BACKGROUND:
Immunosuppressed cancer patients are at increased risk of serious influenza-related complications. Guidelines, therefore, recommend influenza vaccination for these patients. However, data on vaccine effectiveness in this population is lacking, and the value of vaccination in this population remains unclear.

OBJECTIVES:
To assess the effectiveness of influenza vaccine in immunosuppressed adults with malignancies. The primary review outcome is all-cause mortality, preferably at the end of the influenza season. Influenza-like illness (ILI, a clinical definition), confirmed influenza, pneumonia, any hospitalization and influenza-related mortality were defined as secondary outcomes.

SEARCH METHODS:
We searched the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE and LILACS databases up to August 2013. We searched the following conference proceedings: ICAAC, ECCMID, IDSA (infectious disease conferences), ASH, ASBMT, EBMT (hematological), and ASCO (oncological) between the years 2006 to 2010. In addition, we scanned the references of all identified studies and pertinent reviews. We searched the websites of the manufacturers of influenza vaccine. Finally, we searched for ongoing or unpublished trials in clinical trial registry databases using the website.

SELECTION CRITERIA:
Randomized controlled trials (RCTs), prospective and retrospective cohort studies and case-control studies were considered, comparing inactivated influenza vaccines versus placebo, no vaccination or a different vaccine, in adults (16 years and over) with cancer. We considered solid malignancies treated with chemotherapy, haematological cancer patients treated or not treated with chemotherapy, cancer patients post-autologous (up to six months after transplantation) or allogeneic (at any time) hematopoietic stem cell transplantation.

DATA COLLECTION AND ANALYSIS:
Two review authors independently assessed the risk of bias and extracted data from
included studies adhering to Cochrane methodology. Meta-analysis could not be performed because of different outcome and denominator definitions in the included studies.

MAIN RESULTS:
We identified four studies: one RCT and three observational studies, including 2124 participants. One study reported results in person-years while the other three reported per person. The studies were performed between 1993 and 2012 and included adults with haematological diseases (two studies), patients following bone marrow transplantation (one study) and solid malignancies (three studies). Only two observational studies reported all-cause mortality; one showing an adjusted hazard ratio (HR) of 0.88 (95% CI 0.77 to 0.99) for death with vaccination and the other reporting an odds ratio (OR) of 0.43 (95% CI 0.26 to 0.71). The RCT reported a statistically significant reduction in ILI with vaccination, while no difference was observed in one observational study. Confirmed influenza rates were lower with vaccination in the three observational studies, the difference reaching statistical significance in one. Pneumonia was observed significantly less frequently with vaccination in one observational study, but no difference was detected in another or in the RCT. The RCT showed a reduction in hospitalizations following vaccination, while an observational study found no difference. No life-threatening or persistent adverse effects from vaccination were reported. The strength of evidence is limited by the low number of included studies and by their low methodological quality (high risk of bias).

AUTHORS' CONCLUSIONS:
Observational data suggests a lower mortality with influenza vaccination. Infection-related outcomes were lower or similar with influenza vaccination. The strength of evidence is limited by the small number of studies and by the fact that only one was a RCT. Influenza vaccination is safe and the evidence, although weak, is in favour of vaccinating adults with cancer receiving chemotherapy.

Clinical effectiveness of seasonal influenza vaccine among adult cancer patients.


Abstract:
BACKGROUND:
Patients with cancer are at increased risk of developing complications of influenza. In this study, the authors assessed the effectiveness of influenza vaccination among cancer patients.

METHODS:
A prospective, noninterventional cohort study was conducted during the 2010 to 2011 influenza season. The cohort included adult cancer patients with solid malignancies who were receiving chemotherapy and hematologic patients who had active disease. Patients who died between October and November 2010 (N = 43) were excluded. A comparison was made between patients who received the 2011 seasonal influenza vaccine with those who did not. The primary outcome was a composite of hospitalizations for fever or acute respiratory infections, pneumonia, and/or infection-related chemotherapy interruptions. All-cause mortality was a secondary outcome. A propensity-matched analysis was conducted based on the propensity for vaccination.

RESULTS:
Of 806 patients who were included, 387 (48%) were vaccinated. Factors that were associated independently with vaccination included past influenza vaccination, past pneumococcal vaccination, >6 months since cancer diagnosis, country of birth, and cancer type/status. The primary outcome occurred in 111 of 387 (28.7%) vaccinated patients versus 112 of 419 (26.7%) unvaccinated patients (P = .54). No association was observed between vaccination and the primary outcome in a propensity-matched analysis (N = 436) or during peak influenza activity. The mortality rate was 11.9% (46 of 387 patients) in vaccinated patients versus 19.1% (80 of 419 patients) in unvaccinated patients (P = .005). Vaccination retained a significant association with mortality on multivariable analysis (odds ratio, 2.31; 95% confidence interval, 1.4-3.79) and in a propensity-matched analysis (odds ratio, 2.39; 95% confidence interval, 1.32-4.32).

CONCLUSIONS:
Influenza vaccination was associated with lower mortality among cancer patients.
although an association with infection-related complications could not be demonstrated. The current results support efforts to promote influenza vaccination in patients with cancer.