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Seasonal influenza vaccine dose distribution in 195 countries (2004–2013): Little progress in estimated global vaccination coverage

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ABSTRACT

Seasonal influenza is an important disease which results in 250,000–500,000 annual deaths worldwide. Global targets for vaccination coverage rates (VCRs) in high-risk groups are at least 75% in adults ≥65 years and increased coverage in other risk groups. The International Federation of Pharmaceutical Manufacturers and Associations Influenza Vaccine Supply (IFPMA IVS) International Task Force developed a survey methodology in 2008, to assess the global distribution of influenza vaccine doses as a proxy for VCRs. This paper updates the previous survey results on absolute numbers of influenza vaccine doses distributed between 2004 and 2013 inclusive, and dose distribution rates per 1000 population, and provides a qualitative assessment of the principal enablers and barriers to seasonal influenza vaccination. The two main findings from the quantitative portion of the survey are the continued negative trend for dose distribution in the EURO region and the perpetuation of appreciable differences in scale of dose distribution between WHO regions, with no observed convergence in the rates of doses distributed per 1000 population over time. The main findings from the qualitative portion of the survey were that actively managing the vaccination program in real-time and ensuring political commitment to vaccination are important enablers of vaccination, whereas insufficient access to vaccination and lack of political commitment to seasonal influenza vaccination programs are likely contributing to vaccination target failures. In all regions of the world, seasonal influenza vaccination is underutilized as a public health tool. The survey provides evidence of lost opportunity to protect populations against potentially serious influenza-associated disease. We call on the national and international public health communities to re-evaluate their political commitment to the prevention of the annual influenza disease burden and to develop a systematic approach to improve vaccine distribution equitably.

1. Introduction

Seasonal influenza is an important disease which results in 250,000–500,000 annual deaths worldwide [1], of which about 28,000–111,500 are in children <5 years of age, predominantly in developing countries [2]. Adults aged 65 years or older, pregnant women, and people of any age with underlying medical conditions, are at high risk of severe disease or complications [1]. Licensed influenza vaccines are safe and efficacious and are recommended by the World Health Organization (WHO) in priority for pregnant women, children aged between 6 and 59 months, the elderly, individuals with specific underlying medical conditions, and health-care workers [2]. Some countries are progressively expanding the recommended population, with the USA having moved to routine vaccination of any individual >6 months of age since 2010 [3]. Global targets for vaccination coverage rates (VCRs) in high-risk groups are at least 75% in adults ≥65 years and increased coverage in other risk groups [4]. Europe has set similar targets [5]. In the US a 90% target has been set for adults ≥65 years and 70% for persons ≥18 years, by 2020 [6].

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Globally, there are very limited data on influenza VCRs. Regionally, some seasonal influenza VCR data is available from PAHO (Pan-American Health Organization) for states in AMRO (region of the WHO's Americas Regional Office) [7], and in Europe, data is available for some states from the Vaccine European New Integrated Collaboration Effort (VENICE) [8]. The International Federation of Pharmaceutical Manufacturers and Associations Influenza Vaccine Supply (IFPMA IVS) International Task Force developed a survey methodology, in 2008, to assess the global distribution of influenza vaccine doses [9]. Dose distribution can serve as a proxy for VCRs where coverage data is lacking. The IFPMA IVS cumulated data on the distribution of vaccine doses from 2004 to 2011, in up to 157 countries [9–11]. Previous global vaccine dose distribution surveys suggested that VCRs were substantially below target in all regions [10,11]. Three out of six WHO regions together accounted for about 47% of the global population but only about 4% of the IFPMA IVS doses distributed [10,11]. Overall, global distribution of IFPMA IVS member vaccine doses increased by approximately 87% between 2004 and 2011, but only by approximately 12% between 2008 and 2011. Furthermore, dose distribution decreased in EURO (region of the WHO's European Regional Office) and EMRO (region of the WHO's Eastern Mediterranean Office) between 2009 and 2011. The only countries to ever report achieving seasonal influenza VCR targets in the elderly are the UK and the Netherlands [12,13], and no country has reported target VCRs in other risk groups [14,15], or in health care workers [16].

The aim of this paper is to update the results of the previous surveys, to show the evolution in the number of influenza vaccine doses distributed between 2004 and 2013 inclusive, in absolute numbers and in number of doses distributed per 1000 population, and to provide a qualitative assessment of the principal enablers and barriers to seasonal influenza vaccination, as directly experienced by countries with a significant rate of change in dose distribution.

2. Methods

2.1. Quantitative vaccine dose distribution survey

The methodology used to survey dose distribution has been previously described in Palache et al., 2011 [10]. Briefly, member companies of the IFPMA IVS (Abbott Biologicals, Adimmune Corporation, Biken, bioCSL, Janssen-Crucell, Denka Seiken, GlaxoSmithKline Biologicals, Green Cross Corporation, Hualan Biological, Kaketsuken, Kitasato Daiichi Sankyo Vaccine, MedImmune, Novartis Vaccines, and Diagnostics, Protein Sciences Corporation, Saint-Petersburg Scientific Research Institute of Vaccines and Sera, Sanofi Pasteur, Sinovac and Takeda), which manufacture and supply the vast majority of the world's seasonal influenza vaccines, agreed to provide information on the supply of seasonal trivalent influenza vaccine doses to all WHO Member States during 2012 and 2013. To ensure compliance with anti-trust regulations, the survey results were confidentially collected and aggregated by the IFPMA Secretariat. The resulting anonymized database was then combined with the results of the previous IFPMA IVS surveys (2004–2011) [9–11].

2.1.1. Vaccine dose distribution in absolute numbers between 2004 and 2013

Doses distributed by country and by year were aggregated and then, to facilitate comparisons, were categorized by distribution to WHO region.

2.1.2. Vaccine dose distribution per population size between 2004 and 2013

To assess vaccine dose distribution in relation to each country's population size, the study utilized population data from the UN's (United Nations) statistics database [17]. Doses distributed to each country were expressed per 1000 population for 2004–2013 using the corresponding population figures from the United Nation's (UN) statistics database. To facilitate comparisons, countries were then categorized by WHO region. *T*-test analyses were performed between rates of dose distribution/1000 population in 2004 and 2013, and 2008 and 2013, by WHO region.

2.1.3. Rate of change in vaccine dose distribution between 2008 and 2013

To better understand the factors influencing seasonal influenza vaccine dose distribution, countries were categorized into: previously low distribution (<159 doses per 1000 population, in 2008); and, previously high distribution (≥159 doses per 1000 population, in 2008). This 'hurdle' rate of 159 doses per 1000 population was previously defined as the number of doses required to vaccinate those aged 65 years or older in industrialized nations [10], and was again utilized to enable comparisons with previous surveys. For each of the two categories of country (low distribution rate and high distribution rate), the 10 countries with the highest increase in dose distribution per 1000 population, and the 10 countries with highest decrease in dose distribution per 1000 population, were singled out for analyses.

2.2. Qualitative vaccine dose distribution survey

Descriptive analysis from selected countries with a change in dose distribution rate of trivalent seasonal influenza vaccine in the last 2 years of the dose distribution survey (2012 and 2013) was collected through phone or e-mail interviews with thought leaders or policy-makers, to determine specific policies and practices associated with positive or negative trends in seasonal influenza vaccination distribution. Questions were designed to assess: national commitments to measure and increase vaccination coverage; implementation of recommendations, funding, and communications; perception of influenza and VCR; country specific barriers or drivers for VCR; and lessons learnt in the delivery of seasonal influenza vaccine.

A convenience sample of thought-leaders from seven countries was selected, based on the trend of change in vaccine dose distribution, and the ability of thought-leaders to inform on enabling policies or barriers to influenza vaccine uptake. The four countries with increasing distribution rates in the last 2 years of the survey invited to participate were: Thailand, Italy, Argentina, and the UK. The three countries with decreasing distribution rates in the last 2 years of the survey invited to participate were: the Netherlands, Switzerland and the Republic of Korea. The selection of countries was restricted to the three regions with the bulk of vaccine doses distribution (AMRO, EURO and WPRO) so that trends in dose distribution in countries from these regions could be further probed.

Persons invited to participate included: a director of a department of infectious, parasitic and immune mediated diseases, at a national public health institute; a director of a national institute of immunization in a ministry of health; the CEO of a consortium between a government and vaccine industry; a Director General at a national ministry of health; the head of a federal commission on vaccination; the head of a national division of vaccine preventable disease control and national immunization program; and a former director of immunization at a national Department of Health.