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Influenza Vaccination in 29 Countries
An Update to 1997

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Abstract

Objective: This report updates for 1996 and 1997 our 2 earlier reports on the use of influenza vaccination in various countries.

Methods: Methods for obtaining information on influenza vaccine use from 1980 to 1995 in each country are described in our earlier reports. The current report includes data for 29 countries.

Results: Among 16 countries of Western Europe, vaccine use increased substantially in The Netherlands, Finland (1996) and in Ireland (1997). In the remaining 13 countries, vaccine use increased somewhat or remained the same. In the US, vaccine use increased steadily throughout the 1990s, reaching a level of 281 doses per 1000 population in 1997. In New Zealand, there was a substantial increase in 1997, while vaccine use remained relatively unchanged in Canada, Australia and Korea. In Japan and Singapore, little or no influenza vaccine was used. In 1997, 6 countries in Central Europe used modest amounts of influenza vaccine. Among all 29 countries, in 1997 all but 3 (the UK, Ireland and Denmark) had age-based recommendations for influenza vaccination. This changed in 1998 when the UK and Denmark recommended vaccination for persons ≥75 years and ≥ 65 years of age, respectively. Ireland is considering an age-based recommendation. Many countries provide reimbursement for influenza vaccination through national or social health insurance, at least for some recommended groups. In virtually all countries, however, many persons pay for vaccination themselves. The levels of vaccine use in different countries are not related to per capita healthcare spending. Instead, they reflect different levels of awareness of influenza as an important disease and the effectiveness of vaccination in its prevention.

Conclusions: Influenza vaccination has continued to increase or has stabilised in most developed countries, and vaccine is also being used in several developing countries. In spite of much progress, however, the full benefits of influenza vaccination have yet to be achieved in any country.

In 2 earlier reports, we described the use of influenza vaccine in 22 countries from 1980 to 1995.[1,2] During this period, influenza vaccination increased substantially in most of these countries, especially during the 1990s. Since 1995, influenza vaccine use, vaccination recommendations and reimbursement policies for vaccination have changed in a few of these 22 countries. In addition, information on influenza vaccination has been obtained from 6 countries in Central Europe and from Singapore. In this report, we update our findings for these 29 countries through 1997.

Methods

Methods for obtaining information on influenza vaccine use from 1980 to 1995 in each country are described in our earlier reports.[1,2] Annual vaccine use is expressed as the number of doses distributed (less unused doses returned) per 1000 total population in each country. New data on vaccine distribution in 1996 were obtained for all 22 countries included in our more recent report,[2] and in 1997 for all countries except the Republic of Korea. Since 1996, vaccine distribution in the US has not been reported for the calendar year.[1,2] Instead, data are reported for the last half of one year and the first half of the next, subtracting unused doses returned during the last 3 months of the first year and the first 9 months of the next. For this reason, all US rates for the period 1990 to 1995 were recalculated using the new reporting formula. Vaccine distribution in 1997 was reported for 6 countries in Central Europe: Poland, the Czech Republic, Slovakia, Romania, Slovenia and Croatia. Similar data for 1997 were also obtained for Singapore.

For all 29 countries, recommendations for influenza vaccination and policies for reimbursement for vaccination in 1997 were reported. Information on 1997 healthcare expenditures per capita in the 22 countries included in our earlier report was obtained from the Organisation for Economic Cooperation and Development.[3]

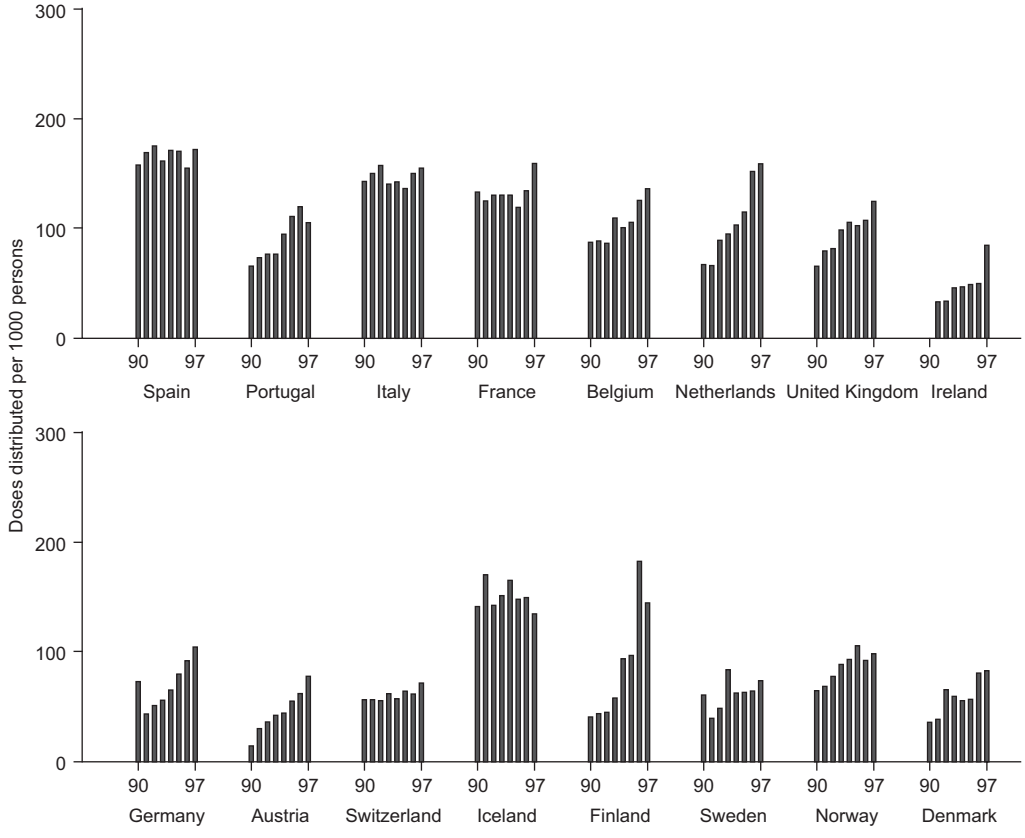

Fig. 1. Influenza vaccination in 16 countries in Western Europe, 1990 to 1997. Vaccination levels are shown as the number of doses of influenza vaccine distributed per 1000 total population.

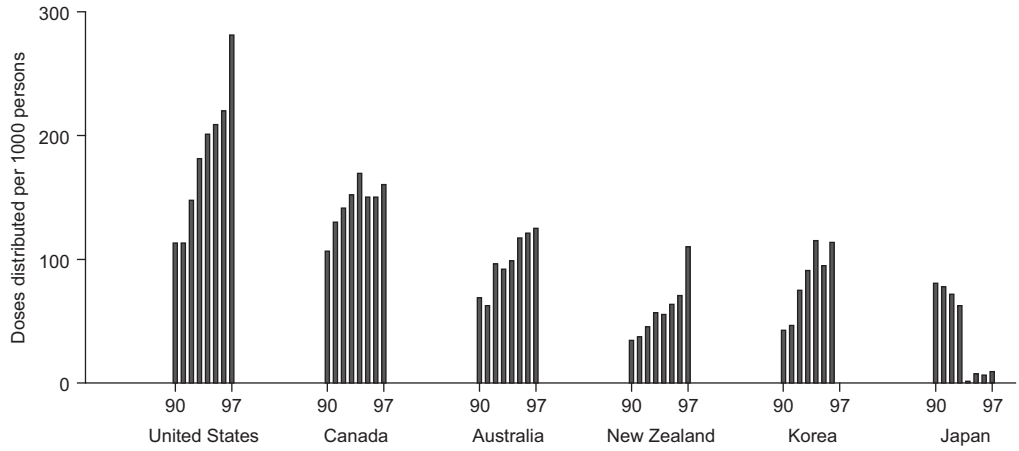

Fig. 2. Influenza vaccination in 6 countries in North America, Australasia and East Asia, 1990 to 1997. Vaccination levels are shown as the number of doses of influenza vaccine distributed per 1000 total population. Vaccine distribution rates for the US for 1990 to 1995 have been recalculated using a new reporting formula (see methods section for details). Information on vaccine distribution in the Republic of Korea in 1997 was not available.

Results

The annual levels of influenza vaccine distributed in 16 countries in Western Europe during the period 1990 to 1997 are shown in figure 1. (Vaccine distribution levels in these countries during the period 1980 to 1989 were reported earlier.[1,2]) During the 2 most recent years, vaccine distribution increased substantially in 3 countries (The Netherlands, Ireland and Finland) and showed modest increases in 6 others (France, Belgium, the UK, Germany, Austria and Denmark). Vaccine use in the remaining 7 countries was little changed compared with previous years.

Influenza vaccine distribution in 6 countries of North America, Australasia and East Asia during the 1990 to 1997 period is shown in figure 2. Vaccine use in the US showed a steady increase from one year to the next throughout this period. In New Zealand, there was a large increase in vaccine use in 1997. During 1996 and 1997, vaccine use in Canada, Australia and Korea was similar to that in previous years and it remained very low in Japan. In addition, influenza vaccine distribution in Singapore in 1997 (not shown in figure 2) was <1 dose per 1000 population.

Information on influenza vaccine distribution in 1997 for 6 countries in Central Europe is shown in table I. None of these countries achieved levels of vaccine use similar to those in the other countries shown in figures 1 and 2, except for Japan. Unfortunately, data on vaccine distribution during earlier years were unavailable.

Table II shows the recommendations for influenza vaccination and methods of reimbursement for vaccination of recommended groups in the 29 countries. In 1997, Japan issued its first recommendations for influenza vaccination of elderly persons and others with high risk conditions. All but 3 of the remaining countries (the UK, Ireland and Denmark) recommended vaccination for all persons above a certain age, usually ≥65 years. All of these 29 countries recommended vaccination for

Table I. Influenza vaccination in Central Europe, 1997

Country	Number of doses distributed per 1000 population
Slovenia	53
Croatia	39
Slovakia	32
Poland	23
Czech Republic	21
Romania	11

Table II. Recommendations for influenza vaccination and reimbursement for vaccination of recommended groups in 29 countries in 1997

Country	High risk conditions or groups								Cost of influenza vaccination is reimbursed by national or social health insurance			
	all persons ≥65 years	cardio-pulmonary	meta-bolic[a]	immuno-compromised[a]	nursing home residents	others at risk[b]	healthcare workers	occupational groups	for all groups	for certain groups	private health insurance	self-payment
Western Europe												
Spain	Yes	Yes	Yes	Yes	Yes	Yes	–[c]	Yes	Yes	–	–	–
Portugal	Yes	Yes	Yes	Yes	Yes	–	–	–	Yes	–	–	–
Italy	Yes	Yes	Yes	Yes	–	Yes	Yes	Yes	–	Yes	–	Yes
France	Yes[d]	Yes	Yes	Yes	Yes	–	Yes	–	Yes	–	–	Yes
Belgium	Yes	Yes	Yes	Yes	Yes	Yes	–	–	–	Yes[e]	–	Yes
The Netherlands	Yes	Yes	Yes	Yes	–	Yes	–	–	Yes	–[f]	–	Yes
United Kingdom	–	Yes	Yes	Yes	Yes	Yes	–	–	Yes	–	–	–
Ireland	–	Yes	Yes	Yes	Yes	Yes	–	–	–	Yes[g]	–	Yes
Germany	Yes[h]	Yes	Yes	Yes	Yes	Yes	Yes	Yes[i]	Yes	–	–	–
Austria	Yes	Yes	Yes	Yes	Yes	–	Yes	Yes	–	–	–	Yes
Switzerland	Yes	Yes	Yes	Yes	Yes	Yes	Yes	–	–	Yes[f]	–	Yes
Iceland	Yes[h]	Yes	Yes	Yes	Yes	–	Yes	–	–	–	–	Yes
Finland	Yes	Yes	Yes	Yes	–	Yes	–	–	–	Yes	–	Yes
Sweden	Yes	Yes	Yes	Yes	–	–	–	–	–	–	–	Yes
Norway	Yes	Yes	–	Yes	Yes	–	Yes	–	–	Yes	–	Yes
Denmark	–	Yes	–	Yes	Yes	Yes	–	–	–	–	Yes	Yes
North America, Australasia and East Asia												
United States	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	–	Yes[f]	Yes	Yes
Canada	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	–	–	–
Australia	Yes	Yes	Yes	Yes	Yes	–	Yes	–	–	Yes	–	Yes
New Zealand	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	–	Yes[f]	–	Yes
Korea	Yes	Yes	Yes	Yes	Yes	Yes	–	–	–	–	–	Yes
Japan	Yes	Yes	Yes	Yes	–	–	–	–	–	–	–	Yes
Singapore	Yes	Yes	Yes	Yes	Yes	–	–	–	–	–	–	Yes
Central Europe												
Slovenia	Yes[h]	Yes	Yes	Yes	–	Yes	Yes	Yes	Yes	–	–	Yes
Croatia	Yes	Yes	Yes	Yes	–	–	Yes	–	Yes	–	–	–

Table II continued

persons with cardiopulmonary diseases, and almost all recommended it for persons with metabolic disorders (e.g. diabetes mellitus) and diseases associated with suppression of the immune system. Most also recommended vaccination for residents of nursing homes and long term care facilities, but fewer had recommendations for healthcare workers and those in certain occupational groups such as the police and fire services.

Few countries had national or social health insurance systems that provided reimbursement for influenza vaccination of all persons for whom it was recommended (table II). However, most provided such reimbursement for those above a certain age. Private health insurance seldom included influenza vaccination as a covered benefit, and in most countries persons for whom vaccination was recommended often had to pay for part or all of the costs themselves.

In figure 3, the relationship between influenza vaccine distribution and the level of healthcare spending per capita in 1997[3] is shown for 22 of the 29 countries. Although both vaccine use and per capita healthcare expenditures were highest in the US, there was no correlation between these two for the other countries. For example, vaccine use was relatively high in Spain and the UK, countries with relatively low per capita expenditures on healthcare. The situation was the reverse in Germany, Denmark and Switzerland, and decidedly so in Japan.

Discussion

In Western European countries, influenza vaccination generally increased or remained more or less the same during 1996 and 1997 compared with the earlier 1990s. In a few countries there were substantial increases in vaccine use. In The Netherlands, favourable results from a cost-effectiveness analysis[4] led to an expansion of vaccination recommendations to include all persons ≥65 years of age. In 1996, demand for the vaccine actually outstripped supply, and in 1997 demand rose to an even higher level. In Finland, the increase in vaccine use noted in 1994 and 1995[2] continued,

Slovakia	Yes	Yes	Yes	Yes	NA	Yes	Yes	Yes	–	Yes	Yes	Yes
Poland	Yes	Yes	Yes	Yes	–	–	Yes	Yes	–	–	–	Yes
Czech Republic	Yes	Yes	Yes	–	Yes	Yes	Yes	Yes	–	Yes	–	Yes
Romania	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	–	Yes	–	–

a Persons with renal diseases or on dialysis are considered in the metabolic or immunocompromised risk groups.

b Others at risk include children on long term aspirin therapy (US, Canada, The Netherlands, Romania), children with asthma (US, Romania), women in the third trimester of pregnancy during influenza seasons (US), household contacts of high risk individuals (US, Canada), frequent staphylococcal infections (Belgium), furunculosis (The Netherlands), and institutionalised mentally retarded persons (The Netherlands).

c Indicates not recommended or not reimbursed.

d ≥70 years.

e 40% reimbursement for person ≥65 years of age.

f ≥65 years.

g Reimbursement for low-income persons ≥65 years of age.

h ≥60 years.

i Persons in frequent contact with the public, such as teachers and sales personnel.

NA = information is not available.

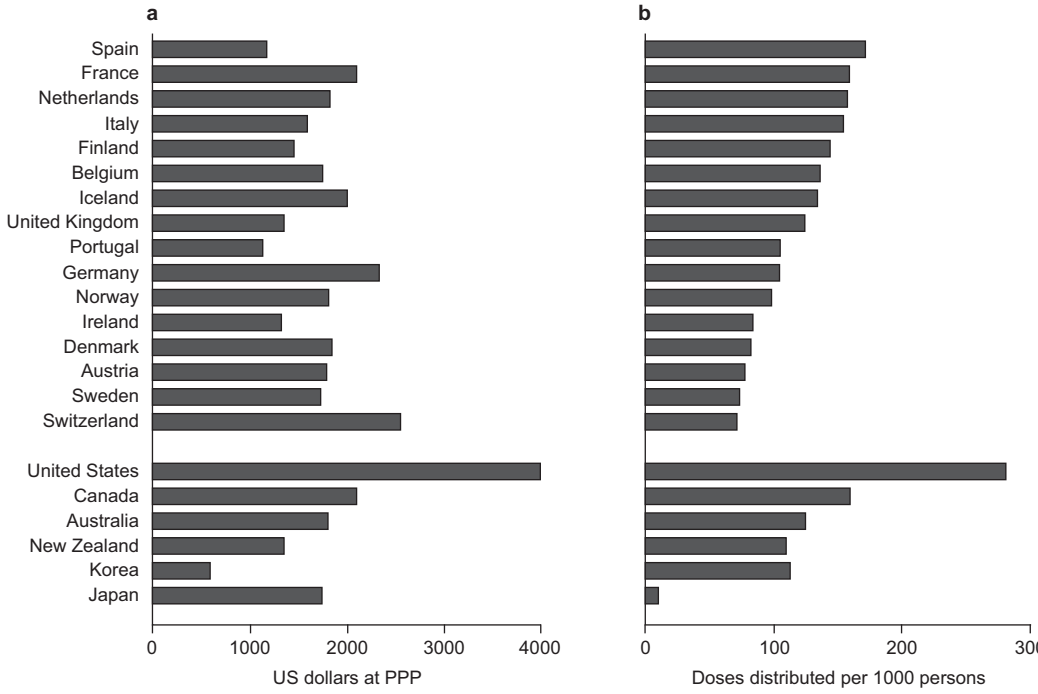

Fig. 3. Healthcare expenditures per capita (**a**) and influenza vaccine distribution (**b**) in 22 countries in 1997. In the Republic of Korea, vaccine distribution is shown for 1996 because 1997 data were unavailable. Data for healthcare expenditures per capita are adjusted for purchasing power parity (PPP).[3]

reaching 182 doses per 1000 population in 1996. These changes were the result of active promotion of vaccination by health authorities, not changes in recommendations or reimbursement policies. A comparable increase (albeit starting from a lower level) was observed in Ireland in 1997. Again, this increase was not due to a change in vaccination recommendations.[5] Vaccination continued to be recommended only for persons with high risk conditions (not, as stated in error in our earlier report, for all persons ≥65 years of age[2]), but it was more vigorously promoted by health officials and provided free of charge to persons with low incomes in recommended groups.

In France, Belgium, the UK, Germany, Austria and Denmark, the use of influenza vaccine in 1996 and 1997 was also somewhat increased over earlier levels, although there were no changes in recommendations or reimbursement policies. In the remaining countries of Western Europe, vaccine use during 1996 and 1997 was little changed compared with previous years in high use (Spain, Italy; >150 doses per 1000 population), moderate use (Portugal; 119 and 105 doses per 1000 population, respectively) and low use (Switzerland, Sweden and Norway; <100 doses per 1000 population) countries.

Vaccine coverage levels were reported in only a few Western European countries. In France, it was estimated that more than 70% of persons ≥70 years of age were vaccinated,[6] while in Belgium the estimate among persons ≥65 years of age was 45 to 50%.[7] More limited data from 3 regions in Italy indicated that in 1995 vaccination rates among the elderly were 26, 32 and 49%, respectively.[8]

Among the countries outside Western Europe, the US continued its vigorous expansion of in-

fluenza vaccination, a change first noted in 1991. Vaccine use increased markedly in 1993 with the initiation of federal reimbursement for all persons ≥65 years of age.[2] In 1997, vaccine use reached a level of 281 doses per 1000 population, and coverage among persons ≥65 years of age was estimated to be 65.5%.[9] Although coverage differed among racial/ethnic groups (67.2, 57.9 and 50.2% in non-Hispanic Whites, Hispanics and non-Hispanic Blacks, respectively), overall it exceeded the Public Health Service goal of ≥60% in 45 of 50 states.

Vaccination levels remained relatively constant in Canada and Australia, but showed substantial improvement in New Zealand in 1997. A favourable cost-effectiveness analysis,[10] the introduction of public reimbursement for all persons aged ≥65 years, and greater promotional efforts by health authorities account for this change. Levels of vaccine use were relatively unchanged in Korea in 1996 (no data were available for 1997) and showed only minimal improvement in Japan: 8, 7 and 10 doses per 1000 of the population in 1995, 1996 and 1997, respectively.

For the 22 countries in Western Europe, and for North America, Australasia and East Asia, the level of influenza vaccine use in any given country in 1997 appeared to have little if any relationship with the per capita level of healthcare spending (fig. 3). This conclusion is reinforced by the observation that, in several countries (the US in 1993, The Netherlands and Finland in 1996, and Ireland and New Zealand in 1997), large increases in vaccine use were observed compared with the previous year without comparable increases in healthcare spending.[3] Moreover, Japan and Singapore, 2 countries with high levels of economic development, used little or no influenza vaccine. The levels of vaccine use in these 22 countries appeared to reflect more closely each country's vaccination recommendations and reimbursement policies, and these in turn appeared to reflect more generally the importance of the public and professional understanding of influenza as a disease and the effectiveness of vaccination in its prevention.

Several changes have occurred recently that will probably result in further increases in influenza vaccination. In 1997, all western countries except the UK, Ireland and Denmark had age-based vaccination recommendations (table II). These recommendations reflected a common understanding that the vaccine is similarly protective in elderly persons with and without high risk conditions,[11] and that annual vaccination of all elderly persons, not just those with high risk conditions, is highly cost effective.[4,11,12] In 1998, Denmark adopted a recommendation to vaccinate all persons ≥65 years of age. Whether the influenza vaccination policy in the UK should include an age cut-off was the subject of increasing discussion in the mid-1990s[13] and, in 1998, the recommendation was changed to include all persons ≥75 years of age.[14] Discussions are currently underway on whether to adopt a similar recommendation in Ireland.

The limited findings from Central Europe in 1997 indicate that influenza vaccination is expanding to include several rapidly developing countries. In Argentina, for example, vaccine use increased from 7 to 36 doses per 1000 of the population during the 5-year period from 1993 to 1997 (D. Stamboulian, personal communication, May 1998). Noticeable increases in vaccination have also been recently observed in Uruguay and Taiwan (D.S. Fedson, unpublished observation).

It is unknown whether the continuing expansion of influenza vaccination in developed countries reflects primarily higher coverage in elderly persons, in younger persons with high risk conditions or in healthy working adults. Vaccination is clinically effective and cost effective in all 3 groups.[4,11,12,15] Yet, current evidence from the US indicates that, although vaccine coverage in the elderly has reached the target level of 60%, coverage levels in younger persons with high risk conditions are much lower.[9] In other countries where much less vaccine has been used, coverage levels in younger high risk individuals are undoubtedly even lower than they are in the US, and the vaccine is probably little used in healthy working adults. Vigorous ef-

forts to extend vaccination to these younger age groups would almost certainly add to the health and economic benefits already being realised by current levels of vaccine use. Moreover, these efforts would help prepare physicians and health officials to vaccinate younger individuals who, in addition to the elderly, will be at a greatly increased risk of hospitalisation and death should a new influenza pandemic arrive.[15,16]

The European Scientific Working Group on Influenza (ESWI) will continue to document influenza vaccine distribution, recommendations and reimbursement in the 29 countries that are the subject of this report. The ESWI investigators are eager to add other countries to those already being followed. Anyone interested in contributing to this project is urged to contact either one of the main authors of this report.

Conclusion

During the period up through 1997, the use of influenza vaccine has continued to increase in some developed countries and stabilised in the rest. The vaccine is also being used in several rapidly developing countries. Almost all countries now have age-based vaccination recommendations, but fewer provide public reimbursement for vaccination of all recommended groups. In spite of recent progress, however, vaccine coverage levels even in high use countries are suboptimal in the elderly and considerably lower in younger high risk individuals. These findings indicate that the full benefits of influenza vaccination have yet to be achieved in any country.

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