, 4418, 4446, 4551, 4628, 4649, 4680, 4716, 4749, 4888, 4940, 4968, 4992, 5008, 5075, 5099, 5176, 5209, 5328, 5363, 5378, 5553, 5588, 5682, 6011, 6047, 6060, 6094, 6163, 6276, 6283, 6330, 6377, 6378, 6391, 6475, 6480, 6557, 6625, 6665, 6716, 6798, 7002, 7059, 7108, 7153, 7337, 7473, 7603, 7749, 7936, 8008, 8041, 8054, 8095, 8112, 8179, 8229, 8232, 8454, 8520, 8539, 8654, 8689, 8771, 8967, 9027, 9044, 9102, 9184, 9246, 9313, 9340, 9455, 9476, 9488, 9727, 10070, 10090, 10109, 10277, 10351, 10362, 10449, 10511, 10592, 10608, 10647, 10689, 10694, 10716, 10754, 10814, 10913, 10939, 11300, 11333, 11339, 11355, 11650, 11936, 11953, 11964, 12042, 12139, 12275, 12308, 12309, 12315, 12354, 12364, 12393, 12397, 12535, 12688, 12697, 12832, 12884, 12991, 13064, 13101, 13114, 13130, 13242, 13246, 13355, 13361, 13410, 13420, 13430, 13453, 13572, 13628, 13629, 13803, 13846, 13955, 13974, 14006, 14010, 14195, 14213, 14244, 14325, 14474, 14536, 14573, 14584, 14592, 14611, 14655, 14677, 14709, 14744, 14796, 14913, 14920, 14926]), cross-sectional (e.g., [3, 4, 6, 23, 102, 105, 116, 131, 138, 214, 261, 344, 349, 359, 373, 3818, 397, 411, 416, 451, 462, 5040, 5114, 5273, 5399, 540, 5752, 5987, 6033, 6047, 6121, 6262, 6279, 637, 649, 651, 656, 657, 662, 675, 7067, 7153, 7700, 7719, 7744, 7749, 799, 8002, 8095, 8112, 8836, 899, 9065, 9133, 9152, 9159, 9160, 9455, 962, 9652, 9764, 9786, 10024, 10109, 10375, 10592, 10746, 10808, 10814, 10826, 10846, 10939, 10948, 11086, 11285, 11449, 11544, 11903, 11964, 12354, 12397, 12433, 12499, 12592, 13031, 13101, 13106, 13430, 13446, 13851, 13987, 14010, 14103, 14244, 14325, 14474, 14611, 14630, 14744, 14926, 1526, 2049, 2050, 2102, 2152, 2267, 2300, 2316, 2325, 2340, 2357, 2375, 2467, 2470, 2475, 261, 2722, 2810, 2899, 3044, 3051, 3055, 3170, 3241, 3332, 3337, 3340, 3422, 3467, 3504, 3570, 3578, 3663, 3708, 3799, 3818, 4026, 4153, 4168, 4218, 4255, 4518, 4552, 4717, 4995, 5052, 5114, 5176, 5247, 5600, 5695, 5746, 5752, 5985, 5992, 6080, 6121, 6163, 6262, 6276, 6279, 6342, 649, 651, 656, 657, 662, 675, 7067, 7153, 7700, 7719, 7744, 7749, 799, 8002, 8095, 8112, 8836, 899, 9065, 9133, 9152, 9159, 9160, 9455, 962, 9652, 9764, 9786, 10024, 10109, 10375, 10592, 10746, 10808, 10814, 10826, 10846, 10939, 10948, 11086, 11285, 11449, 11544, 11903, 11964, 12354, 12397, 12433, 12499, 12592, 13031, 13101, 13106, 13430, 13446, 13851, 13987, 14010, 14103, 14244, 14325, 14474, 14611, 14630, 14744, 14926]), randomized controlled trials (RCT) (e.g., [70, 2334, 2406, 2439, 2479, 2602, 2861, 5066, 5247, 7222, 7933, 11153, 11182, 12315,

13873, 13877, 14038, 14445, 10694, 12592]), and mixed methods studies (e.g., [6, 8, 14, 28, 36, 42, 45, 59, 60, 106, 109, 111, 114, 124, 127, 137, 146, 177, 183, 186, 197, 200, 206, 217, 220, 221, 227, 234, 246, 247, 273, 278, 3130, 3144, 3151, 3152, 3153, 3160, 3167, 3219, 3247, 3282, 3286, 3303, 3305, 3326, 3337, 3340, 3341, 3345, 3360, 3362, 3425, 3436, 3485, 3492, 3493, 3496, 3504, 3535, 3578, 3579, 3580, 3583, 3590, 3597, 3646, 3663, 3706, 3749, 3759, 378, 3808, 3814, 3879, 3888, 3899, 3956, 3990, 402, 4050, 4078, 4150, 4168, 4255, 4310, 4318, 4319, 4399, 4443, 4499, 4500, 4625, 4737, 4738, 4770, 4811, 4879, 4944, 4999, 500, 505, 516, 530, 535, 542, 544, 5600, 5979, 604, 6049, 6064, 6085, 6108, 6255, 6342, 6432, 6649, 6666, 675, 6954, 7026, 7049, 7067, 7178, 7757, 7790, 8197, 8218, 8307, 8453, 8479, 8485, 8563, 8587, 8601, 8661, 8670, 8676, 8730, 8738, 8794, 8808, 8863, 8939, 8991, 9133, 9227, 9292, 9313, 9470, 9556, 9593, 9664, 9804, 9811, 9819, 9929, 10012, 10024, 10187, 10310, 10384, 10445, 10450, 10467, 10622, 10645, 10668, 10761, 10796, 10819, 10840, 10846, 10885, 10892, 10948, 10961, 10970, 11153, 11226, 11397, 11432, 11449, 12047, 12153, 12167, 12294, 12310, 12393, 12499, 12616, 12658, 12884, 13106, 13244, 13621, 13629, 13753, 13757, 13873, 13877, 13884, 13918, 13987, 14117, 14208, 14213, 14443, 14536, 14573, 14584, 14592, 14630, 14655, 14677, 14709, 14796, 14913, 14920, 14926, 1501, 1552, 1564, 1571, 1581, 1609, 1619, 1620, 1626, 1648, 1681, 1683, 1685, 1720, 1747, 1754, 1759, 1773, 1779, 1796, 1811, 1813, 1816, 1819, 1849, 1853, 1857, 1864, 1878, 1883, 197, 2027, 2036, 2048, 2051, 2066, 2079, 2083, 2084, 2089, 2130, 2131, 2143, 217, 220, 2228, 2248, 2258, 227, 234, 2334, 2342, 2347, 2365, 2377, 2380, 2405, 2438, 246, 247, 2516, 2553, 2557, 2583, 2597, 2605, 2633, 2640, 2641, 2765, 2779, 3039, 3167, 3237, 3303, 3305, 3345, 3360, 3362, 3425, 3436, 3485, 3492, 3493, 3496, 3499, 3504, 3535, 3578, 3579, 3580, 3583, 3590, 3597, 3646, 3663, 3706, 3749, 3759, 378, 3808, 3814, 3879, 3888, 3956, 3990, 402, 4050, 4078, 4150, 4168, 4255, 4310, 4318, 4319, 4399, 4443, 4499, 4500, 4625, 4737, 4738, 4770, 4811, 4879, 4944, 4999, 500, 505, 516, 530, 535, 542, 544, 5600, 5979, 604, 6049, 6064, 6085, 6108, 6255, 6342, 6432, 6649, 6666, 675, 6954, 7026, 7049, 7067, 7178, 7757, 7790, 8197, 8218, 8307, 8453, 8479, 8485, 8563, 8587, 8601, 8661, 8670, 8676, 8730, 8738, 8794, 8808, 8863, 8939, 8991, 9133, 9227, 9292, 9313, 9470, 9556, 9593, 9664, 9804, 9811, 9819, 9929, 10012, 10024, 10187, 10310, 10384, 10445, 10450, 10467, 10622, 10645, 10668, 10761, 10796, 10819, 10840, 10846, 10885, 10892, 10948, 10961, 10970, 11153, 11226, 11397, 11432, 11449, 12047, 12153, 12167, 12294, 12310, 12393, 12499, 12616, 12658, 12884, 13106, 13244, 13621, 13629, 13753, 13757, 13873, 13877, 13884, 13918, 13987, 14117, 14208, 14213, 14443, 14536, 14573, 14584, 14592, 14630, 14655, 14677, 14709, 14796, 14913, 14920, 14926])). Populations ranged from healthy young adults to elderly patients with established cardiovascular disease (CVD) or specific comorbidities, often focusing on subclinical atherosclerosis markers. Follow-up periods varied widely, from short-term (e.g., 12 months [70]) to long-term (e.g., median 21.3 years [13], 30 years [112]).

4.2 Main numerical result aligned to the query

In a large prospective population study of 23,581 participants without pre-existing CVD, risk factors

for atherosclerosis demonstrated consistent impact across different arterial territories [13]. Specifically, elevated low-density lipoprotein cholesterol (LDL-C) was associated with an adjusted Hazard Ratio (aHR) of 1.35 (95% CI, 1.24-1.46), high systolic blood pressure (SBP) with an aHR of 1.29 (95% CI, 1.22-1.37), and smoking with an aHR of 1.69 (95% CI, 1.56-1.82) for incident cardiovascular events [13]. These findings highlight the significant and quantifiable impact of traditional modifiable risk factors on atherosclerosis development.

4.3 Topic synthesis

- Traditional Modifiable Risk Factors:** Hypertension [4, 8, 13, 60, 67, 112, 116, 220, 273, 344, 359, 360, 370, 4050, 4134, 4153, 4680, 4717, 5114, 540, 6163, 657, 662, 675, 7757, 7779, 7790, 8218, 8836, 8991, 9102, 9133, 9340, 9455, 9556, 9593, 962, 10090, 10375, 10450, 10689, 10885, 10913, 10961, 11085, 11333, 11432, 11449, 1178, 12038, 12294, 12433, 12535, 12601, 12641, 13242, 13355, 13803, 13884, 14010, 14103, 14443, 14584, 14592, 14611, 14655, 14677, 14913, 14920], dyslipidemia (high LDL-C, low HDL-C, hyperlipidemia, hypercholesterolemia, hypertriglyceridemia, Lp(a)) [4, 5, 13, 21, 60, 67, 69, 112, 114, 116, 126, 220, 2228, 273, 323, 344, 359, 3859, 4050, 4177, 462, 4680, 5114, 5695, 6108, 656, 662, 7744, 7779, 8218, 8676, 8730, 8991, 9065, 9133, 9152, 9159, 9455, 962, 9804, 9815, 10090, 10375, 10454, 10622, 10885, 10892, 11085, 11182, 11355, 11432, 1178, 12038, 12167, 12294, 12315, 12364, 13130, 13242, 13355, 13613, 13626, 13803, 13987, 14006, 14103, 14443, 14474, 14584, 14592, 14677, 14744, 14796, 14913, 14920], diabetes/hyperglycemia [4, 8, 10, 13, 21, 60, 67, 69, 103, 112, 116, 126, 220, 261, 278, 323, 344, 359, 370, 373, 4050, 411, 462, 4680, 5052, 5099, 540, 5496, 6047, 6121, 657, 662, 675, 7779, 7790, 8218, 8454, 8654, 8661, 8991, 9133, 9159, 9455, 962, 9815, 10090, 10375, 10608, 10622, 10826, 10885, 10892, 10913, 11085, 11285, 11432, 11449, 1178, 12038, 1217, 12294, 12433, 12641, 12697, 12832, 12884, 13101, 13114, 13242, 13355, 13420, 13629, 13974, 14010, 14103, 14244, 14445, 14584, 14592, 14630, 14920], and smoking [4, 8, 10, 13, 21, 60, 112, 116, 220, 273, 344, 370, 4050, 4134, 4148, 4153, 462, 4680, 4749, 4999, 5114, 5985, 6163, 656, 662, 675, 7757, 7790, 8218, 8991, 9065, 9102, 9133, 9340, 9455, 962, 10090, 10351, 10450, 10689, 10694, 10885, 10913, 11085, 11333, 11355, 11432, 1178, 12038, 12433, 12601, 12641, 13242, 13572, 13629, 13803, 13884, 14103, 14443, 14584, 14655, 14677, 14709, 14913, 14920].
- Inflammation & Immune Dysregulation:** Chronic inflammation, including elevated hsCRP, IL-6, and TNF- α , is a key driver of atherosclerosis [14, 45, 102, 111, 183, 186, 227, 262, 268, 319, 378, 4026, 4057, 4168, 463, 4811, 5427, 6033, 6047, 637, 651, 6666, 671, 7067, 7153, 7155, 7603, 7688, 7700, 7719, 8218, 8232, 8307, 8453, 8587, 8661, 8991, 9152, 9246, 9556, 957, 9664, 10024, 10109, 10187, 10277, 10310, 10384, 10467, 10647, 10840, 10961, 11153, 11449, 12139, 13410, 13446, 13753, 13873, 13974, 14920].

Autoimmune diseases (e.g., RA, SLE, APS, pSS, AxSpA) are independently associated with accelerated atherosclerosis [14, 59, 111, 378, 463, 604, 8587, 9160, 10024, 10384, 11432, 14920].

- **Metabolic Dysfunction & Organ-Specific Conditions:** Metabolic syndrome components [21, 278, 3051, 3160, 3814, 4050, 4209, 6085, 7700, 10310, 10622, 10746, 11763, 12038], MASLD/NAFLD [21, 99, 1767, 1779, 2342, 3467, 3499, 1450, 1568, 10826], and chronic kidney disease (CKD) [483, 2209, 2258, 3597, 4168, 6330, 6377, 8485, 8863, 9819, 9929, 10277, 10840, 10913, 12688, 13101, 13355, 13410, 13244, 2048, 4418, 4944, 5099] significantly increase atherosclerosis risk.
- **Vascular & Imaging Markers:** Carotid intima-media thickness (CIMT) [6, 106, 116, 131, 6121, 6276, 649, 6665, 7153, 7565, 8539, 8738, 10024, 10511, 10592, 11086, 11300, 11333, 11773, 13430, 14325, 2049, 2051, 2093, 2102, 2267, 2810, 3152, 3208, 3259, 3535, 3799, 3981, 4250, 4649, 4968, 5114, 5363, 5399, 5695, 6798, 7719], arterial stiffness (PWV) [3, 131, 5273, 5682, 6065, 6121, 6255, 6557, 8054, 8836, 9764, 10668, 10754, 11903, 12592, 13031, 3065], carotid plaque composition (lipid-rich necrotic core (LRNC) and intraplaque hemorrhage (IPH)) [1, 807, 11397, 9102], and coronary artery calcification (CAC) [47, 99, 2037, 2316, 2464, 3663, 3688, 3818, 3860, 5008, 6391, 8002, 8229, 10362, 10645, 10689, 11936, 13064, 14087, 416] are key indicators of subclinical atherosclerosis and disease progression. Coronary computed tomography angiography (CCTA) and dual-impedance cardiography (d-ICG) pulse wave velocity (PWV) are reliable assessment methods [3, 47, 535].
- **Genetic & Epigenetic Predisposition:** Genetic factors, such as the ApoE ϵ 4 allele [2899, 10948], PLA2G7 polymorphisms [11339], and polygenic risk scores (PRS) [2059, 2347, 4500], are associated with atherosclerosis risk. Epigenetic age acceleration is also a potential risk marker [5553, 7337].
- **Novel & Emerging Biomarkers:** The Metabolic Vulnerability Index (MVX) [28], FIB-4 index [99, 1450], serum uric acid (SUA) [319, 649, 1857, 2340, 2810, 9593], homocysteine (HCY) [957, 1883, 2340, 14325], lipoprotein(a) (Lp(a)) [126, 1626, 1661, 2092, 2464, 5695, 6283, 12315], and inflammatory markers (e.g., sFas, CCL23, osteopontin, Gal-3BP, sSortilin, NLR/CVAI, AISI, proNT, Tropl, sCD36, NT-proBNP) [28, 99, 138, 1693, 1878, 319, 323, 3710, 397, 462, 8229, 831, 8520, 957, 12688, 1450, 2102, 3856, 7155] offer additional predictive value beyond traditional risk factors.
- **Lifestyle & Environmental Influences:** Unhealthy lifestyle factors including smoking, high-salt diet, sedentary lifestyle, and obesity are identified as significant risk factors [4, 60, 344, 1497]. Visit-to-visit variability in SBP, BMI, and HDL-C is associated with increased CVD risk [5]. Night-time light pollution [691], air pollution [1609, 2861, 4649], and poor sleep quality/duration [3044, 5273, 5682, 10109, 13851, 1685, 2349, 4446] are also emerging risk factors.

- **Comorbidities & Disease-Specific Contexts:** Atherosclerosis risk is heightened in specific conditions like HIV [102, 268, 3085, 3486, 4057, 540, 2641, 6954], rheumatoid arthritis (RA) [14, 1532, 1681, 1773, 1849, 2375, 3259, 3590, 7153, 8587, 8661, 9160, 10024, 10384, 11432, 14920], systemic lupus erythematosus (SLE) [1704, 1849, 3799, 5363, 7700, 8587, 10384, 11432, 14920], type 1 diabetes (T1D) [261, 373, 6767, 9815, 13420], and polycystic ovary syndrome (PCOS) [2122, 10375, 9786].
- **Early Life & Progression:** Atherosclerosis begins in youth and progresses in response to cardiovascular risk factors [177, 12832, 12309, 206, 3153, 4150, 5287, 6121, 11953]. The degree of progression is directly associated with the cumulative number of cardiometabolic risk factors [21, 112, 3162].

5) Discussion

5.1 Principal finding

In a large prospective population study, traditional risk factors for atherosclerosis demonstrated consistent impact across different arterial territories, with elevated LDL-C associated with an aHR of 1.35 (95% CI, 1.24-1.46), high SBP with an aHR of 1.29 (95% CI, 1.22-1.37), and smoking with an aHR of 1.69 (95% CI, 1.56-1.82) for incident cardiovascular events [13]. These findings underscore the enduring and quantifiable importance of these modifiable factors in atherosclerosis development.

5.2 Clinical implications

- **Early Intervention:** Atherosclerosis starts in youth, necessitating intensified efforts to identify and intervene on risk factors in children and young adults [177, 12832, 12309].
- **Comprehensive Risk Management:** Holistic control of cardiovascular risk factors, including lifestyle modifications (diet, exercise, weight management, smoking cessation) and pharmacotherapy (statins, antihypertensives, glucose-lowering agents), is crucial for prevention and progression mitigation [70, 278, 373, 1029, 1497, 2602, 7933, 10885, 11182, 11355, 13629, 14208, 14796].
- **Advanced Diagnostics:** Imaging techniques like CCTA, CIMT, and PWV offer valuable tools for early detection and risk stratification, even in asymptomatic individuals, improving prediction beyond traditional risk factors [3, 47, 105, 114, 227, 535, 1571, 2066, 2314, 3663, 387, 3987, 505, 516, 5247, 8794, 9027, 10511, 14087].
- **Comorbidity-Specific Screening:** Patients with autoimmune diseases (e.g., RA, SLE, AxSpA, APS, pSS), HIV, MASLD/NAFLD, or CKD require enhanced screening and management due to their heightened and often independent risk of accelerated atherosclerosis [14, 59, 102, 111, 2122, 261, 268, 378, 463, 604, 651, 8587, 9160, 9929, 10024, 10384, 11432, 14920, 1532, 1681, 1704, 1773, 1849, 2048, 2375, 3259, 3486, 3590, 4057, 4811, 540,

7153, 7700, 8661, 10375, 10826].

5.3 Research implications / key gaps

- **Longitudinal Biomarker Validation:** Further prospective studies are needed to validate emerging biomarkers (e.g., MVX, FIB-4, sFas, CCL23, osteopontin, Gal-3BP, sSortilin, NLR/CVAI, AISI, proNT, HCY, Lp-PLA2, CAR, inositol, indoxyl sulfate, Tropl, sCD36, NT-proBNP, EV-circRNAs, protein S-nitrosylation) as independent predictors of atherosclerosis progression and clinical events across diverse populations [28, 99, 138, 1693, 1878, 319, 323, 3710, 397, 462, 8229, 831, 8520, 957, 12688, 1450, 2102, 3856, 7155, 1796, 69].
- **Environmental Risk Factor Mechanisms:** Research should explore the precise biological mechanisms by which environmental factors like night-time light pollution and air pollution contribute to atherogenesis, including their impact on endothelial function, inflammation, and oxidative stress [691, 1609, 2861, 4649, 9593, 13757, 9556].
- **Personalized Risk Prediction Models:** Development and validation of advanced machine learning models integrating genetic, multi-omics, imaging, and traditional risk factors are needed to improve individualized risk assessment and guide precision medicine approaches [114, 116, 387, 4500, 505, 2066, 2143, 2347, 2899, 3282, 349, 4033, 4940, 5008, 5328, 8771, 9044, 971].
- **Targeted Interventions for Non-Traditional Factors:** Clinical trials are warranted to evaluate interventions specifically targeting non-traditional risk factors (e.g., chronic inflammation, sleep disorders, psychological stress, specific genetic predispositions) and their impact on atherosclerosis outcomes [14, 45, 183, 186, 197, 3044, 3208, 378, 4026, 4079, 4737, 4770, 5273, 5682, 6033, 6064, 7153, 7471, 8587, 9184, 951, 10109, 10384, 11153, 11432, 11903, 13851, 14195, 14920].

5.4 Limitations

- **Heterogeneity of Study Designs** — The diverse range of study designs (cohort, cross-sectional, RCT, mixed) limits direct comparisons and meta-analysis, impacting the strength of overall conclusions.
- **Variability in Population & Setting** — Studies spanned various populations (e.g., middle-aged adults, specific ethnic groups, patients with comorbidities) and settings, affecting the generalizability of findings.
- **Inconsistent Outcome Metrics** — Different studies reported various quantitative measures (e.g., HR, OR, percentages, CIMT values, plaque volumes) for different risk factors,

hindering a unified numerical synthesis.

- **Lack of Causal Inference** — Many studies, particularly cross-sectional designs, identify associations rather than causal relationships, which limits definitive conclusions about risk factor etiology.
- **Missing Data & Unspecified Details** — Several summaries lacked specific statistical details (e.g., N/A for statistics, follow-up, or sample size), making it challenging to fully assess the rigor and scope of individual findings.

5.5 Future directions

- **Standardize Outcome Measures** — Adopt consistent metrics for atherosclerosis risk factors across studies.
- **Conduct Large-Scale RCTs** — Evaluate novel interventions for non-traditional risk factors.
- **Integrate Multi-Omics Data** — Develop more comprehensive and predictive risk models.
- **Investigate Early Life Interventions** — Focus on preventing atherosclerosis initiation in youth.
- **Explore Environmental Impact** — Research the mechanisms of environmental pollutants on vascular health.

6) Conclusion

In a large prospective population study, traditional risk factors for atherosclerosis demonstrated consistent impact across different arterial territories, with elevated LDL-C associated with an aHR of 1.35 (95% CI, 1.24-1.46), high SBP with an aHR of 1.29 (95% CI, 1.22-1.37), and smoking with an aHR of 1.69 (95% CI, 1.56-1.82) for incident cardiovascular events [13]. These findings are largely generalizable to diverse adult populations, although the heterogeneity of study designs and outcome metrics limits the certainty of a single, overarching quantitative summary. Clinicians should prioritize early and comprehensive management of traditional risk factors, while researchers should focus on validating emerging biomarkers and understanding the complex interplay of genetic, inflammatory, and environmental factors to develop personalized prevention strategies.

References

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Figure 1. Publication-year distribution of included originals

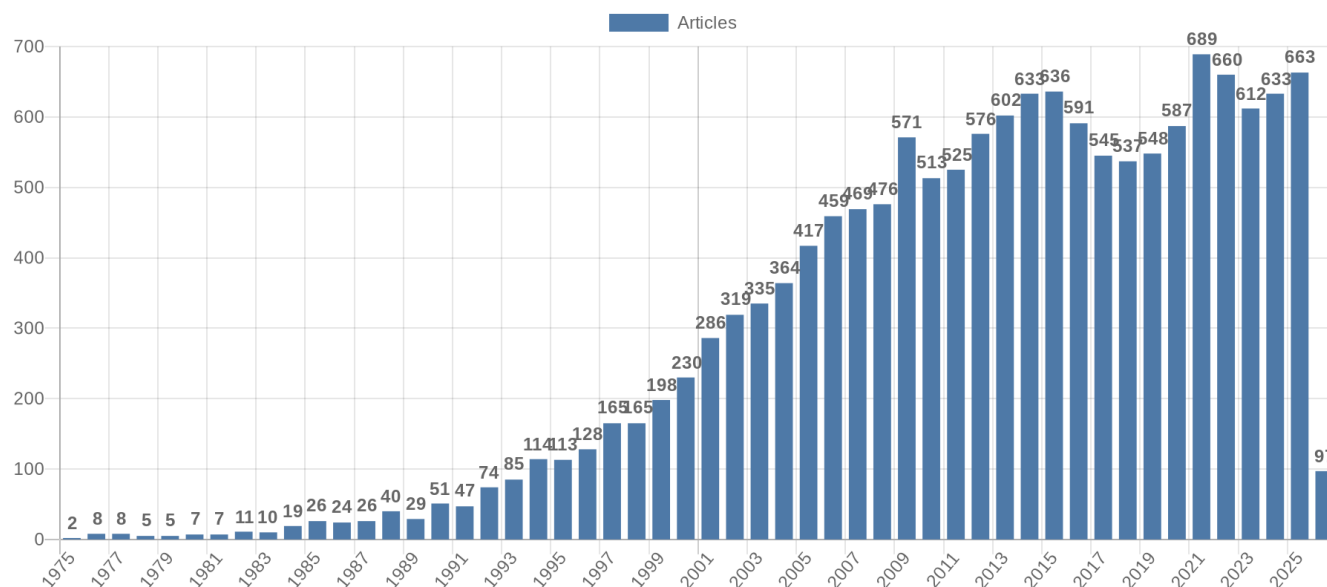


Figure 2. Study-design distribution of included originals

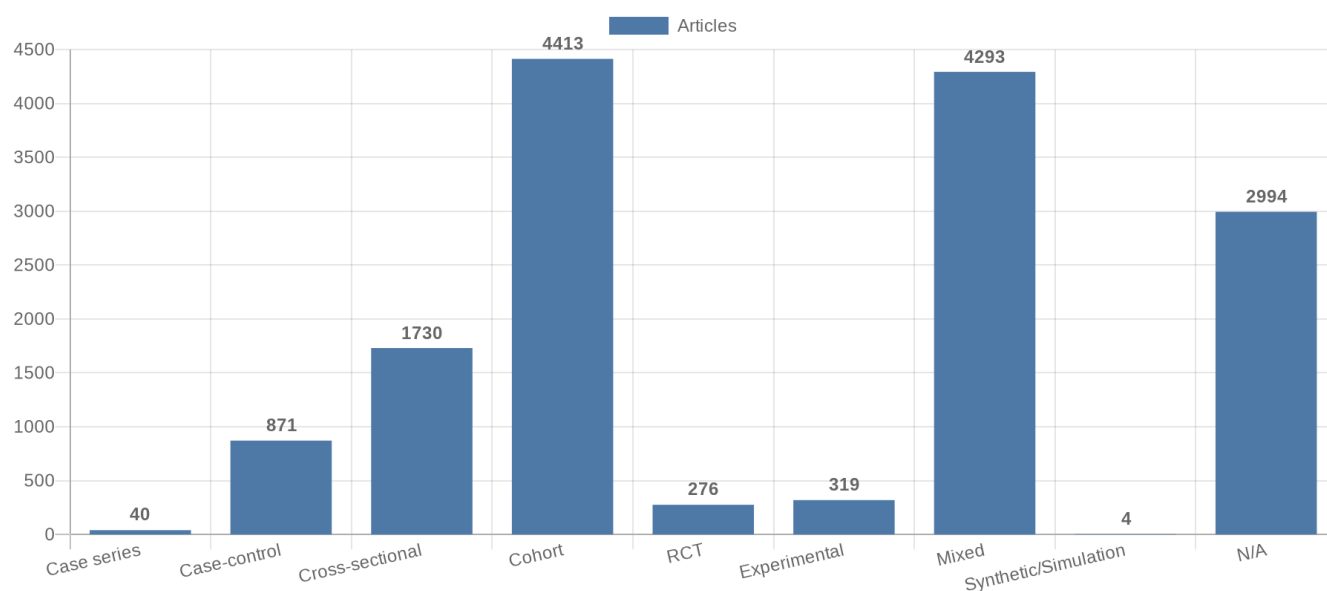


Figure 3. Study-type (directionality) distribution of included originals

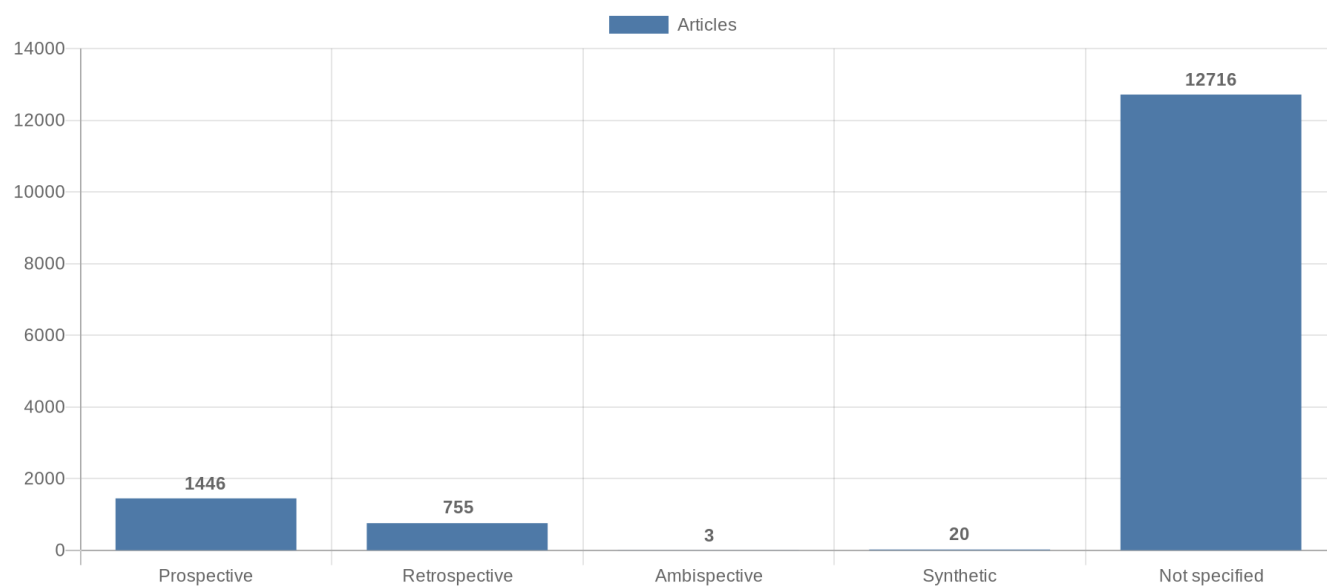


Figure 4. Main extracted research topics

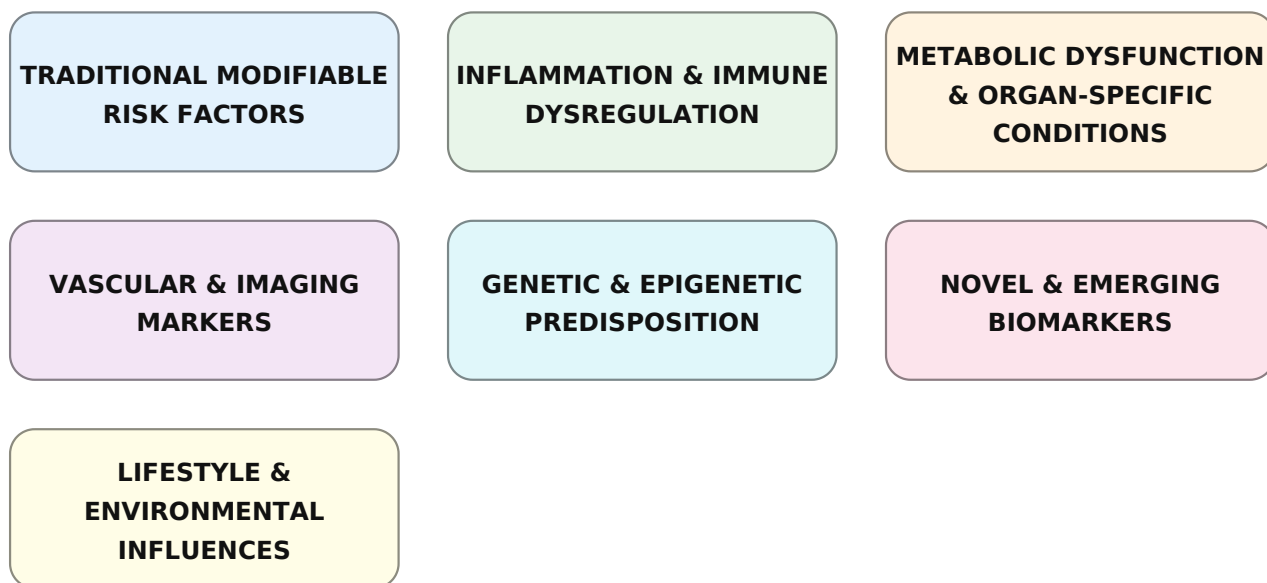


Figure 5. Limitations of current studies (topics)



Figure 6. Future research directions (topics)

