



Influenza vaccines may protect against cardiovascular diseases: The evidence is mounting and should be known by the Canadian public health community

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Results of first PubMed search (April 12, 2023)

Search words: influenza AND vaccin* AND (cardiovascular OR myocardial OR stroke OR arrhythmia)

Number of hits: 1,015

Selection: Review article or systematic review or meta-analysis

Number of hits: 194

Exclusion criteria: irrelevant according to population, intervention, control, outcomes and study (PICOS) (i.e. adults, influenza vaccination, vaccinated vs. unvaccinated, adverse CVD outcome, quantitative study), editorial, commentary, non-systematic narrative reviews, clinical guidelines

Excluded: 171

Retained: 25 systematic reviews with or without meta-analysis

Results of second PubMed search (July 17, 2023)

Search words: influenza AND vaccin* AND (cardiovascular OR myocardial OR stroke OR arrhythmia)

Selection: Year 2023

Number of hits: 75

Selection: Review article or systematic review or meta-analysis

Number of hits: 15

Exclusion criteria: irrelevant according to PICOS (i.e. adults, influenza vaccination, vaccinated vs. unvaccinated, adverse CVD outcome, quantitative study), editorial, commentary, non-systematic narrative reviews, clinical guidelines

Excluded: 11

Retained: 4 systematic reviews with or without meta-analysis including one duplicate with first search and one manuscript in Chinese that could not be assessed

Total assessed

First and second search: $25 + 2 = 27$

One additional review identified through another search: 1

Total manuscript assessed: $27 + 1 = 28$ (references 1–28)



References

1. Meyers DG. Myocardial infarction, stroke, and sudden cardiac death may be prevented by influenza vaccination. *Curr Atheroscler Rep* 2003;5(2):146–9. [DOI PubMed](#)
2. Meyers DG. Could influenza vaccination prevent myocardial infarction, stroke and sudden cardiac death? *Am J Cardiovasc Drugs* 2003;3(4):241–4. [DOI PubMed](#)
3. Keller T, Weeda VB, van Dongen CJ, Levi M. Influenza vaccines for preventing coronary heart disease. *Cochrane Database Syst Rev* 2008;(3):CD005050. [DOI PubMed](#)
4. Loomba RS, Aggarwal S, Shah PH, Arora RR. Influenza vaccination and cardiovascular morbidity and mortality: analysis of 292,383 patients. *J Cardiovasc Pharmacol Ther* 2012;17(3):277–83. [DOI PubMed](#)
5. Udell JA, Zawi R, Bhatt DL, Keshtkar-Jahromi M, Gaughran F, Phrommintikul A, Ciszewski A, Vakili H, Hoffman EB, Farkouh ME, Cannon CP. Association between influenza vaccination and cardiovascular outcomes in high-risk patients: a meta-analysis. *JAMA* 2013;310(16):1711–20. [DOI PubMed](#)
6. Barnes M, Heywood AE, Mahimbo A, Rahman B, Newall AT, Macintyre CR. Acute myocardial infarction and influenza: a meta-analysis of case-control studies. *Heart* 2015;101(21):1738–47. [DOI PubMed](#)
7. Clar C, Oseni Z, Flowers N, Keshtkar-Jahromi M, Rees K. Influenza vaccines for preventing cardiovascular disease. *Cochrane Database Syst Rev* 2015;2015(5):CD005050. [DOI PubMed](#)
8. Lee KR, Bae JH, Hwang IC, Kim KK, Suh HS, Ko KD. Effect of Influenza Vaccination on Risk of Stroke: A Systematic Review and Meta-Analysis. *Neuroepidemiology* 2017;48(3-4):103–10. [DOI PubMed](#)
9. LeBras MH, Barry AR. Influenza Vaccination for Secondary Prevention of Cardiovascular Events: A Systematic Review. *Can J Hosp Pharm* 2017;70(1):27–34. [DOI PubMed](#)
10. Tsivgoulis G, Katsanos AH, Zand R, Ishfaq MF, Malik MT, Karapanayiotides T, Voumvourakis K, Tsiodras S, Parissis J. The association of adult vaccination with the risk of cerebrovascular ischemia: A systematic review and meta-analysis. *J Neurol Sci* 2018;386:12–8. [DOI PubMed](#)
11. Caldeira D, Rodrigues B, David C, Costa J, Pinto FJ, Ferreira JJ. The association of influenza infection and vaccine with myocardial infarction: systematic review and meta-analysis of self-controlled case series. *Expert Rev Vaccines* 2019;18(11):1211–7. [DOI PubMed](#)
12. Rodrigues BS, David C, Costa J, Ferreira JJ, Pinto FJ, Caldeira D. Influenza vaccination in patients with heart failure: a systematic review and meta-analysis of observational studies. *Heart* 2020;106(5):350–7. [DOI PubMed](#)
13. Cheng Y, Cao X, Cao Z, Xu C, Sun L, Gao Y, Wang Y, Li S, Wu C, Li X, Wang Y, Leng SX. Effects of influenza vaccination on the risk of cardiovascular and respiratory diseases and all-cause mortality. *Ageing Res Rev* 2020;62:101124. [DOI PubMed](#)
14. Rodrigues BS, Alves M, Duarte GS, Costa J, Pinto FJ, Caldeira D. The impact of influenza vaccination in patients with cardiovascular disease: an overview of systematic reviews. *Trends Cardiovasc Med* 2021;31(5):315–20. [DOI PubMed](#)
15. Zangiabadian M, Nejadghaderi SA, Mirsaiedi M, Hajikhani B, Goudarzi M, Goudarzi H, Mardani M, Nasiri MJ. Protective effect of influenza vaccination on cardiovascular diseases: a systematic review and meta-analysis. *Sci Rep* 2020;10(1):20656. [DOI PubMed](#)
16. Pérez-Rubio A, San Román JA, Eiros Bouza JM. The impact of influenza vaccination on cardiovascular diseases. *Med Clin (Barc)* 2021;157(1):22–32. [DOI](#)
17. Yedlapati SH, Khan SU, Talluri S, Lone AN, Khan MZ, Khan MS, Navar AM, Gulati M, Johnson H, Baum S, Michos ED. Effects of Influenza Vaccine on Mortality and Cardiovascular Outcomes in Patients With Cardiovascular Disease: A Systematic Review and Meta-Analysis. *J Am Heart Assoc* 2021;10(6):e019636. [DOI PubMed](#)
18. Liprandi ÁS, Liprandi MI, Zaidel EJ, Aisenberg GM, Baranchuk A, Barbosa EC, Sánchez GB, Alexander B, Zanetti FT, Santi RL, Múnera-Echeverri AG, Perel P, Piskorz D, Ruiz-Mori CE, Saucedo J, Valdez O, Juanatey JR, Piñeiro DJ, Pinto FJ, Quintana FS. Influenza Vaccination for the Prevention of Cardiovascular Disease in the Americas: Consensus document of the Inter-American Society of Cardiology and the World Heart Federation. *Glob Heart* 2021;16(1):55. [DOI PubMed](#)



19. Maniar YM, Al-Abdoun A, Michos ED. Influenza Vaccination for Cardiovascular Prevention: Further Insights from the IAMI Trial and an Updated Meta-analysis. *Curr Cardiol Rep* 2022;24(10):1327–35. [DOI PubMed](#)
20. Jaiswal V, Ang SP, Yaqoob S, Ishak A, Chia JE, Nasir YM, Anjum Z, Alraies MC, Jaiswal A, Biswas M. Cardioprotective effects of influenza vaccination among patients with established cardiovascular disease or at high cardiovascular risk: a systematic review and meta-analysis. *Eur J Prev Cardiol* 2022;29(14):1881–92. [DOI PubMed](#)
21. Gupta C, Sachdeva A, Khamar J, Bu C, Bartoszko J, Loeb M. Effectiveness of the influenza vaccine at reducing adverse events in patients with heart failure: A systematic review and meta-analysis. *Vaccine* 2022;40(25):3433–43. [DOI PubMed](#)
22. Behrouzi B, Bhatt DL, Cannon CP, Vardeny O, Lee DS, Solomon SD, Udell JA. Association of Influenza Vaccination With Cardiovascular Risk: A Meta-analysis. *JAMA Netw Open* 2022;5(4):e228873. [DOI PubMed](#)
23. Diaz-Arocutipa C, Saucedo-Chinchay J, Mamas MA, Vicent L. Influenza vaccine improves cardiovascular outcomes in patients with coronary artery disease: A systematic review and meta-analysis. *Travel Med Infect Dis* 2022;47:102311. [DOI PubMed](#)
24. Liu M, Lin W, Song T, Zhao H, Ma J, Zhao Y, Yu P, Yan Z. Influenza vaccination is associated with a decreased risk of atrial fibrillation: A systematic review and meta-analysis. *Front Cardiovasc Med* 2022;9:970533. [DOI PubMed](#)
25. Tavabe NR, Kheiri S, Dehghani M, Mohammadian-Hafshejani A. A Systematic Review and Meta-Analysis of the Relationship between Receiving the Flu Vaccine with Acute Cerebrovascular Accident and Its Hospitalization in the Elderly. *BioMed Res Int* 2023;2023:2606854. [DOI PubMed](#)
26. Addario A, Célarier T, Bongue B, Barth N, Gavazzi G, Botelho-Nevers E. Impact of influenza, herpes zoster, and pneumococcal vaccinations on the incidence of cardiovascular events in subjects aged over 65 years: a systematic review. *Geroscience* 2023:1–29. Epub ahead of print. [DOI PubMed](#)
27. Gupta R, Quy R, Lin M, Mahajan P, Malik A, Sood A, Sreenivasan J, Bandyopadhyay D, Goel A, Agrawal A, Vyas AV, Patel NC, Frishman WH, Aronow WS. Role of Influenza Vaccination in Cardiovascular Disease: Systematic Review and Meta-Analysis. *Cardiol Rev* 2023 : Epub ahead of print. [DOI PubMed](#)
28. Modin D, Lassen MC, Claggett B, Johansen ND, Keshtkar-Jahromi M, Skaarup KG, Nealon J, Udell JA, Vardeny O, Solomon SD, Gislason G, Biering-Sørensen T. Influenza vaccination and cardiovascular events in patients with ischaemic heart disease and heart failure: A meta-analysis. *Eur J Heart Fail* 2023. [DOI PubMed](#)