

Influenza Vaccines and CVD



Key facts



Influenza disease is estimated to result in about **3 to 5 million cases of severe illness**, and about **290,000 to 650,000 deaths**



People with chronic cardiac disease are at greater risk of severe disease or complications when infected



Health care workers are often at **high risk acquiring influenza virus infection** due to increased exposure to the patients and risk further spread particularly to vulnerable individuals



Complications such as **heart attacks** in cardiovascular patients may be **reduced by up to 67% with influenza vaccination**



Healthcare workers' vaccination against influenza **reduces mortality and influenza cases in healthcare facilities**

1 Influenza epidemiology

Seasonal influenza is an acute respiratory infection caused by influenza viruses which circulate in all parts of the world. Illnesses range from mild to severe and even death. Hospitalization and death occur mainly among high risk groups. Worldwide, influenza annual epidemics are estimated to result in about 3 to 5 million cases of severe illness, and about 290 000 to 650 000 deaths^{1,2}.

All age groups can be affected but there are groups that are more at risk than others¹:

- › People at greater risk of severe disease or complications when infected are: pregnant women, children under 59 months, the elderly, individuals with chronic medical conditions (such as chronic cardiac, pulmonary, renal, metabolic, neurodevelopmental, liver or hematologic diseases) and individuals with immunosuppressive conditions (such as HIV/AIDS, receiving chemotherapy or steroids, or malignancy).
- › Health care workers are often at high risk acquiring influenza virus infection due to increased exposure to the patients and risk further spread particularly to vulnerable individuals.

2 Influenza infection and cardiovascular disease

- › In persons with cardiovascular disease, systemic respiratory infections - which are frequently caused by influenza viruses - increase the risk of stroke and heart attacks three- and five-fold respectively, in the three days following the onset of infection .
- › The risk of dying from acute myocardial infarction and chronic ischaemic heart disease is 1.3 times greater during influenza epidemic weeks⁵.
- › A study showed that 50% of adults hospitalized during the 2014-2015 flu season in the USA had heart conditions⁶.

3 What are the benefits of influenza vaccination for patients with CVD?

When the impact of vaccination on NCDs was measured in over 35,000 older adults, mortality from stroke, diabetes, COPD, and heart disease was lowered by 65%, 55%, 45% and 22% respectively⁷. Complications, such as heart attacks in cardiovascular or COPD patients, may be reduced by up to 67%^{8,9} and the chance of stroke occurrence may be reduced by 24%¹⁰. One study calculated the vaccine efficacy to be 29% in preventing acute myocardial infarction (AMI).

4 Should healthcare professionals also get influenza vaccination?

Healthcare workers constitute a special group at an elevated risk of both contracting and transmitting influenza to already vulnerable patients. Nosocomial infections can compromise quality of care and patient safety and result in prolonged hospital stays, microbial resistance, exacerbations of existing conditions and even deaths¹².

Healthcare workers are another high-risk group in terms of both susceptibility and contagiousness: they are at a risk of exposure to influenza virus since healthcare facilities are a frequent site of nosocomial outbreaks¹³. Healthcare workers can act as vectors as well, unknowingly infecting their patients particularly when the infection is asymptomatic.

The most recent evidence indicates that healthcare workers' vaccination against influenza reduces mortality and influenza cases in healthcare facilities¹⁴.

5 How healthcare professionals can help patients get their influenza shot

A recent study from Israel provided evidence that patients whose physicians got a flu shot were more likely to follow their lead than patients of the physicians who did not get the flu shot¹⁵. Studies indicate that recommendations by physicians is the most effective strategy influencing patients' behaviour, since the majority of people view their doctors as the most trusted source of health information¹⁶.

¹ <http://www.who.int/mediacentre/factsheets/fs211/en/>

² <http://www.who.int/weir/2012/wer8747.pdf>

³ Siriwardena A.N. Increasing Evidence that Influenza is a Trigger for Cardiovascular Disease, *The Journal of Infectious Diseases*, 2012

⁴ Smeeth, L., Thomas, S.L., Hall, A.J., Hubbard, R., Farrington, P. and Vallance, P. (2004) Risk of Myocardial Infarction and Stroke after Acute Infection or Vaccination. *The New England Journal of Medicine*, 351, 2611-2618. <http://dx.doi.org/10.1056/NEJMoa041747>

⁵ Madjid, M., Miller, C.C., Zarubaev, V.V., Marinich, I.G., Kiselev, O.I., Lobzin, Y.V., Filippov, A.E. and Casscells, S.W. (2007) Influenza Epidemics and Acute Respiratory Disease Activity Are Associated with a Surge in Autopsy-Confirmed Coronary Heart Disease Death: Results from 8 Years of Autopsies in 34,892 Subjects. *European Heart Journal*, 28, 1205-1210. <http://dx.doi.org/10.1093/eurheartj/ehm035>

⁶ <http://www.cdc.gov/flu/heartdisease/index.htm>

⁷ Wang, C.S., Wang, S.T., Lai, C.T., Lin, L.J. and Chou, P. (2007) Impact of Influenza Vaccination on Major Cause-Specific Mortality. *Vaccine*, 25, 1196-1203. <http://dx.doi.org/10.1016/j.vaccine.2006.10.015>

⁸ Sung, L.C., Chen, C.I., Fang, Y.A., Lai, C.H., Hsu, Y.P., Cheng, T.H., Miser, J.S. and Liu, J.C. (2014) Influenza Vaccination Reduces Hospitalization for Acute Coronary Syndrome in Elderly Patients with Chronic Obstructive Pulmonary Disease: A Population-Based Cohort Study. *Vaccine*, 32, 3843-3849. <http://dx.doi.org/10.1016/j.vaccine.2014.04.064>

⁹ Udell, J.A., Zawi, R., Bhatt, D.L., Keshtkar-Jahromi, M., Gaughran, F., Phrommintikul, A., Ciszewski, A., Vakili, H., Hoffman, E.B., Farkouh, M.E. and Cannon, C.P. (2013) Association between Influenza Vaccination and Cardiovascular Outcomes in High-Risk Patients. A Meta-Analysis. *Journal of the American Medical Association*, 310, 1711-1720. <http://dx.doi.org/10.1001/jama.2013.279206>

¹⁰ Siriwardena, A.N., Asghar, Z. and Coupland, C.C. (2014) Influenza and Pneumococcal Vaccination and Risk of Stroke or Transient Ischaemic Attack—Matched Case Control Study. *Vaccine*, 32, 1354-1361. <http://dx.doi.org/10.1016/j.vaccine.2014.01.029>

¹¹ Barnes M., Heywood A., Mahimbo A et al. Acute Myocardial Infarction and Influenza: A Meta-Analysis of Case-Control Studies. *Heart*, 2015. Published online: <http://heart.bmj.com>

¹² Hollmeyer, H., Hayden, F., Poland, G. and Buchholz, U. (2009) Influenza Vaccination of Healthcare Workers in Hospitals—A Review of Studies on Attitudes and Predictors. *Vaccine*, 27, 3935-3944. <http://dx.doi.org/10.1016/j.vaccine.2009.03.056>

¹³ Poland, G., Tosh, T. and Jacobson, R.M. (2005) Requiring Influenza Vaccination for Healthcare Workers: Seven Truths We Must Accept. *Vaccine*, 23, 2251-2255. <http://dx.doi.org/10.1016/j.vaccine.2005.01.043>

¹⁴ Ahmed, F., Lindley, M.C., Allred, N., Weinbaum, C.M. and Grohskopf, L. (2014) Effect of Influenza Vaccination of Healthcare Personnel on Morbidity and Mortality among Patients: Systematic Review and Grading of Evidence. *Clinical Infectious Diseases*, 58, 50-57. <http://dx.doi.org/10.1093/cid/cit580>

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