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Epidemic and Pandemic Alert and Response

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Contents

Acronyms and abbreviations

The acronyms and abbreviations listed below have been used in this report.

CpGs	immunostimulatory oligonucleotide containing cytosine-guanosine sequence
DNA	deoxyribonucleic acid
ECBS	WHO Expert Committee on Biological Standardization
GIVS	Global Immunization Vision and Strategies
HA	haemagglutinin
H5N1	highly pathogenic avian influenza virus, type H5N1
LAIV	live attenuated influenza vaccine
NA	neuraminidase
NIP	national immunization programme
PAHO	Pan American Health Organization
SPF	specific pathogen-free
UNICEF	United Nation Children's Fund
VLP	virus-like particles
WHA	World Health Assembly
WHO	World Health Organization

Executive summary

The objective of the Global Vaccine Action Plan is to increase the supply of a pandemic vaccine and thereby reduce the gap between the potential vaccine demand and supply anticipated during an influenza pandemic.

To mitigate the potential impact of an influenza pandemic, control interventions include two strategies – one, a non-pharmaceutical approach such as social distancing and infection control and the other, a pharmaceutical approach such as the use of influenza vaccines and antivirals for treatment and prophylaxis. In an influenza pandemic most of the world's population will be highly susceptible to the virus infection and it is conceivable that the virus will spread rapidly. The availability of a pandemic vaccine will be delayed by several months because of the requirements for vaccine formulation and production lead-time. Furthermore, it is probable that insufficient production capacity will restrict global access to the vaccine, at least during the first phase of the pandemic.

Immunization against influenza is considered to be an essential public-health intervention to control both seasonal epidemics and pandemic influenza. Influenza vaccine development and deployment are critical elements of pandemic influenza preparedness. There are marked differences between countries in terms of their respective capacities, priorities and resources to establish a seasonal influenza vaccination policy and programme. The major influenza vaccine producers operate and supply almost exclusively in Australia, Europe, North America and some countries in Asia and Latin America. Most resource-constrained countries do not have the means to access seasonal influenza vaccines and could face this challenge during an influenza pandemic. Planning for appropriate availability of vaccines to manage a pandemic response requires a global perspective and concerted effort, not only in developing a vaccine but also in producing and distributing it.

At the present time, if an influenza pandemic were to occur, the potential vaccine supply would fall several billion doses short of the amount needed to provide protection to the global population.

Countries can assist by: a) developing seasonal influenza vaccination programmes if they can afford to, and b) increasing influenza vaccine coverage in existing programmes. This will provide industry with the clear forecast of demand that is integral to ensuring an incremental increase in seasonal vaccine production-capacity. This approach, although highly valuable, would be unlikely to raise production capacity to sufficient levels to serve the global population in the foreseeable future. One important option for the global health community to consider, therefore, is countries' willingness to pay vaccine manufacturers for unused excess capacity of vaccines.

Together with the current production challenges, it must be stressed that there are several scientific and technological issues that need to be addressed to facilitate development of effective pandemic vaccine. New influenza candidate vaccines are in the pipeline and clinical trials to evaluate the safety and immunogenicity of candidate H5N1 vaccines are under way. Recently published preliminary results with split-virus inactivated vaccines show suboptimal immunogenicity. However, more encouraging results have been obtained with whole-virus adjuvanted, inactivated vaccines.

In response to these challenges and in order to develop a Global Vaccine Action Plan for Pandemic Influenza Vaccines, WHO organized a consultation in Geneva on 2–3 May 2006 and invited key stakeholders – from national immunization programmes, national regulatory authorities, vaccine manufacturers and the research community – to participate. The objective of the consultation was to identify and prioritize practical solutions for reducing the anticipated gaps in vaccine supply. The participants drew up an Action Plan with strategies for the short, mid and long term, aiming to increase influenza vaccine production and surge capacity before and during an influenza pandemic. They identified three main approaches: a) an increase in seasonal vaccine use; b) an increase in production capacity; and c) further research and development. The implementation of this plan will require the concerted efforts of countries, industry and the global health community.

Increase in seasonal vaccine use

The first approach relies on countries establishing clear immunization policies to increase the use of seasonal influenza vaccine. This will provide the vaccine industry with a solid demand forecast and stimulate it to increase production capacity. For purposes of the discussion, the participants divided countries into three categories based on their probable demand for seasonal influenza vaccine.

Group 1: Countries that already use seasonal influenza vaccine and that could reach the goal of immunizing 75% of their target population either in the near future or by 2010, as recommended by WHA Resolution 58, 2005.

Group 2: High-income or middle-income countries that currently do not use seasonal influenza vaccine.

Group 3: Low-income countries.

Increased consumption of seasonal influenza vaccine in Group 1 countries could raise demand by 60% above the current annual level of distribution – that is, 350 million annual doses – bringing the annual total demand to 560 million doses.

Group 2 countries need to decide on a policy and conditions required to introduce influenza vaccines into their national immunization schedules in the near future. As an example, the 2006 demand for countries in the Region of the Americas is for approximately 40 million doses, of which 11 million doses of seasonal influenza vaccine will be purchased through the Pan American Health Organization (PAHO) Revolving Fund. This demonstrates that at least a proportion of Group 2 countries will generate demand and thereby promote expansion of the production capacity for influenza vaccines.

In Group 3 countries, competing health priorities and the price of trivalent inactive influenza vaccine (currently in the range of US $3–7.00 per dose) is a barrier to the introduction of seasonal influenza vaccination.

Participants identified priority strategies to increase demand for seasonal influenza vaccine, including:

- development of regional and national plans, and
- resource mobilization to assist countries to purchase both seasonal and pandemic influenza vaccines.

Increase in vaccine production-capacity

The second approach concentrates on increasing production capacity for pandemic vaccines, without taking into account the expected demand for seasonal vaccine. Should there be a pandemic that appears to cause high mortality, there will probably be calls to vaccinate the global population – currently estimated to be 6.7 billion. A pragmatic approach in the short term will be to provide surge-capacity by using antigen-sparing methods; this could result in the availability of more doses.

The participants evaluated various strategies to increase production capacity for pandemic vaccines and considered the following to be the most promising:

- improving production yields and immunogenicity for vaccines based on H5N1 influenza strains;
- building new production plants in both developing and industrialized countries;
- focusing on further development of adjuvanted vaccines with adjuvants widely used in licensed vaccines;
- expanding the production of live attenuated influenza vaccines (LAIV);
- evaluating the immunogenicity of inactivated whole-virus vaccines;
- evaluating the potential for delivering vaccines by alternative routes – for example, the intradermal route using needle-free delivery devices such as jet injectors.

Further research and development