

# Influenza prevention can help meet wider public health objectives

Abraham Palache

International Federation of Pharmaceutical Manufacturers and Associations (IFPMA) Influenza Vaccine Supply International Task Force (IVS ITF), Geneva, Switzerland; [admin@ifpma.org](mailto:admin@ifpma.org), [t.music@ifpma.org](mailto:t.music@ifpma.org)

Received 12 September 2012; revised 10 October 2012; accepted 22 October 2012

## ABSTRACT

**Influenza burden:** Influenza imposes a major burden on people and public health systems, causing millions of severe cases and up to one million deaths annually. Much of this burden is borne by those aged 65 or over, children under 2 years of age and people with non-communicable chronic diseases, such as heart and lung conditions and diabetes. In the elderly, influenza can have longer-term effects beyond acute infection, with some facing increased disability and care requirements. **Prevention:** Taking into account the growing elderly population worldwide and their susceptibility to non-communicable conditions as well as rising healthcare costs, public health policies are increasingly focusing on disease prevention strategies and promotion of healthy ageing initiatives. Influenza vaccination has an important role to play in these approaches. **Immunization of high-risk groups is recommended by public health organizations, both internationally and locally within many countries. However, although vaccines are considered the most effective method for preventing influenza, many high-risk people remain unvaccinated. Improving vaccination rates:** In recent years, research has focused on increasing vaccine coverage. The results demonstrate the key role healthcare professionals play in encouraging immunization, alongside factors such as communication, education and financial support for vaccination. **Paradoxically, although vaccination recommendations often include healthcare professionals and studies demonstrate the potential protection offered to workers and patients, many remain unvaccinated. As a result, a growing number of organizations, particularly in North America, are implementing policies requiring vaccination of healthcare pro-**

**essionals as a patient safety measure. In summary:** Influenza vaccination has a key role to play in helping to protect the health of the growing elderly population, reduce the burden associated with non-communicable diseases and decrease the annual toll on public health. Improving vaccination levels relies on the support of healthcare professionals, and increasingly healthcare professional immunization is considered an integral part of patient care.

**Keywords:** Influenza; Non-Communicable Disease; Vaccination; Public Health; Policy; Healthy Ageing; Healthcare Professional; Patient Safety

## 1. INTRODUCTION

For many years influenza has presented a public health paradox. This highly infectious viral disease has a significant annual toll on people and public health systems each year, and although influenza has long been considered a “vaccine-preventable” disease, many groups remain unvaccinated. This paper explores this paradox, examining the burden of influenza and the role of healthcare workers and public policy in reducing its annual impact.

## 2. INFLUENZA BURDEN

Influenza viruses can be transmitted via the respiratory secretions of those infected, and have an average incubation of two days [1]. Influenza type A and B viruses are common causes of acute respiratory illness, with type A viruses the principal cause of large influenza epidemics, as well as pandemics [1]. The viruses have high rates of mutation and antigen variability, and small changes (antigenic drift) occur relatively often, which can result in repeated outbreaks [1]. Influenza imposes a significant burden on people and public health systems. The World Health Organization (WHO) estimates that influenza is responsible for 3 - 5 million cases of severe illness annually, and the 2003 World Health Assembly (WHA),

member states recognized that seasonal epidemics cause fatal complications in up to one million people each year [2,3]. Much of this burden is placed on vulnerable populations, such as the elderly, children under 2 years of age and people with certain chronic non-communicable conditions, such as heart and lung disease and diabetes, which are at greater risk of serious illness and death from influenza [1]. WHO estimates over 90% of deaths attributed to influenza and pneumonia, its most common complication, occur in the elderly and other high-risk groups, with most influenza-associated deaths in industrialized countries occurring in people aged 65 years and older [1,2]. Amongst the elderly population, particularly the frail and those with certain chronic conditions, the burden can be compounded further by longer-term effects beyond acute infection, with some experiencing a decline in mobility and independence, or requiring increased care post hospitalization [4-6].

In addition to the impact on health and quality of life, influenza has significant economic consequences. In the United States, the overall economic burden is estimated to exceed \$87 billion annually, and within the European Union the Commission estimates the cost could be €5.9 billion - €27.7 billion [7,8]. Global population trends may contribute further to the strain influenza imposes on health budgets. As life expectancy increases and the ageing global population continues to grow, the susceptibility to non-communicable diseases also increases [9-11]. As a result, populations at-risk of serious illness and death from influenza are likely to continue expanding, placing a greater burden on healthcare systems worldwide.

### 3. PUBLIC HEALTH POLICY AND INFLUENZA PREVENTION

Faced with the major social, health and economic implications of an ageing population, policymakers around the world are pursuing healthy ageing initiatives, such as the WHO's 2012 World Health Day focused on *Ageing and Health* and the European Innovation Partnership on Active and Healthy Ageing [12,13]. Health authorities are also implementing prevention strategies to reduce the impact of non-communicable diseases, such as the 2008-2013 WHO Action Plan [14]. As influenza imposes a significant toll on the elderly and those with specific chronic conditions, influenza prevention strategies may fit within wider public policy efforts to promote healthy ageing and control the burden of non-communicable disease. Prevention strategies can include vaccination and adjunct antiviral medication, as well as non-pharmacological interventions such as hand-washing and respiratory hygiene, although the impact of these latter approaches is not well understood [7].

### 3.1. Influenza Vaccination

Influenza vaccines are designed each year to match the viruses expected to cause the next epidemic [1]. Protection against influenza can be conferred by antibodies, and serum levels of hemagglutination-inhibiting antibodies correlate with protection against infection and illness [1]. Inactivated trivalent vaccines, usually of the split virus and subunit types, are used widely, and in some countries live attenuated influenza vaccines are available [1]. Developments, such as cell culture-based vaccines and improved adjuvants, are also underway [1].

WHO considers vaccination the most effective method for preventing influenza or its severe outcomes, and notes, "Safe and effective vaccines have been available and used for more than 60 years" [2]. In healthy adults, WHO estimates vaccines with a good antigenic match can prevent 70% - 90% of influenza-specific illness [1,2]. In adults with risk factors for influenza complications, vaccine effectiveness is typically lower than in the healthy [7]. However, a number of studies have reported substantial reductions in hospitalizations and deaths among those vaccinated [7].

In the elderly, vaccination can reduce severe illness and complications by up to 60%, and deaths by 80% [2]. Vaccination may also reduce hospitalization by approximately 50% in the elderly in nursing homes and 25% - 39% during influenza seasons in those living elsewhere [1]. A 2010 review by the Cochrane Collaboration of vaccination in the elderly found a "relative scarcity" of randomised controlled trials (RCTs), questioned the quality of other studies and called for further long-term high quality research to be conducted [15]. However, in the RCTs it assessed inactivated vaccine efficacy was 43% against influenza-like-illness in the elderly living in the community with high viral circulation [15]. Against influenza, vaccine efficacy was 58% [15].

### 3.2. Vaccination Recommendations

Many health authorities recommend vaccination for those at risk. WHO recommends annual vaccination for risk groups, including the elderly (often defined as  $\geq 65$  years old) and people with chronic heart, lung, metabolic or renal disease or immunodeficiency, to reduce the incidence of severe illness and death [1,2]. WHO also recommends other groups for vaccination based on local data and capacities, such as healthcare workers, children aged 6 - 23 months, pregnant women and contacts of those at high-risk [1]. In 2012, the WHO Strategic Advisory Group of Experts on immunization confirmed these risk groups, and included children aged 6 - 59 months [16]. At the local level, member states from each WHO region have incorporated influenza vaccine into their national immunization schedules, with most targeting

specific populations [17]. By 2009, WHO data show 79 countries worldwide had included influenza in their vaccination schedules [17].

### 3.3. Vaccination Coverage

Although numerous health authorities recommend influenza vaccination for those at risk, many are not immunized. WHO acknowledges that vaccination is increasing, but “no country fully implements its vaccine recommendations”, and confirms that even in wealthy countries a significant proportion of those at-risk groups from influenza complications are not vaccinated [1]. In its 2003 resolution on influenza, the WHA called for countries with vaccination policies to increase uptake amongst those at high-risk, and set a target of 75% coverage for the elderly by 2010, which remains the target level in the European Union’s recommendations [3,18].

Recent research by the International Federation of Pharmaceutical Manufacturers and Associations (IFPMA), which represents manufacturers who supply most of the world’s influenza vaccines, found vaccination rates remain below recommended levels [19]. The research in 157 countries found over two-thirds did not distribute sufficient doses for 10% of the population, and over one-third distributed too few doses to cover 1% [19]. The study found no country in any region of the world distributed enough vaccine to immunize half its population, although official recommendations suggested 85% should be vaccinated in the US and up to 49% in the EU [19].

## 4. THE INFLUENZA PARADOX

Low levels of global influenza vaccination represents an ongoing paradox. Although influenza is a serious disease and imposes a significant disease burden, many high-risk groups remain unvaccinated despite the availability of safe and effective vaccines and recommended immunization by health authorities around the world. Influenza has long been considered a “vaccine-preventable” disease, but for many it is not being prevented.

## 5. VACCINE UPTAKE AND THE ROLE OF HEALTHCARE WORKERS

Researchers have studied a range of factors that may influence vaccine uptake. Many studies show healthcare workers have a key role to play in encouraging vaccination. US guidelines note, “Studies consistently show that provider recommendation is the strongest predictor of vaccination” [7]. Research in the EU confirms that recommendation by healthcare workers is particularly important in motivating immunization [20,21].

Several other factors also appear important in successful immunization programs. These combine educa-

tion and publicity (for health workers and vaccine recipients), reminder/recall systems, assessment and feedback of uptake rates and removing administrative and financial barriers to vaccination [7]. WHO also stresses the importance of raising public consciousness of influenza and the benefits offered by vaccination [1]. Research conducted by the IFPMA supports this position. Its study found policies that connect with patients, namely wide-scale communications and financial support for vaccination, were more strongly linked to vaccine coverage levels than official recommendations or national development status [19].

### Vaccination of Healthcare Workers

In addition to healthcare professionals’ role in encouraging immunization, many health authorities recommend that healthcare professionals are vaccinated also. IFPMA research included in a recent review of healthcare worker immunization found 88% of countries included in the study recommended vaccination [22]. Other international research detailed in the review found the great majority of study countries also recommended vaccination for health professionals [22].

A number of studies have investigated the impact of influenza and effect of immunization in health professionals [22]. Evidence suggests healthcare professionals may be at increased risk of contracting influenza due to exposure in the community and to infected patients, and workers risk transmitting the virus to patients. Additionally, outbreaks can disrupt health services, cause workplace absences and increase costs. Immunization of healthcare workers has been associated with improvements in patient safety and decreased mortality, as well as reduced staff absences. These studies suggest vaccination has potential benefits for staff, patients and healthcare organizations.

## 6. HEALTH WORKER VACCINATION AND THE ROLE OF PUBLIC HEALTH POLICY

A number of studies suggest many health workers remain unvaccinated. While comprehensive research into national coverage levels in health professionals is limited, studies in Europe and the US show that in many cases vaccine uptake is higher in the elderly than among workers [22].

Researchers have explored factors affecting vaccine coverage rates, and a number of healthcare organizations have developed programs to increase staff uptake [22]. These initiatives have found that programs with easy access to free vaccination, education to address misconceptions, support from management and the use of official forms to decline immunization can increase cover-

age.

In a growing number of health organizations, particularly in the US, vaccination policies are moving beyond voluntary approaches and are calling for immunization as a requirement to protect healthcare professionals and patients [22]. In the US, the Immunization Action Coalition includes over 200 organizations in its “Honor Roll for Patient Safety”, which recognizes influenza vaccination mandates in healthcare settings [23]. For inclusion in the Honor Roll, an organization’s mandate must require employee vaccination, as well as specific measures such as wearing a mask, reassignment to non-patient-care duties or dismissal to prevent influenza transmission from unvaccinated staff to patients [23].

In the US, support for vaccination requirements extends beyond individual healthcare institutions. Major infection control and hospital epidemiology societies (Association for Professionals in Infection Control and Epidemiology, Society for Healthcare Epidemiology of America), infectious disease societies (Infectious Diseases Society of America, National Foundation for Infectious Diseases), medical societies (American College of Physicians, American Academy of Pediatrics, American Medical Association, American Academy of Family Practitioners), public health societies (American Public Health Association, American Medical Directors Association) the National Patient Safety Foundation and National Business Group on Health Organizations, have concluded that health worker immunization is a patient safety issue and requiring vaccination is the only way to achieve the highest possible coverage rates [24].

## 7. CONCLUSIONS

The case for effective influenza prevention and the contributions of health workers and public health policy to achieve this goal seem clear. Influenza imposes a major burden on vulnerable groups, including the elderly and those with chronic conditions. As the world’s population ages, and susceptibility to non-communicable diseases increases with age, the number of people at risk from serious illness and death due to influenza is likely to grow, placing health budgets under further strain. As a result, influenza prevention has an important role to play in public health policy, helping to meet the objectives of healthy ageing initiatives and strategies to reduce the impact of non-communicable conditions and influenza related deaths.

As vaccination remains the most effective method for preventing influenza, increasing coverage levels among risk groups requires effective immunization policies, and most importantly the support of healthcare professionals. However, the role of healthcare professionals goes beyond encouraging patient vaccination. Many health authorities recommend immunization of healthcare workers

and an increasing number of organizations, particularly in the US, are introducing policies requiring vaccination as a patient safety measure. Although compulsory immunization remains controversial in modern democracies, the growing focus on protecting workers and their patients, and the fact that many health professionals remain unvaccinated, is likely to intensify the debate about how to best increase coverage in this crucial group.

Overall, influenza prevention can contribute to meeting the objectives of recent wide-reaching public health initiatives, offering the potential to benefit both those at risk and society more broadly.

## 8. ACKNOWLEDGEMENTS

The author wishes to thank the members of the IFPMA influenza vaccine group for their contributions to the conception of this paper and for their review and input into the manuscript.

## REFERENCES

- [1] WHO (2005) Influenza vaccines WHO position paper. *Weekly Epidemiological Record*, **33**, 279-287.
- [2] WHO (2009) Influenza (seasonal) fact sheet No 211. <http://www.who.int/mediacentre/factsheets/fs211/en/index.html>
- [3] Resolution of the World Health Assembly (2003) Prevention and control of influenza pandemics and annual epidemics. *WHA*, **56**, 19.
- [4] Barker, W., Borisute, H. and Cox, C. (1998) A study of the impact of influenza on the functional status of frail older people. *Archives of Internal Medicine*, **158**, 645-650. [doi:10.1001/archinte.158.6.645](https://doi.org/10.1001/archinte.158.6.645)
- [5] Falsey, A., Hennessey, P., Formica, M., Cox, C. and Walsh, E. (2005) Respiratory syncytial virus infection in elderly and patients. *New England Journal of Medicine*, **352**, 1749-1759. [doi:10.1056/NEJMoa043951](https://doi.org/10.1056/NEJMoa043951)
- [6] McNeil, S. (2012) Influenza in the elderly and persons with comorbidities: Promoting independence and preventing disability through vaccination. *WHO Workshop on Health and Economic Impact of Influenza*, Indonesia, 5-7 June 2012. [http://www.who.int/influenza\\_vaccines\\_plan/resources/Session\\_3\\_Influenza\\_elderly\\_comorbidities\\_Shelly\\_McNeil.pdf](http://www.who.int/influenza_vaccines_plan/resources/Session_3_Influenza_elderly_comorbidities_Shelly_McNeil.pdf)
- [7] Centers for Disease Control and Prevention (2010) Prevention and control of influenza with vaccines. *Morbidity and Mortality Weekly Report*, **59**, 1-62.
- [8] Commission of the European Communities (2009) Proposal for a Council Recommendation on seasonal influenza vaccination. *COM*, **353**. [http://ec.europa.eu/health/ph\\_threats/com/Influenza/docs/seasonflu\\_rec2009\\_en.pdf](http://ec.europa.eu/health/ph_threats/com/Influenza/docs/seasonflu_rec2009_en.pdf)
- [9] United Nations (2012) Towards global equity in longevity. Population Facts, February 2012.
- [10] United Nations (2012) Population ageing and the non-communicable diseases. Population Facts, January 2012.

- [11] United Nations (2010) World population ageing 2009. New York.
- [12] WHO (2012) World Health Day overview. <http://www.who.int/world-health-day/2012/en/index.html>
- [13] European Commission (2012) European innovation partnership on active and healthy ageing. [http://ec.europa.eu/research/innovation-union/index\\_en.cfm?section=active-healthy-ageing&pg=home](http://ec.europa.eu/research/innovation-union/index_en.cfm?section=active-healthy-ageing&pg=home)
- [14] WHO (2008) 2008-2013 Action plan for the global strategy for the prevention and control of noncommunicable diseases. WHO, Geneva.
- [15] Jefferson, T., Di Pietrantonj, C., Al-Ansary, L., Ferroni, E., Thorning, S. and Thomas, R. (2010) Vaccines for preventing influenza in the elderly. *Cochrane Database of Systematic Reviews*, **2**, 004876.
- [16] WHO (2012) Meeting of the strategic advisory group of experts on immunization, April 2012: Conclusions and recommendations. *Weekly Epidemiological Record*, **87**, 201-216.
- [17] Miller, E. (2010) Report from the SAGE working group on influenza vaccines and immunizations. [http://www.who.int/immunization/sage/nov2010\\_sage\\_influenza\\_wg\\_update\\_miller.pdf](http://www.who.int/immunization/sage/nov2010_sage_influenza_wg_update_miller.pdf)
- [18] Council of the European Union (2009) Council recommendation of 22 December 2009 on seasonal influenza vaccination. *Official Journal of the European Union*, **L384**, 71-72.
- [19] Palache, A. (2011) Seasonal influenza vaccine provision in 157 countries (2004-2009) and the potential influence of national public health policies. *Vaccine*, **29**, 9459-9466. [doi:10.1016/j.vaccine.2011.10.030](https://doi.org/10.1016/j.vaccine.2011.10.030)
- [20] Blank, P., Schwenkglenks, M. and Szucs, T. (2009) Vaccination coverage rates in eleven European countries during two consecutive influenza seasons. *Journal of Infection*, **58**, 441-453.
- [21] Blank, P., Schwenkglenks, M. and Szucs, T. (2008) Influenza vaccination coverage rates in five European countries during season 2006/07 and trends over six consecutive seasons. *BMC Public Health*, **8**, 272. [doi:10.1186/1471-2458-8-272](https://doi.org/10.1186/1471-2458-8-272)
- [22] Music, T. (2012) Protecting patients, protecting healthcare workers: A review of the role of influenza vaccination. *International Nursing Review*, **59**, 161-167. [doi:10.1111/j.1466-7657.2011.00961.x](https://doi.org/10.1111/j.1466-7657.2011.00961.x)
- [23] Immunization Action Coalition (2012) Honor roll for patient safety. Mandatory influenza vaccination for healthcare workers. <http://www.immunize.org/honor-roll/>
- [24] Editorial (2012) The nursing profession and patient safety and healthcare provider influenza immunization: The puzzling stance of the American Nursing Association. *Vaccine*, **30**, 1753-1755.