Influenza vaccine and older people: an evidence-based policy?

INFLUENZA is a common respiratory illness that may affect up to 20% of the population annually, although only a small proportion of these may consult their doctor. For young, healthy adults, it can be an unpleasant illness, causing a significant increase in absenteeism, but it is rarely life-threatening. In older people, influenza infection is a major cause of hospitalization and mortality during winter months. In 1993 there were more than 13 000 excess deaths attributed to influenza in Britain.[1] Death rates are even higher during epidemic years; the most recent, in 1989/90, is estimated to have resulted in 29 000 excess fatalities in the UK, of whom more than 85% were over the age of 65.[2] Influenza vaccination could halve the attributed volume of deaths and morbidity. Nearly all influenza vaccinations in the UK are given in a primary care setting,[3] so general practitioners (GPs) and other members of the primary health care team have a major role to play in promoting vaccine uptake.

Many western countries use age (commonly 65 years and over) as the criterion for targeting their influenza immunization programmes.[4] The present UK policy advises GPs to offer vaccine only to institutionalized elderly people or those believed to be at high risk of medical complications.[5] While not necessarily implying that the UK policy is inappropriate, this disparity does perhaps indicate a need to review the rationale for the current guidelines. In a recent *Effectiveness Matters* bulletin distributed to GPs, the NHS Centre for Reviews and Dissemination summarized the evidence regarding the effectiveness of influenza vaccination in older people.[6] We concluded that it would be worthwhile to consider vaccinating all people over the age of 65.

The vaccine is highly effective at reducing mortality and morbidity from influenza in all older people. A recent systematic review of observational research studies compared 8000 people who had been vaccinated with 20 000 who had not, and showed that vaccination produced a reduction of more than 50% in cases of respiratory illness, pneumonia, hospitalization and mortality.[7] The studies included in this review examined the effects of vaccination mainly in institutionalized elderly people, and made no distinction between high-risk and low-risk status. However, a United Kingdom (UK) community-based study indicates that, for people over the age of 55, the vaccine reduces the risk of death by 90% for those at high risk and by 75% for others.[8] The effectiveness of vaccination in reducing rates of death and hospitalization in populations not at high risk is confirmed in recent United States (US) community studies.[9,10]

While the effect of the vaccine in reducing the risk of death is similar in both patient groups (relative risk reduction), the numbers of deaths avoided in the high-risk group will obviously be greater because more people in this group die (absolute benefit). The number of deaths prevented will depend on the attack rate of the virus in any given year. Using UK mortality data and the effectiveness figures from the previous UK study,[8] it is possible to estimate that, in 1989, the number of older people who would have needed to be vaccinated to prevent one death would have been 40 in high-risk groups and 240 in other groups. In 1993 (a year with a lower attack rate),[1] these figures would have been 80 and 500 respectively. Given the low cost of the vaccine (around £5 a dose), influenza immunization appears to be highly cost-effective.

The aim of health care is not just to increase the chances of survival but to improve the quality of life. Many older people identified as high risk have a poor quality of life and a short life expectancy compared with those who have no chronic medical conditions. While the number of lives saved may be lower for older people who are not at high risk, the gain in quality of life for each death avoided will be greater.

The modern vaccine is also very safe. It includes only inactivated viruses that cannot cause influenza. Two randomized placebo-controlled trials have also established that systemic side effects occur with the same frequency in those receiving a placebo as they do in vaccinated groups.[11-12] Local side effects occur in up to 20% of vaccinated people, causing a soreness or swelling at the injection site; this is usually mild and subsides within 48 hours of vaccination.

It is important that interventions are not only clinically effective but also cost-effective. Some of the costs of influenza vaccination will be offset by reducing influenza-related hospitalizations. In New Zealand it has been calculated that the vaccination of all people over 65 would result in a net saving to the health service of around NZ$19.67 million.[13] A cost-effectiveness study conducted in the US on people over the age of 65 showed that for nine influenza seasons there was a net saving of US$6.11 for each high-risk person vaccinated, and a net cost of US$4.82 for each elderly person not at high risk. Overall, the policy of immunizing everyone over 65 saved an average of US$1.10 per vaccination.[10] The results of these studies may not be directly applicable to the UK because of differences in the utilization of health services and the cost of vaccine. However, given the likely effects on survival, these studies provide strong evidence to support the view that vaccinating the majority of over-65s would be one of the most cost-effective preventive interventions routinely available in the NHS. The overall financial impact will depend upon a number of factors, including the influenza attack rate, hospital bed occupancy rate and length of stay.[14]

The present Department of Health guidelines result in a variation in immunization policy between GPs, so raising equity issues. High-risk criteria can also result in policies that discriminate against people who have led healthier lifestyles. The adoption of a policy to consider all over-65s for vaccination would ensure that older people are treated equally and would also help to improve the coverage of high-risk groups, now typically less than 40%.[3]

Immunization of older people against influenza is likely to be one of the most cost-effective primary health care interventions available for general practice. At a time when there are serious concerns in the NHS about the shortage of hospital facilities, it would be prudent to consider vaccinating all older people. The Department of Health has been promoting a more evidence-based approach to health care. Though definitive cost-effectiveness data based on trials are lacking, the research evidence in this area strongly suggests that GPs would be wise to review their practice policy and consider all people over 65 as possible candidates for influenza vaccination.

MATTHEW D BRADLEY
Research fellow, NHS Centre for Reviews and Dissemination, University of York

TREVOR A SHELDON
Director, NHS Centre for Reviews and Dissemination, University of York

IAN S WATT
Dissemination manager, NHS Centre for Reviews and Dissemination, University of York

References

1. Fleming DM. The impact of three influenza epidemics on primary care in England and Wales. *PharmacoEconomics* 1996; **9** Suppl 3: 38-45.
2. Ashley J, Smith T, Dunnell K. Deaths in Great Britain associated with the influenza epidemic of 1989/90. *Popul Trends* 1991; **65:** 16-20.
3. Nguyen-Van-Tam JS, Nicholson KG. Influenza immunization; vaccine offer, request and uptake in high-risk patients during the 1991/2 season. *Epidemiol Infect* 1993; **111:** 347-355.
4. Nicholson KG, Snacken R, Palache AM. Influenza immunization policies in Europe and the United States. *Vaccine* 1995; **13:** 365-369.
5. Department of Health. Immunization against infectious disease (Green Book). London: HMSO, 1996.
6. NHS Centre for Reviews and Dissemination, University of York. Influenza vaccination and older people. *Effectiveness Matters* 1996; **2:** 1-4.
7. Gross PA, Hermogenes AW, Sacks HS, *et al.* The efficacy of influenza vaccine in elderly persons: A meta-analysis and review of the literature. *Ann Inter Med* 1995; **123:** 519-527.
8. Fleming DM, Watson JM, Nicholas S, *et al.* Study of the effectiveness of influenza vaccination in the elderly in the epidemic of 1989-90 using a general practice database. *Epidemiol Infect* 1995; **115:** 581-589.
9. Baker W, Raubertas R, Menegus M, *et al.* Case control study of influenza vaccine effectiveness in preventing pneumonia hospitalisation among older persons, Monroe County, New York, 1989-1992. In: Hannoun C, Kendal AP, Klenk HD, Ruben FL (eds). *Options for the control of influenza II.* Amsterdam: Elsevier Science Publishers, 1993.
10. Mullooly JP, Bennett, MD, Hornbrook MC, *et al.* Influenza vaccination programs for elderly persons: Cost-effectiveness in a Health Maintenance Organization. *Ann Intern Med* 1994; **121:** 947-952.
11. Govaert TME, Aretz K, Masurel N, *et al.* Adverse reactions to influenza vaccine in elderly people. *BMJ* 1993; **307:** 988-990.
12. Margolis KL, Nichol KL, Poland GA, *et al.* Frequency of adverse reactions to influenza vaccine in the elderly. *JAMA* 1990; **264:** 1139-1141.
13. Scott WG, Scott HM. Economic evaluation of vaccination against influenza in New Zealand. *PharmacoEconomics* 1996; **9:** 51-60.
14. Jefferson TO, Demicheli V. Economic evaluation of influenza vaccination and economic modelling. Can results be pooled? *PharmacoEconomics* 1996; **9:** 67-72.

Address for correspondence

Dr Matthew Bradley, NHS Centre for Reviews and Dissemination, University of York, York YO1 5DD.

Exercise prescription in primary care

EXERCISE prescription is in the news. The Royal College of General Practitioners' conference on 'Sport and health: Fitness for the over 50s' summarized the physical and social benefits of exercise for older age groups,[1] and the Health Education Authority (HEA) began a new campaign in 1996, 'Action for life', to encourage all of us to be more active.[2] In March this year the second phase was launched, 'Action for later life', at an international conference in Birmingham. Yet, in 1994, Iliffe *et al* warned against enthusiastically promoting unproven strategies and urged further research studies.[3] So, what is the current state of knowledge?

The benefits of exercise are clear. Observational studies show that active adults live longer, have lower blood pressure, suffer less from coronary artery disease, diabetes mellitus, osteoporosis, colonic cancer and depression, and have greater self-esteem.[4] The active elderly have even more tangible benefits, such as better coordination, mobility, strength and endurance.[5] A sedentary lifestyle has been known to be a significant risk factor for coronary artery disease (alongside smoking, hypertension and hyperlipidaemia), but its prevalence of 70% in those adults who lead a sedentary lifestyle is much higher than in those with the other risk factors (30%, 15% and 30% respectively).[6] There is some evidence that adopting a more active lifestyle in later life delays the onset of ischaemic heart disease and improves prognosis after myocardial infarction.[7] Exercise programmes may also help the elderly achieve significant gains in functional mobility and strength, such as the ability to rise from a chair or walk unaided.[8]

Risks from physical activity are relatively minor. Violent, unaccustomed exercise, severe enough to cause gasping for breath, such as playing squash, is associated with a higher incidence of myocardial infarction and death in the following 24 hours, but regular, vigorous exercise protects against such events.[9] Moderate intensity exercise carries a very low risk of injury, but there is still controversy about the incidence of osteoarthritis of the hip in runners.[10]

Activity may be increased for little financial cost. This, combined with its numerous potential advantages, produces a high cost–benefit ratio. It has been estimated that if more people were less sedentary, between a third and a quarter of strokes and heart attacks, and one quarter of non-insulin dependent diabetes in people aged over 45 could be avoided, and hip fractures halved.[11,12] The importance of diet and exercise in the treatment of common general practice conditions has recently been reviewed.[13]

Longitudinal research studies initially emphasized the value of three periods of vigorous activity per week, defined as enough to induce sweating and breathlessness.[14] More recent evidence suggests that less vigorous exercise, such as walking, is equally beneficial, and the latest recommendation is for five 30-minute periods (or ten 15-minute periods) of exercise per week,[15] and forms the basis of the HEA's current policy. This is an important message as many people perceive that becoming more active is associated with sports and extreme fitness, which may act as a barrier to change.[16]

What interventions work? Hillsdon *et al*,[17] in their review of the literature, could find only 10 randomized controlled trials of interventions specifically designed to increase physical activity. Nine were from the United States and one from Switzerland, with none from primary care or the United Kingdom. The successful outcomes were associated with home-based programmes, using unsupervised, informal exercise, usually moderate intensity walking, and were associated with frequent, brief professional contact, often by short telephone calls. These programmes are the opposite of most recommended regimes tried in primary care.

There have been three main types of primary care approach to exercise prescription: first, by referral to a leisure centre; secondly, by referral to an exercise specialist working within the community; and thirdly, by referral to a member of the primary health care team (PHCT). An HEA survey of England in 1993 found 121 leisure centre prescription schemes in operation.[18] A review in Sussex of 729 patients referred by their general practitioner (GP) to their local leisure centre found that only 22% completed the 20-session course. Although men and older people

were slightly better at compliance, the referring GP was found to be the most important predictor of success, with a four-fold difference of completion rates between referring doctors.[1] Similar compliance rates were found in a controlled evaluation of the project, but those that did adhere demonstrated health gains.[19]

Preliminary results from an evaluation of an inner city exercise prescription scheme in London suggest that general practitioners see exercise as a form of alternative therapy, and that it is used as such by patients who are relatively young and active, but with psychological, social and emotional difficulties (see-Tai S, Smith P, Gould MM, Illife S. Characteristics of patients attending an inner city prescription for exercise scheme. Unpublished manuscript).

A trial of a primary care-based intervention using an exercise specialist is currently being undertaken in Sheffield (J Munro, personal communication, 1996), and there is a community-based intervention, not involving PHCT members, under way in Wellingborough (M Hillsdon, personal communication, 1996). A health visitor intervention of various health promotional activities was successful at increasing reported exercise activity,[20] as was a GP, using personal example and leaflets.[21] There have been no studies of other members of the PHCT. The successful criteria found by Hillsdon *et al*[17] could easily be met in primary care, perhaps best by practice nurses. This potential further call on their time might be mitigated by reducing the number of consultations and prescriptions, and could be a more effective health promotion strategy than their current work.

Physical activity has been shown to be associated with many health and social benefits. Those changing to a more active lifestyle experience those benefits. The HEA campaign is to get more people more active more often. It is a low-cost, low-technology, non-drug intervention. How we can best prescribe it in primary care, particularly from within the PHCT, still needs more research.

FRANK SMITH
Senior lecturer in general practice and primary care,
St George's Hospital Medical School, London

STEVE ILIFFE
Reader in primary care,
University College London Medical School

References

1. Smith F R. Sport and health: Fitness for the over 50's. [Connection pVII.] *Br J Gen Pract* 1996; **46:** January.
2. Health Education Authority. *Health update 5: Physical activity.* London: Health Education Authority, 1995.
3. Iliffe S, Tai S, Gould M, *et al.* Prescribing exercise in general practice. *BMJ* 1994; **309:** 494-495.
4. Fentem PH. Benefits of exercise in health and disease. *BMJ* 1994; **308:** 1291-1295.
5. Elward KE, Larson EB. Benefits of exercise for older adults: a review of existing evidence and current recommendations for the general population. *Clin Geriatr Med* 1992; **8:** 35-50.
6. Bennett N, Dodd T, Flatley J, *et al. Health survey for England 1993.* London: Office of Population Censuses and Surveys, 1995.
7. Posner JD, Gorman KM, Gitlin LN, *et al.* Effects of exercise training in the elderly on the occurrence and time to onset of cardiovascular diagnoses. *J Am Geriatr Soc* 1990; **38:** 205-212.
8. Fiatrone MA, O'Neill EF, Ryan ND, *et al.* Exercise training and nutritional supplementation for physical frailty in very elderly people. *NEJM* 1994; **330:** 1769-1775.
9. Mittleman MA, Maclure M, Tofler GH, *et al.* Triggering of acute myocardial infarction by heavy physical exertion: protection against triggering by regular exertion. *N Engl J Med* 1993; **329:** 1677-1683.
10. Ernst E. Jogging for a healthy heart and worn-out hips? *J Intern Med* 1990; **228:** 295-297.
11. Nichol J. Health and healthcare costs and benefits of exercise. *PharmacoEconomics* 1994; **5:** 109-122.
12. Bassey EJ. Exercise in the prevention of osteoporosis in women. *Ann Rheum Dis* 1995; **54:** 861-162.
13. Little P and Margetts B. The importance of diet and physical activity in the treatment of conditions managed in general practice. *Br J Gen Pract* 1996; **46:** 187-192.
14. Blair SN, Kohl HW, Paffenbarger RS, *et al.* Physical fitness and all cause mortality: A prospective study of healthy men and women. *JAMA* 1989; **262:** 2395-2401.
15. Pate RP, Pratt M, Blair SN, *et al.* Physical Activity and Public Health: a recommendation from the Centres for Disease Control and Prevention and the American College of Sports Medicine. *JAMA* 1995; **273:** 402-407.
16. Godin G, Desharnis R, Valois P, *et al.* Differences in perceived barriers to exercise between high and low attenders: observations among different populations. *American Journal of Health Promotion* 1994; **8:** 279-285.
17. Hillsdon M, Thorogood M, Antiss T, Morris J. Randomised controlled trials of physical activity promotion in free living populations: a review. *J Epidemiol Community Health* 1995; **49:** 448-453.
18. Biddle S, Fox K, Edmund L. *Physical activity promotion in primary health care in England.* London: Health Education Authority, 1994.
19. Taylor AH. *Evaluating GP exercise referral schemes: findings from a randomised controlled study.* Eastbourne: University of Brighton, 1996.
20. Cupples ME, McKnight A. Randomised controlled trial of health promotion in general practice for patients at high cardiovascular risk. *BMJ* 1994; **309:** 993-996.
21. Campbell MJ, Browne D, Waters WE. Can general practitioners influence exercise habits? A controlled trial. *BMJ* 1985; **290:** 1044-1046.

Address for correspondence

Dr F R Smith, Division of General Practice and Primary Care, Level 6 Hunter Wing, St George's Hospital Medical School, Cranmer Terrace, London SW17 0RE.