Influenza vaccination of healthy adults was effective during the 1998 to 1999 flu season but not the 1997 to 1998 season

Bridges CB, Thompson WW, Meltzer MI, et al. **Effectiveness and cost-benefit of influenza vaccination of healthy working adults. A randomized controlled trial.** JAMA. 2000 Oct 4;284:1655-63.

QUESTION

Is influenza vaccination effective for preventing influenza-like illness (ILI) in healthy working adults?

DESIGN

Randomized {allocation concealed*}†, blinded (patients and clinicians),* controlled trial done during the flu seasons of 1997 to 1998 and 1998 to 1999.

SETTING

Dearborn, Michigan, United States.

PARTICIPANTS

2375 healthy adults who were 18 to 64 years of age, were full-time employees of the Ford Motor Company, and did not have any medical condition for which influenza vaccine was recommended or any contraindications to vaccination. 1184 adults (mean age 44 y, 79% men) participated during 1997 to 1998, with 95% follow-up, and 1191 (mean age 44 y, 76% men) participated during 1998 to 1999, with 99% follow-up.

INTERVENTION

During the 1997 to 1998 flu season, 595 adults were allocated to trivalent inactivated influenza vaccine, and 589 were allocated to a placebo injection of sterile saline. During the 1998 to 1999 season, 587 were allocated to influenza vaccine, and 604 were allocated to placebo.

MAIN OUTCOME MEASURES

Patient reports of ILI (feverishness or temperature ≥ 100° F plus cough or sore throat) and associated physician visits and lost work days during the influenza period.

MAIN RESULTS

During 1997 to 1998, vaccine efficacy (based on recipients with laboratory-confirmed influenza illness) was 50% (Table). Vaccine recipients reported 38% more ILI-related sick days (P = 0.01), 45% more lost work days (P = 0.047), and 378% more lost work hours for physician visits (P < 0.001) than did placebo recipients; ILIs and physician visits did not differ. During 1998 to 1999, vaccine efficacy was 86% (Table). Vaccine recipients reported 34% fewer ILIs and 34% fewer related sick days (P < 0.001 for both), 42% fewer physician visits (P < 0.001), 32% fewer lost work days (P = 0.002), and 47% fewer lost hours for physician visits (P < 0.001).

CONCLUSION

Influenza vaccination did not prevent influenza-like illness in healthy working adults during the 1997 to 1998 flu season but was effective during the 1998 to 1999 flu season.

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*See Glossary.

†Information provided by author.

Vaccine vs placebo for laboratory-confirmed influenza illness*

Year	Vaccine	Placebo	RRR (95% CI)	NNT (CI)
1997–98	2.2%	4.4%	50% (–77 to 86)	Not significant
1998–99	1.4%	10.2%	86% (47 to 96)	12 (7 to 27)

*Abbreviations defined in Glossary; RRR, CI, and NNT calculated from data in article.

COMMENTARY

Influenza vaccination is clinically effective and cost-effective in older persons (1). Using relatively conservative estimates of 40% for reducing hospitalization and death, influenza vaccination results in a savings of U.S. $2.32 per Medicare beneficiary (2). Furthermore, the cost per year of life gained is $145. These savings were calculated by subtracting hospital payment savings (for admission for pneumonia treatment) from vaccine program costs.

Hospitalization for influenza, however, is rare in young, healthy adults, so cost-effectiveness is harder to determine. Economic benefits are calculated by balancing the increased costs of vaccination (because of the need to take time off from work) with direct (physician visits and prescriptions) and indirect costs (lost time from work) from an influenza illness.

A previous randomized trial by Nichol and colleagues suggested that vaccination of healthy, working adults would save $47 per vaccinee (3). This analysis was limited by a relatively high calculated influenza attack rate (35%) that was determined by telephone interviews (4). To determine the generalizability of Nichol's findings, Bridges and colleagues studied the clinical effectiveness and societal cost-benefit of influenza vaccination over a 2-year period. Influenza infection was laboratory confirmed in a subset of patients. In the first year of the study, the vaccine and the most common circulating influenza virus were a poor match; this problem occurs about once every 10 years. Influenza vaccination provided neither clinical nor economic benefit in that year. In the second year of the study, vaccine efficacy was 86% (well in line with the typical 70% to 90% efficacy rate) with a more characteristic attack rate of 10%. Even in this year, vaccinating young, healthy adults against influenza resulted in a net cost of about $11 per vaccinee.

These data verify the clinical benefits of influenza vaccination, so physicians may confidently recommend vaccination for "any person who wishes to reduce the likelihood of becoming ill with influenza" (5). Unfortunately, no net societal economic benefit may be derived from vaccinating young, healthy persons. Sometimes doing the right thing costs us money.

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