**Table S1. Characteristics of included studies.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Author | Study period | Country/Region | Data source | Study design | Outcomes | Observation window | Population, age | Dose No. | Vaccine type | Total (N) | Myocarditis events (N) | Myocardial infarction events (N) | Cardiac arrhythmia events (N) |
| Ab Rahman N 2022 | February 1, 2021 to September 30, 2021 | Malaysia | the Malaysian Data Warehouse | SCCS | myocardial infarction, myocarditis / pericarditis, arrhythmia | 21 days | ≥12 years | first, second | BNT162b2, CoronaVac, ChAdOx1 | 20202054 people, 35201509 doses | 25 | 1495 | 1375 |
| Abraham N 2022 | December 2020 to March 13, 2022 | Canada | Canadian Adverse Events Following Immunization Surveillance System | observational study | myocarditis / pericarditis | 7 days post-vaccination | 18-39 years | first, second | BNT162b2, mRNA-1273 | 19370047 | 372 |  |  |
| Barda N 2021 | December 20, 2020 to May 24, 2021 | Israel | Clalit Health Services in Israel | observational cohort study | each potential adverse event | 42 days after vaccination | ≥16 years | first, second | BNT162b2 | 938812 persons | 21 | 59 | 254 |
| Bardenheier BH 2021a | December 18, 2020 to March 7, 2021 | US | Electronic Health Record data from Genesis HealthCare | cohort study | myocarditis | 15 days | average age ≥60 years | first, second | Moderna, Pfizer-BioNTech | 8553 persons, 16924 doses |  | 1 |  |
| Bardenheier BH 2021b | December 18, 2020 to February 14, 2021 | US | a large nursing home provider spanning 24 US states | retrospective cohort study | myocarditis | 15 days | average age ≥60 years | first | mRNA-1273, BNT162b2 | 13163 persons |  | 1 |  |
| Cari L 2021 | to June 21, 2021 | European | EudraVigilance, the European Centre for Disease Prevention and Control database | retrospective, observational study | adverse events, including myocardial infarction and cardiac arrhythmia |  | ≥18years | at least one dose | ChAdOx1, Ad26.COV2.S, BNT162b2 | 266391184 doses |  | 1871 | 7778 |
| Chou OHI 2022 | January 1, 2020 to June 30, 2021 | Hong Kong, China | any of the Hong Kong public hospitals, local electronic healthcare database | retrospective cohort study | myopericarditis | myopericarditis; time interval ≤14 days | ≥12 years | first, second | CoronaVac, BNT162b2 | 7588200 doses | 42 |  |  |
| Chua GT 2021 | June 14, 2021 to September 4, 2021 | Hong Kong, China | Comirnaty vaccination | observational study | myocarditis/pericarditis | myocarditis/pericarditis; ≤14 days | 12-17 years | first, second | BNT162b2 | 178163 persons, 305406 doses | 33 |  |  |
| Dagan N 2021 | December 20, 2020 to May 24, 2021 | Israel | Clalit Health Services in Israel | observational cohort study | each potential adverse event | each potential adverse event; 42 days after vaccination | ≥16 years | first, second | BNT162b2 | 938812 persons | 21 | 59 | 254 |
| Diaz GA 2021 | February 2021 to May 2021 | US | Forty hospitals of American | observational study | myocarditis, myopericarditis, pericarditis | follow-up median 23.5 days | IQR 57(40-70) years | first, second | Ad26.COV2.S, mRNA-1273, BNT162b2 | 2000287 persons | 20 |  |  |
| Dickerman BA 2022 | January 4, 2021 to September 20, 2021 | US | the national health care databases of the US Department of Veterans Affairs | observational study | myocardial infarction, other thromboembolic events, myocarditis or pericarditis, arrhythmia, other adverse events | 14 days after first dose | ≥18 years | first | BNT162b2, mRNA-1273 | 429564 | 6 | 94 | 343 |
| Farahmand R 2022 | August 3, 2020 to May 21, 2021 | Israel | Beth Israel Deaconess Medical Center; Massachusetts Immunization Information System | cohort study | myopericarditis and myocardial | follow-up median 71 days | ≥18 years | first, second | BNT162b2, mRNA-1273, ChAdOx1, Ad26.COV2.S | 268320 persons | 10 |  |  |
| Hause AM 2021 | December 14, 2020 to July 16, 2021 | US | VAERS | retrospective,observational study | myocarditis | 7 days | 12-17 years | first, second | BNT162b2 | 8900000 persons | 397 |  |  |
| Hause AM 2022a | December 9, 2021 to February 20, 2022 | US | VAERS | retrospective,observational study | myocarditis | 7 days | 12-17 years | booster | BNT162b2 | 2800000 persons | 47 |  |  |
| Hause AM 2022b | September 22, 2021 to February 6 | US | VAERS | retrospective,observational study | myocarditis | 7 days | ≥18 years | booster | BNT162b2, mRNA-1273 | 81200000 persons | 37 |  |  |
| Hippisley-Cox J 2021 | December 20, 2020 to May 24, 2021 | UK | the Office for National Statistics, the United Kingdom's health service | SCCS | adverse events | 28 days | ≥16years | first | ChAdOx1 n、BNT162b2 | 29121633 persons |  | 14445 |  |
| Husby A 2021 | October 1, 2020 to October 5, 2021 | Denmark | Danish healthcare system | cohort study | myocarditis or myopericarditis | 28 days | ≥12 years | first, second | BNT162b2, mRNA-1273, ChAdOx1, Ad26.COV2.S | 4155361 persons | 69 |  |  |
| Israeli Ministry of Health 2021 | December 2020 to May 2021 | Israel | the Ministry of Health database of Israel | retrospective,observational study | myocarditis events, from first dose to 30 days after second doses | from first dose to 30 days after second doses | ≥16 years | first, second | mRNA vaccines | 5401150 persons | 148 |  |  |
| Jabagi MJ 2022 | December 15, 2020 to April 30, 2021 | French | the French National Health Data System | SCCS | acute myocardial infarction, stroke, or pulmonary embolism | 1-7 and 8-14 days | ≥75 years | first, second | BNT162b2 | 3900000 persons |  | 1277 |  |
| Karlstad Ø 2022 | December 27, 2020 to October 5, 2021 | Denmark, Finland, Norway, Sweden | nationwide health registers | cohort study | myocarditis or pericarditis | 28 days | ≥ 12 years | first, second | BNT162b, mRNA-1273, AZD1222 | 18814068 persons | 347 |  |  |
| Kim HW 2021 | February 1, 2021 to April 30, 2021 | US | Duke University Medical Center | prospective study | myocarditis | 7 days | ≥16 years | first, second | mRNA-1273, BNT162b2 | 561197 persons | 4 |  |  |
| Klein NP 2021a | December 14, 2020, to June 26, 2021 | US | eight data-contributing health plans of US | observational study | myocarditis/pericarditis | 42 days after first dose, 22 days after second dose | ≥12 years; mean age 49 years | first, second | BNT162b2, mRNA-1273 | 6175813 persons, 11845128 doses | 87 | 613 |  |
| Klein NP 2021b | December 2020 to August 21, 2021 | US | CDC | observational study | myocarditis/pericarditis, first in 60 days | First in 60 Days | ≥12 years | first, second | Janssen, BNT162b2, mRNA-1273 | 7077839 persons, 13334831dose | 115 |  |  |
| Lai FTT 2022a | to September 30, 2021 | Hong Kong, China | Department of Health of the Hong Kong, Hospital Authority | retrospective cohort study | adverse events, including myocarditis and cardiac arrhythmia | 28 days | 12-18 years | first, second | BNT162b2 | 138141 dose1,  119664 dose2 | 38 |  | 19 |
| Lai FTT 2022b | February 23, 2021 to August 2, 2021 | Hong Kong, China | Hospital Authority of Hong Kong | case-control study | carditis (acute myocarditis or pericarditis) | BNT162b2 and CoronaVac are 21 and 28 days, respectively | ≥12 years | first, second | BNT162b2, CoronaVac | 9284702 | 27 |  |  |
| Lee CW 2022 | December 14, 2020 to September 30, 2021 | Korea | VAERS | observational study | myocarditis/pericarditis | 84 days | ≥12 years | first, second | BNT162b2 | 235285732 persons | 474 | 59 |  |
| Li M 2021 | December11, 2020 to August 13, 2021 | US | VAERS and CDC COVID Data Tracker | observational study | myocarditis and pericarditis | myocarditis and pericarditis | ≥12 years | first, second | Ad26.COV2.S, mRNA-1273, BNT162b2 | 353846154 doses | 2116 |  |  |
| lp S 2022 | December 8, 2020 to May 17, 2021 | England | Health Data Research UK and other institutions | cohort study | hospitalised or fatal myocarditis/pericarditis | (0-13 days, 14+ days) after first and second doses | ＞12 years | first, second | BNT162b2, ChAdOx1 | 49786346 persons | 607 |  |  |
| Massari M 2021 | December 27, 2020 to September 30, 2021 | Italy | National Centre for Drug Research and Evaluation | SCCS | myocarditis/pericarditis | 21 days | 12-39 years | first, second | BNT162b2, mRNA-1273 | 2861809 persons, 5109231 doses | 114 |  |  |
| Mevorach D 2021 | December 20, 2020, to May 31, 2021 | Israel | Ministry of Health database of Israel | retrospective study | myocarditis | 21 days after first dose and 30 days after second dose | ≥16 years | first, second | BNT162b2 | 5442696 persons | 136 |  |  |
| Montgomery J 2021 | January 2021 to April 2021 | US | US Military Health System, VAERS | retrospective case series study | myocarditis | 30day | 20-51 years | first, second | BNT162b2, mRNA-1273 | 2810000 doses | 23 |  |  |
| Niesen MJM 2022 | December 2020 to October 2021 | US | multistate Mayo Clinic Enterprise | cohort study | adverse event within 14 days after each dose | 14 days | IRQ 67 years | booster | BNT162b2, mRNA-1273 | 47999 persons | 1 |  |  |
| Oster ME 2021 | December 2020 to August 2021 | US | VAERS | observational study | myocarditis | 7 days | ≥12 years | first, second | BNT162b2, mRNA-1273 | 192405448 persons, 354100845 doses | 1626 |  |  |
| Patone M 2021 | December 1, 2020 to November 15, 2021 | England | NIMS | SCCS | myocarditis, pericarditis, and cardiac arrhythmias，1-28 days | 28 days | ≥13 years | first, second, third | ChAdOx1, BNT162b2, mRNA-1273 | 42200614 persons; 91572102 doses | 552 |  |  |
| Patone M 2022 | December 1, 2020 to August 24, 2021 | England | NIMS | SCCS | myocarditis, pericarditis, and cardiac arrhythmias | 28 days | ≥16 years | first, second | ChAdOx1, BNT162b2, mRNA-1273 | 38615491 persons; 70711239 doses | 397 |  | 86754 |
| Rosenblum HG 2022 | December 14, 2020 to June 14, 2021 | US | VAERS and v-safe | observational study | adverse Event after 0-7days | 7day | ≥16 years | first, second | BNT162b2, mRNA-1273 | 298792852 doses | 1307 | 1118 |  |
| Simone A 2021 | December 14, 2020 to July 20, 2021 | US | Kaiser Permanente Southern California | observational study | acute myocarditis | 10 days | ≥18 years | first, second | BNT162b2, mRNA-1273 | 2392924 persons; 4629775 doses | 15 |  |  |
| Su JR 2021 | December 2020 to October 6, 2021 | US | VAERS | observational study | myopericarditis, pericarditis | 7 days | ≥12 years | first, second | Janssen, BNT162b2, mRNA-1273 | 402469096 doses | 2459 |  |  |
| Tome J 2022 | January 1, 2021 to February 11, 2022 | EU/EEA countries | the EudraVigilance database and the European Centre for Disease Prevention and Control's vaccination tracker database | retrospective,observational study | myocarditis/pericarditis | 28 days | ≥12 years | first | mRNA-1273, BNT162b2 | 557868504 | 5356 |  |  |
| Whiteley WN 2022 | December 8, 2020 to March 18, 2021 | England | General Practice Extraction Service Data for Pandemic Planning and Research | cohort study | major arterial, venous, and thrombocytopenic | >28 days | ≥18years | first | ChAdOx1-S、BNT162b2 | 21193814 persons |  | 7536 |  |
| Witberg G 2021 | December 20, 2020 to May 24, 2021 | Israel | Clalit Health Services in Israel | retrospective cohort study | myocarditis | 21 days after each of the two doses | ≥16 years | first, second | BNT162b2 | 2558421 persons | 54 |  |  |
| Wong HL 2022 | Dec 14, 2021 to Jan 1, 2022 | US | four administrative claims databases (Optum, Health Core, Blue Health Intelligence, and CVS Health) | retrospective cohort study | myocarditis, pericarditis | 7 days | 18-64 years | first, second | mRNA-1273, BNT162b2 | 15148369 persons, 27544270 doses | 411 |  |  |

SCCS: self-controlled case series study; VAERS: Vaccine Adverse Event Reporting System; CDC: Centers for Disease Control and Prevention; NIMS: National Incident Management System; EU: European Union; EEA: European Economic Area