# Global survey on National Vaccine Deployment and Vaccination Plans for pandemic A(H1N1) 2009 vaccine – 2010

## Report of Findings

# World Health Organization

**May 2013**

## Contents

## Abbreviations and acronyms

| | |
|---|---|
| AEFI | adverse effects following immunization |
| AFR | WHO African Region |
| AFRO | WHO Regional Office for Africa |
| AMR | WHO Region of the Americas |
| AMRO/PAHO | WHO Regional Office for the Americas/Pan American Health Organization |
| EMR | WHO Eastern Mediterranean Region |
| EMRO | WHO Regional Office for the Eastern Mediterranean |
| EUR | WHO European Region |
| EURO | WHO Regional Office for Europe |
| GAP | global pandemic influenza action plan to increase vaccine supply |
| MS | WHO Member States |
| NDVP | national deployment and vaccination plan |
| SAGE | Strategic Advisory Group of Experts on Immunization |
| SEAR | WHO South-East Asia Region |
| SEARO | WHO Regional Office for South-East Asia |
| UNICEF | United Nations Children's Fund |
| VENICE | Vaccine European New Integrated Collaboration Effort |
| WPR | WHO Western Pacific Region |
| WPRO | WHO Regional Office for the Western Pacific |

## Acknowledgements

The World Health Organization (WHO) would like to acknowledge and thank the following Member States for their participation in the 2010 global survey.

Africa Region: Central African Republic, Congo, Gambia, Guinea, Lesotho, Liberia, Mauritania, Namibia, Niger, Sao Tomé et Principe, Senegal, Seychelles, Sierra Leon, and Togo.

Americas Region: Argentina, Barbados, Belize, Bolivia, Brazil, the Cayman Islands, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Saint Lucia, Suriname, Trinidad and Tobago, and Uruguay.

Eastern Mediterranean Region: Afghanistan, Bahrain, Egypt, Iran, Jordan, Lebanon, Oman, and the Syrian Arab Republic.

European Region: Armenia, Azerbaijan, Georgia, Kosovo, Kyrgyzstan, the Republic of Moldova, and Tajikistan.

South East Asia Region: Bangladesh, Indonesia, Maldives, Nepal, Sri Lanka, Thailand, and Timor-Leste.

Western Pacific Region: Australia, Cambodia, China, Cook Islands, Fiji, Kiribati, Lao People's Democratic Republic, Malaysia, Marshall Islands, Mongolia, Nauru, New Caledonia, New Zealand, Niue, Palau, Papua New Guinea, Philippines, the Republic of Korea, Samoa, Singapore, Solomon Islands, Tokelau, Tonga, Tuvalu, and Vanuata.

The Organization also wishes to thank the many donors, governments, technical agencies, and private sector organizations for their support of the WHO pandemic A(H1N1) 2009 vaccine deployment initiative.

WHO would also like to thank its staff from headquarters and the regional offices for their contribution in developing the tools, facilitating the implementation of the surveys, and providing input to the analyses. From headquarters: Marie-Paule Kieny, John S. Tam, Claudia Vivas Torrealba, Kanokporn Coninx, and Reka Balla. From the African Regional Office: Richard Alombah, Afework Assefa, Patrick Byaruhang, Amos Chweya, Seka Leone, Jean Negantchou, Abdulquadir Oni, Richard Mihigo, and Adam Zenaw. From the Americas Regional Office: Alba Maria Ropero, Thais Dos Santos, and Hannah Kurtis. From the Eastern Mediterranean Regional Office: Ezzeddine Mohsni and Dalia Samhouri. From the European regional Office: Pernille Jorgensen, Rebecca Martin, and Annemarie Wasley. From the South East Asia Regional Office: Jayantha Liyange. From the Western Pacific Regional Office: Md. Shafiqul Hossain.

## EXECUTIVE SUMMARY

Globally, influenza is a significant public health issue and vaccination is one of the most important medical interventions that can be used for reducing morbidity and mortality. On 11 June 2009, the World Health Organization (WHO) raised its pandemic alert to the highest level in view of the rapid global spread of the A(H1N1)pdm 2009 virus. With support from and in collaboration with Member States and partners, WHO strengthened its pandemic preparedness and response activities. Vaccination is crucial to pandemic mitigation efforts and the availability of pandemic vaccine, particularly in low and middle income countries, proved challenging. Many Member States and partners pledged support, including vaccines and additional resources for countries in need of the pandemic A(H1N1) 2009 vaccine. WHO set out a two-phase approach for supplying vaccines sufficient for immunizing 10% of the population in eligible countries based on the timing required to fulfill the pledges from Member States and partners.

The aim of this study is to assess the degree to which national pandemic vaccine deployment and vaccination plans (NDVPs) were implemented and to consolidate and distil lessons learned from the six WHO regions in an effort to improve future planning and to identify information that may have general applications.

In total, 84 out of 194 Member States (43%), including 51 out of 77 Member States (66%) who were eligible for and received WHO vaccine, participated in the survey (Table 1). In addition to the survey entries, further verifiable data were obtained from NPVD activity reports from countries.

The major findings of the survey include:

- Out of a total of 1.18 billion doses of pandemic A(H1N1) 2009 vaccine received by 163 countries, WHO provided 78.06 million doses to 77 countries through the WHO Pandemic Influenza A(H1N1) Vaccine Deployment Initiative. Demand for vaccines varied with the changing epidemiology of the pandemic as the virus spread across the globe and, as the level of concern about the virus diminished, demand for vaccine was reduced. The cost of vaccination was also a constraining factor for countries and limited the quantity of and demand for vaccine. This factor became more important as the level of concern for the pandemic decreased.

- The main suppliers of pandemic A(H1N1) 2009 vaccines included GlaxoSmithKline, Novartis, and Sanofi Pasteur, supplemented by Butantan, Green Cross, and MedImmune.

- Of the countries participating in this survey, 55% indicated that they implemented all activities as spelled out in their NDVPs. In most regions, countries reported high percentages of supervisory visits executed, with supervisors providing final reports on vaccine deployment and vaccination activities in countries where vaccination campaigns were completed.

- Overall, 56% of countries across all of the regions reported having sufficient supply chain and logistics capacity, with the exception of communications hardware, to deploy and administer pandemic A(H1N1) 2009 vaccines. Likewise, 68% of responding countries reported that vaccine and ancillary items were delivered to 80% of end users within seven days of receiving their material.

- With regard to public information and communications, the public's main concerns were vaccine safety as reported by 86% of countries, the need for the vaccine (75%), vaccine

efficacy (50%), and vaccine benefits (25%). Communication strategies were developed for various priority groups including health-care workers, pregnant women, persons with chronic medical conditions, and essential personnel, along with children and persons over 65 years of age.

- The majority of countries (85%) reported having a functioning adverse effects following immunization (AEFI) surveillance system during vaccination campaigns. In countries with no such system, reporting sheets and standard operating procedures (SOP) were developed for AEFI associated with pandemic A(H1N1) 2009 vaccination.

Lessons learned most frequently concerned communications. Many countries recommended improving public communications campaigns, enhancing pre-campaign education, providing better focus on priority groups, and effectively and vigorously addressing all anti-vaccination rumors. Vaccine availability needs to be timely and refrigeration infrastructure needs to be enhanced and better maintained. Planning and supervision need to be supported with better information and also logistics and management need to be based on a multi-sectoral approach, with campaign coordination beginning at least several weeks before activities are set in motion.

Pandemic preparedness is an ongoing concern, and this study provides information about the degree to which NDVPs were implemented in the deployment and utilization of pandemic A(H1N1) 2009 vaccines. It has also identified strengths and weaknesses in implementing the constitutive activities of these plans. This information, along with the lessons learned and guidance developed, will be useful for future pandemic planning and will also direct attention to those regions and countries where help is most needed.

# INTRODUCTION

Between July 2009 and January 2010, WHO conducted 10 workshops in its six regions and trained 170 countries in preparing national vaccine deployment and vaccination plans (NDVP) for the 2009 A(H1N1) influenza pandemic. Additionally, WHO promptly initiated vaccine development for pandemic influenza A(H1N1) 2009 in collaboration with health ministries, national health agencies, and the vaccine industry.(1)

## Aim of the study

The overall aim of this study was to assess the level at which NDVPs were implemented and to consolidate lessons learned from the countries within the six WHO regions. Experience gained from the survey will be used to improve future planning and identify information that may have general applications, such as deployment of other vaccines and essential medical supplies.

The specific objectives of the study were to:

- Gather basic data concerning NDVP implementation
- Review the implementation of NDVPs
- Identify management and organization issues related to oversight, supervision, and funding
- Identify vaccine strategies selected by countries along with prioritization of target groups
- Obtain information about supply chain logistics activities
- Identify the major issues of concern regarding public information and communications
- Obtain information on post-marketing surveillance
- Summarize lessons learned from the six WHO regions

# MATERIALS AND METHODS

## Study design

An electronic-based cross-sectional survey designed with standardized questions was developed in collaboration with all WHO regional offices (AFRO, AMRO/PAHO, EMRO, EURO, SEARO, and WPRO).

## Data collection

The standardized questionnaire included three main types of questions: close-ended questions (those where respondents could answer Yes/No), multiple choice questions, and open-ended questions with free text input. The electronic questionnaire was developed using Datacol and was made available to all participating countries from the WHO extranet in May 2010 (http://extranet.who.int/datacol). Usernames and passwords were given to each WHO regional office to be shared with their constituent countries. The electronic questionnaires were completed by Member States and regional office focal points in each country or region and were archived on a specific date. A Microsoft Word version of the questionnaire was also provided to countries without broadband internet access. The questionnaire was made available in English, French, Russian, and Spanish. The initial data file was downloaded for analysis on 15 February 2011. Additional analysis of the primary and interim data sets was performed in March 2013, after all surveys and other sources had been made available or published. The final result is an analysis that is as accurate as possible and combines verifiable data from several sources.

The online questionnaire consisted of seven parts:

1. General survey data
2. Management and organization: oversight, supervision, and funding
3. Vaccine strategies
4. Supply chain logistics
5. Public information and communications
6. Post-marketing surveillance
7. Termination of deployment reports

Focal points in each Member State or in WHO regional offices entered data directly online. In response to early feedback received by WHO headquarters from regional offices additional questions and some technical modifications were incorporated in the final questionnaire. Regional data could be followed directly through custom views that were made available to all focal points at WHO regional offices.

Member States were asked to complete the questionnaire between 7 July and 15 October 2010 and were supplied with explanations by each WHO region concerning the objectives and rationale of the survey. Due to some ongoing A(H1N1) 2009 pandemic vaccination campaigns, initial response rates were low. To facilitate a broader response, the deadline for completion was later extended to 15 February 2011.

## Other data sources

Four sources of data were verified for purposes of this report: 1) the WHO A(H1N1) 2009 vaccine deployment survey; 2) WHO pandemic A(H1N1) 2009 vaccine deployment reports; 3) country termination reports submitted to WHO at the conclusion of the pandemic; and 4) Vaccine European New Integrated Collaboration Effort (VENICE) II Survey.

The WHO A(H1N1) 2009 vaccine deployment survey was administered to all Member States (194) and some non-Member States (9). In all, 84 countries responded to the WHO H1N1 Survey. Of those, 77 were eligible for and received vaccine through WHO. Data from 23 countries were derived from country reports submitted to WHO at the conclusion of the pandemic. Countries in the European Union/European Economic Area (EU/EEA) declined to participate in the WHO H1N1 Survey and instead participated in the VENICE II Survey. Out of 53 Member States in the WHO EUR region seven were qualified for WHO vaccine deployment. Data from the VENICE II Survey were extracted and are reported here for 29 out of 30 countries in the EU/EEA. Deployment data for the 77 countries who received vaccine through WHO were verified based on WHO deployment reports and totaled based on the final report from the WHO Deployment Team dated 10 November 2010.

All data reported in this document were verified through these four sources. Data that could not be verified are not presented here.

## Data analysis

The data were analyzed using Microsoft Excel and appropriate statistics were produced along with the frequency of occurrence of each variable. Answers in French, Russian, and Spanish were translated into English and a common database was developed.

There are several limitations of the database which were acknowledged prior to the start of data collection. For example, the survey was started before some countries had terminated their

deployment and vaccination activities, so some eligible countries did not complete the survey in time to meet the deadline. Also, the survey questionnaire was not pre-tested, resulting in occasional inconsistencies in countries' understanding of the questions. Lastly, because each country was given the choice of which variables to prioritize on the basis of its particular circumstances, data should be seen as providing indications rather than rigorous demonstrations. This does not invalidate the lessons learned, however, since these lessons always involve qualitative elements.

## RESULTS

The results of the survey are presented in the format of tables and figures and brief explanations summarizing the main results of each question. In total, 84 Member States (84/194, 43%), including 51/77 Member States who were eligible for and received WHO-deployed vaccine, participated in the WHO A(H1N1) Survey (Table 1). A list of countries that participated in the survey is presented in Annex 1.

**Table 1: Number of eligible Member States and countries receiving WHO-deployed vaccine that responded to the survey — Evaluation of the implementation of H1N1 pandemic influenza national vaccine deployment and vaccination plans, by region**

| Region | No. of Member States that received WHO-deployed vaccine | No. of Member States respondents that received WHO-deployed vaccine | No. of other Member States/countries that participated in the survey | Total survey participants |
|---|---|---|---|---|
| **AFR** | 34 | 14 | 0 | 14 |
| **AMR** | 10 | 9 | 14 | 23 |
| **EMR** | 4 | 1 | 7 | 8 |
| **EUR †** | 6 | 6 | 1 | 7 |
| **SEAR** | 7 | 5 | 2 | 7 |
| **WPR** | 16 | 16 | 9 | 25 |
| **All regions** | 77 | 51 | 33 | 84 |

† Only countries in EUR eligible to receive vaccines from WHO participated in the WHO H1N1 Survey. 29 Member States in the EU/EEA participated in the VENICE II Survey.

# I. Management and organization: oversight, supervision, and funding

### Importation Barriers

Out of 84 Member States and countries that responded to the survey, 26 of which, varying by region, reported that they experienced customs, legal, and regulatory barriers when importing A(H1N1) 2009 pandemic vaccine (Table 2a). The rest of the participating countries reported that there were no such barriers.

**Table 2a: Member States and countries that had customs, legal, or regulatory barriers when importing A(H1N1) pandemic vaccine, by region**

| Region | Number of respondents by region | Countries that reported barriers | % | Countries that reported no barriers | % | Number of countries not responding | % |
|---|---|---|---|---|---|---|---|
| AFR | 14 | 5 | 36% | 9 | 64% | | |
| AMR | 23 | 12 | 52% | 11 | 48% | | |
| EMR | 8 | 2 | 25% | 6 | 75% | | |
| EUR † | 7 | 0 | 0% | 6 | 86% | 1 | 14% |
| SEAR | 7 | 3 | 43% | 4 | 57% | | |
| WPR | 25 | 4 | 16% | 21 | 84% | | |
| **TOTAL** | **84** | **26** | **31%** | **57** | **68%** | **1** | **1%** |

† Only EUR countries responding to the 2010 WHO H1N1 Survey are included here.

Nine **Member States and countries** reported difficulties receiving approval for vaccine importation from national regulatory authorities. Customs and import duties and processes were the next highest reported problem. Transportation issues, indecisiveness on the part of one country's Ministry of Health, a perceived change in the emergency status of the pandemic, and a requirement for pre-qualification round out the remaining challenges (Table 2b).

**Table 2b: Barriers to importation, by region**

| | | | | Cause of barriers | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Region | No. of responses by region | Countries with barriers (%) | | NRAs | Customs or import duties | Transport | Indecision by MOH | Emergency status and need changed | PQ required |
| AFR † | 14 | 5 | 36% | 2 | 3 | 1 | -- | -- | -- |
| AMR | 23 | 12 | 52% | 1 | -- | 1 | -- | -- | -- |
| EMR | 8 | 2 | 25% | 2 | -- | -- | -- | -- | -- |
| EUR ‡ | 7 | 0 | 0% | -- | -- | -- | -- | -- | -- |
| SEAR | 7 | 3 | 43% | 2 | -- | -- | -- | 1 | -- |
| WPR | 25 | 4 | 16% | 2 | -- | -- | -- | -- | 1 |
| **Total ^** | **84** | **26** | **31%** | **9** | **3** | **2** | **0** | **1** | **1** |

† One country in AFR reported both national regulatory authorities and transportation issues as their barriers. All other countries in all regions reported only one barrier each.

‡ In EUR, one country out of seven that were eligible for WHO-deployed vaccines did not answer the barriers to importation question, because the country respondent cancelled their vaccination programme (see Table 2a).

^ In AMR and WPR, 12 and four countries, respectively, reported barriers to importation, but only two countries in AMR and three countries in WPR provided additional explanations.

PQ = pre-qualification of vaccine by WHO.

**Vaccine distribution, delivery, and tracking**

Seventy-three of the 84 participating countries, or 87%, reported that vaccine distribution occurred at the level of the health centres while 75 (89%) responded that they had a vaccine delivery schedule for each level of pandemic A(H1N1) 2009 vaccine distribution. Seventy-four countries (88%) were able to track the vaccine shipments at each level by lots and number of doses as received, repackaged, and shipped to the next level (Table 3).

**Table 3: Level of A(H1N1) pandemic vaccine distribution and ability to track shipments by doses and lots, by region †**

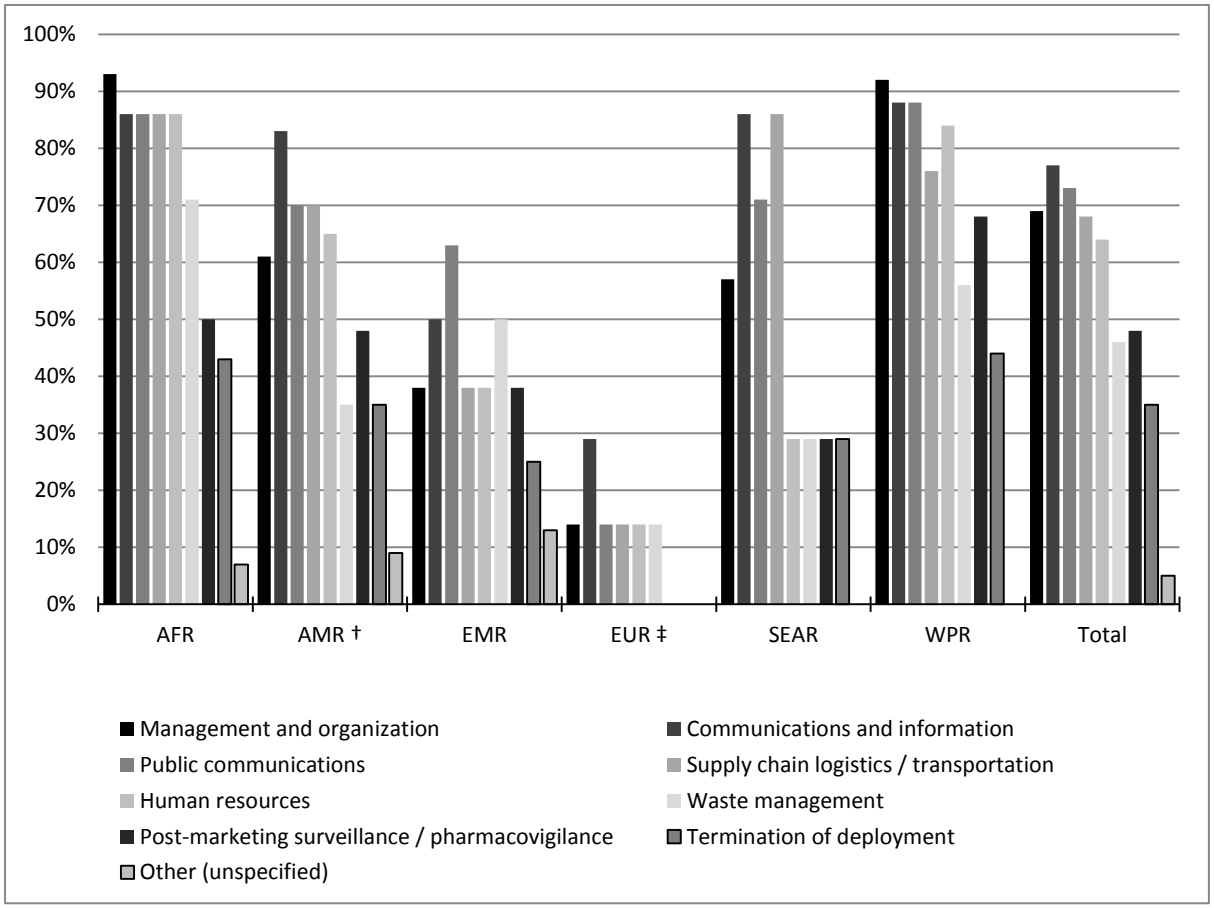
| Region | Number of responding countries | % lowest level of vaccine distribution | | | | % of countries with delivery schedule prepared for each level | % of countries with the ability to track shipments by lots & doses at each level |
|---|---|---|---|---|---|---|---|
| | | National | Regional | District | Health centres | | |
| AFR | 14 | -- | -- | 7% | 93% | 93% | 93% |
| AMR | 23 | -- | -- | 4% | 96% | 91% | 91% |
| EMR | 8 | -- | -- | -- | 88% | 88% | 88% |
| EUR † | 7 | -- | -- | 14% | 71% | 100% | 86% |
| SEAR | 7 | -- | -- | 43% | 43% | 86% | 71% |
| WPR | 25 | 4% | -- | 4% | 92% | 84% | 88% |
| **Total** | **84** | **1%** | **0%** | **8%** | **87%** | **89%** | **88%** |

† Only countries responding to the 2010 WHO H1N1 Survey are included here.

**Surge capacity for vaccine deployment and vaccination**

In nearly all regions, Communications and information was cited as requiring surge capacity (77%), followed by Public communication (73%), Management and organization (69%), Supply chain logistics/transportation (68%), and Human resources (64%) (Figure 1). The areas of Pharmacovigilance, Waste management, and Termination of deployment received 48%, 46%, and 35%, respectively. Four countries (5%) mentioned other needs but did not specify what those additional capacity needs might be.

**Figure 1: Main areas of work requiring surge capacity for implementing vaccine deployment plans in WHO-eligible countries, by region**




† In AMR, 23 countries participated in the 2010 WHO Survey. Of those, 22 reported required surge capacity. Only one country did not as they canceled their vaccination campaign.

‡ In EUR, seven countries were eligible for WHO-deployed vaccine. Only three of the seven reported required surge capacity.

## II. Vaccination strategies

### Access to vaccine and sources

The number of doses of pandemic vaccine received by region is shown in Table 4. The source of the vaccine varied by region with 100% and 90% of participating countries from AFR and SEAR, respectively, reporting that vaccine was deployed from WHO, whereas 93% and 92% of vaccine received in AMR and EMR, respectively, was government procured (Figure 2).

**Table 4: Distribution and sources for pandemic A(H1N1) 2009 vaccine doses, by region †**

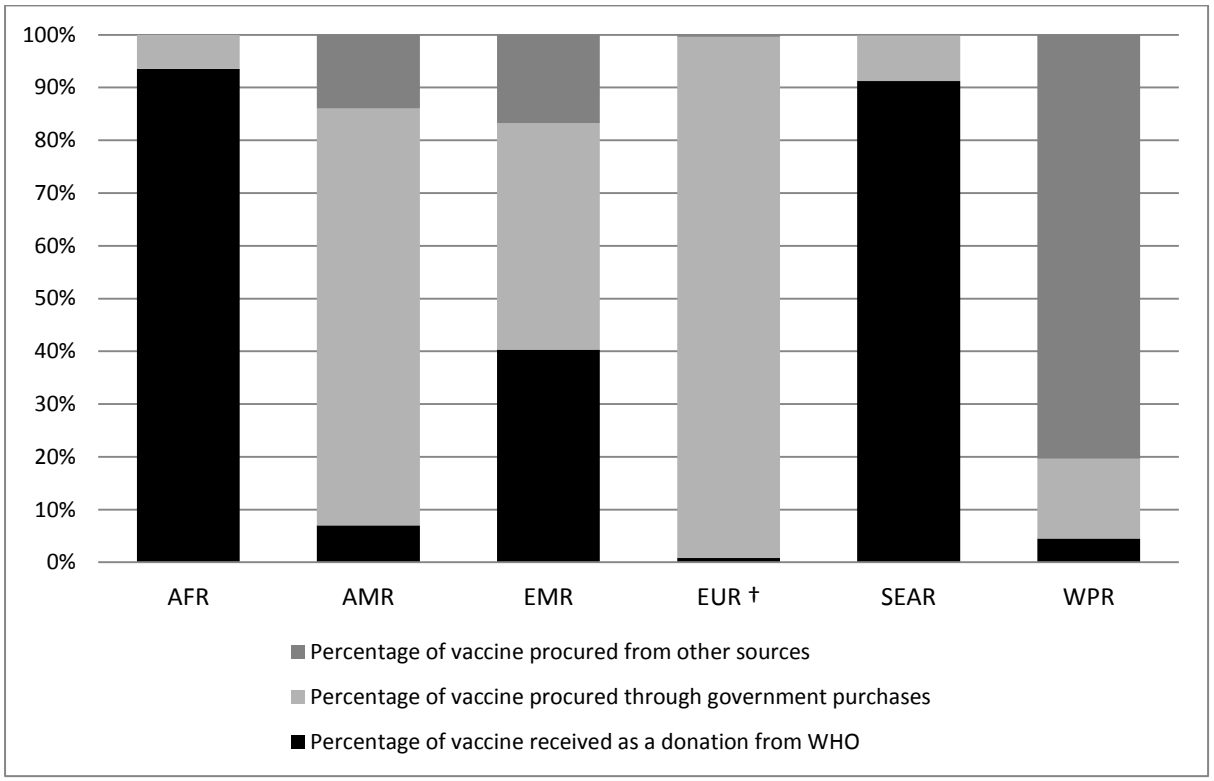
| Region | Total no. of doses received from all sources ‡ | % of vaccine received as deployment from WHO | % of vaccine procured through government purchases | % of vaccine procured from other sources |
|---|---|---|---|---|
| AFR | 33,955,078 | 94.5% | 6.5% | 0.0% |
| AMR | 143,968,840 | 7.0% | 79.0% | 14.0% |
| EMR | 10,784,000 | 40.3% | 42.9% | 16.8% |
| EUR ^ | 230,715,990 | 0.8% | 98.8% | 0.4% |
| SEAR | 23,110,200 | 91.2% | 8.7% | 0.1% |
| WPR | 193,089,000 | 4.5% | 15.1% | 80.4% |
| **Total** | 634,702,320 | **12.3%** | **59.4%** | **28.3%** |

† Only countries that participated in the 2010 WHO H1N1 Survey are tallied here. In total, 1.1 billion doses of vaccine were acquired by countries.

‡ Total number of doses received from all sources represents donations to countries in all regions eligible to receive WHO-donated vaccines combined with vaccine donations from other sources and vaccines procured through government purchases.

^ Only countries eligible to receive WHO-deployed vaccines in EUR participated in the survey.

**Figure 2: Distribution of pandemic A(H1N1) 2009 vaccine by source and region**




† Only countries eligible to receive WHO-deployed vaccines in EUR participated in the survey.

## III. Vaccine utilization and coverage

Pandemic A(H1N1) 2009 vaccine utilization and coverage for targeted and overall populations are shown in Table 5. While utilization and coverage for all targeted populations were lowest in EMR countries (4.0%), coverage for targeted populations and in the general population were, on average, low in all regions. AMR was the exception with 63.6% utilization. Annex 2 includes data about vaccine utilization and coverage according to the general country population in countries eligible for WHO-deployed vaccine. Data on vaccine utilization and coverage relative to entire populations in non-eligible countries are presented in Annex 3.

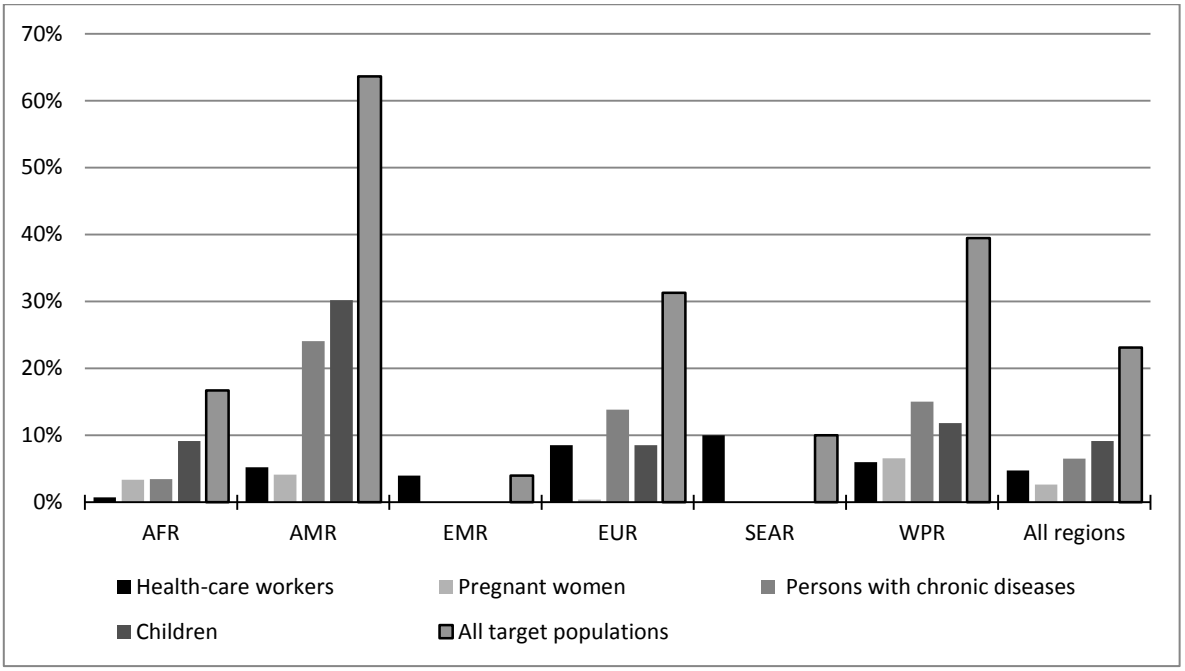
**Table 5: Utilization of WHO-deployed pandemic A(H1N1) 2009 vaccine in eligible countries, by targeted populations and by region**

| Region | Health-care workers | Pregnant women | Persons with chronic diseases | Children | All targeted populations |
|---|---|---|---|---|---|
| **AFR** | 0.7% | 3.4% | 3.4% | 9.2% | 16.7% |
| **AMR** | 5.2% | 4.1% | 24.1% | 30.2% | 63.6% |
| **EMR** | 4.0% | 0.0% | 0.0% | 0.0% | 4.0% |
| **EUR †** | 8.5% | 0.4% | 13.9% | 8.5% | 31.3% |
| **SEAR** | 10.0% | 0.0% | 0.0% | 0.0% | 10.0% |
| **WPR** | 6.0% | 6.6% | 15.0% | 11.8% | 39.5% |
| **All regions** | **4.8%** | **2.7%** | **6.5%** | **9.2%** | **23.1%** |

† Only countries eligible to receive WHO-donated vaccines in EUR participated in the WHO Survey.

Figure 3 illustrates the percentage of utilization of pandemic A(H1N1) 2009 vaccine deployed by WHO in each region by targeted populations: health-care workers; pregnant women; persons with chronic conditions; and children; and a total of all targeted populations across all six regions. Overall, the regions covered nearly one quarter of all targeted populations, representing some 38 million individuals.

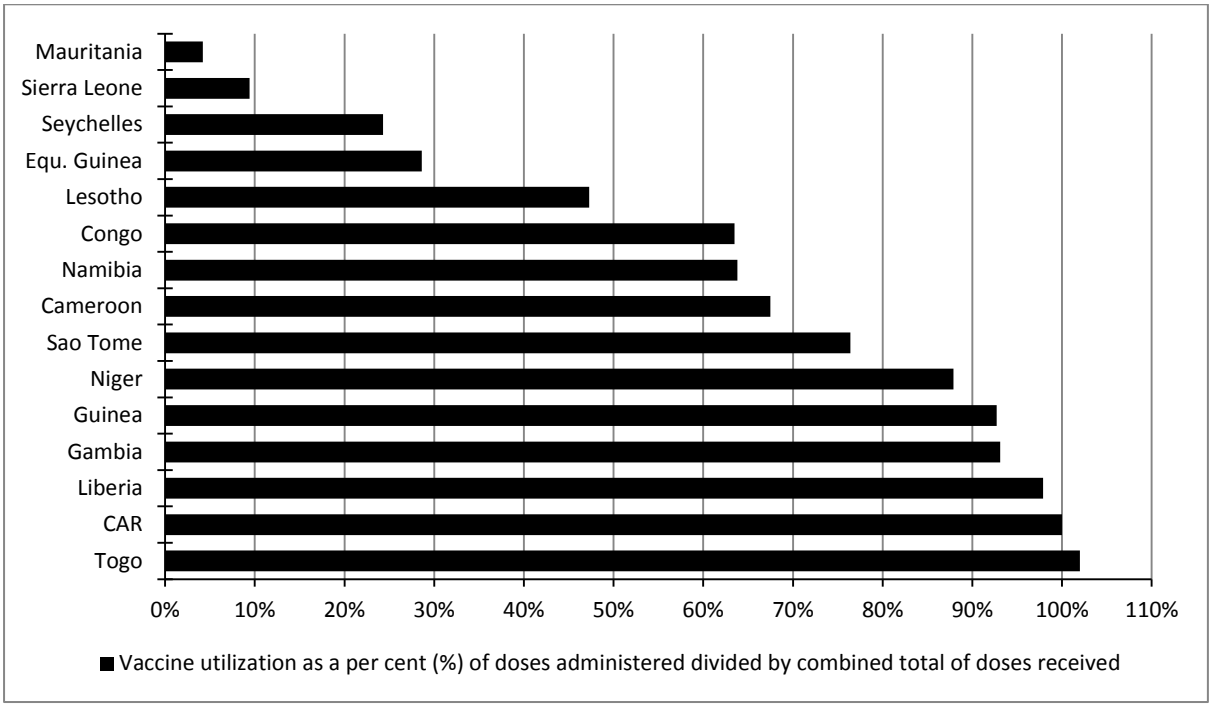
**Figure 3: Utilization of WHO-donated vaccines, by targeted populations and by region**



## African Region

Out of 46 Member States in the African Region (AFR), verifiable data on pandemic A(H1N1) 2009 vaccine utilization and coverage were available from 15 countries (Figure 4). The average coverage of total populations in these 15 countries was 1%, with vaccine utilization rate overall on an average of 6%, the latter ranging from 4% in Mauritania to 100% in Central Africa Republic and 102% in Togo. Pandemic A(H1N1) 2009 vaccines in AFR were administered to priority targeted populations: health-care workers, pregnant women, and individuals with chronic diseases along with children in some countries.

**Figure 4: Percentage of vaccine utilization in countries eligible for WHO-deployed vaccine, African Region**




Note: Out of 34 countries in the African Region that received WHO-deployed vaccine, only 15 reported verifiable distribution and utilization data through the WHO Survey (13) or by submitting a country report to WHO (2).

Table 6 shows the number of vaccine doses administered in each responding country and a comparison of planned vaccination coverage and coverage by total population.

**Table 6: Number of doses administered and percentage of planned vaccination coverage compared with vaccination coverage for total population, African Region**

| Country | Planned vaccination coverage (%) | No. of doses administered | Coverage by total country population (%) |
|---|---|---|---|
| **Equatorial Guinea** | 23% | 32,331 | 4.6% |
| **Central African Republic** | 11% | 448,000 | 10.2% |
| **Cameroon** | 10% | 1,232,484 | 6.3% |
| **Congo** | 10% | 253,942 | 6.3% |
| **Gambia** | 10% | 152,494 | 7.7% |
| **Guinea** | 10% | 972,613 | 9.7% |
| **Lesotho** | 10% | 92,252 | 4.3% |
| **Mauritania** | 10% | 12,387 | 0.4% |
| **Namibia** | 10% | 137,901 | 0.0% |
| **Niger** | 10% | 1,208,855 | 7.8% |
| **Sao Tome et Principe** | 10% | 12,219 | 7.4% |
| **Seychelles** | 10% | 2,188 | 2.5% |
| **Togo** | 10% | 676,931 | 11.2% |
| **Liberia** | 2% | 76,383 | 1.9% |
| **Senegal** | 2% | n.r. | 0.0% |

Note: Out of 34 countries in AFR that responded to the WHO H1N1 Survey, only 15 provided verifiable data on planned coverage number of doses administered.

n.r. = not reported.

**Americas Region**

Verifiable data on pandemic A(H1N1) 2009 vaccine utilization were available from 24 of 35 Member States in the Americas Region (AMR), including 10 countries that received WHO-deployed vaccines. Of those 10, eight reported verifiable data for vaccine utilization through the current WHO Survey. Only nine countries that procured vaccines through other donations or government purchases reported verifiable data. Figure 7 shows the percentage of vaccine utilization in eligible and non-eligible countries for WHO-deployed vaccine, while Table 7 provides the number of doses utilized and vaccine coverage per total population compared with planned coverage.

**Figure 5: Percentage of vaccine utilization in countries eligible and non-eligible for WHO-deployed vaccine, Americas Region**

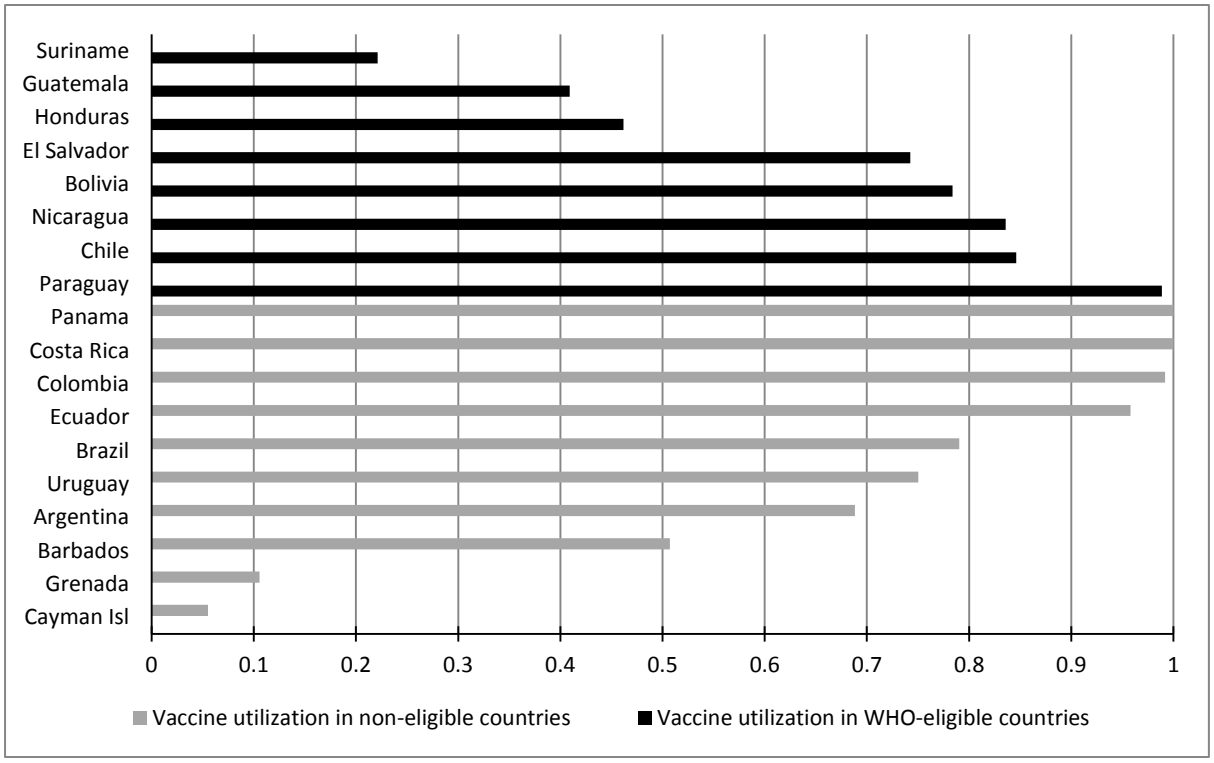



**Table 7: Number of doses administered and percentage of planned vaccination coverage compared with vaccination coverage for total population, Americas Region**

| Country | Planned vaccination coverage (%) | No. of doses administered | Coverage by total country population (%) |
|---|---|---|---|
| **Guyana** | 37% | n.r. | n.a. |
| **El Salvador** | 34% | 1,690,101 | 27% |
| **Honduras** | 24% | 999,801 | 13% |
| **Nicaragua** | 14% | 626,886 | 11% |
| **Suriname** | 11% | 22,129 | 4% |
| **Bolivia** | 10% | 1,097,280 | 11% |
| **Guatemala** | 10% | 531,926 | 4% |
| **Paraguay** | 10% | 1,186,477 | 18% |
| **Chile** | 7% | 3,553,338 | 21% |
| **Cuba** | n.r. | n.r. | n.a. |

Of 35 Member States in AMR, 10 countries were eligible for WHO-donated vaccines. Out of those 10, nine reported verifiable data.
n.r. = not reported. n.a. = not available.

**Eastern Mediterranean Region**

Verifiable data on pandemic A(H1N1) 2009 vaccine utilization and coverage were available from 11 out of 22 countries in the Eastern Mediterranean Region (EMR), including four countries eligible for WHO-deployed vaccine. Only seven countries reported verifiable data for planned vaccine coverage and coverage by total country population. Out of those seven, only two countries eligible for WHO vaccine deployment reported verifiable planned and total coverage data (Figure 6 and Table 8). Overall, vaccine utilization was 38% with coverage barely reaching 1% of the total population for those countries that reported verifiable data. Competing priorities and adverse public and media communications were reported to have played a major role in this.

**Figure 6: Percentage of vaccine utilization in countries eligible and non-eligible for WHO-deployed vaccine, Eastern Mediterranean Region**

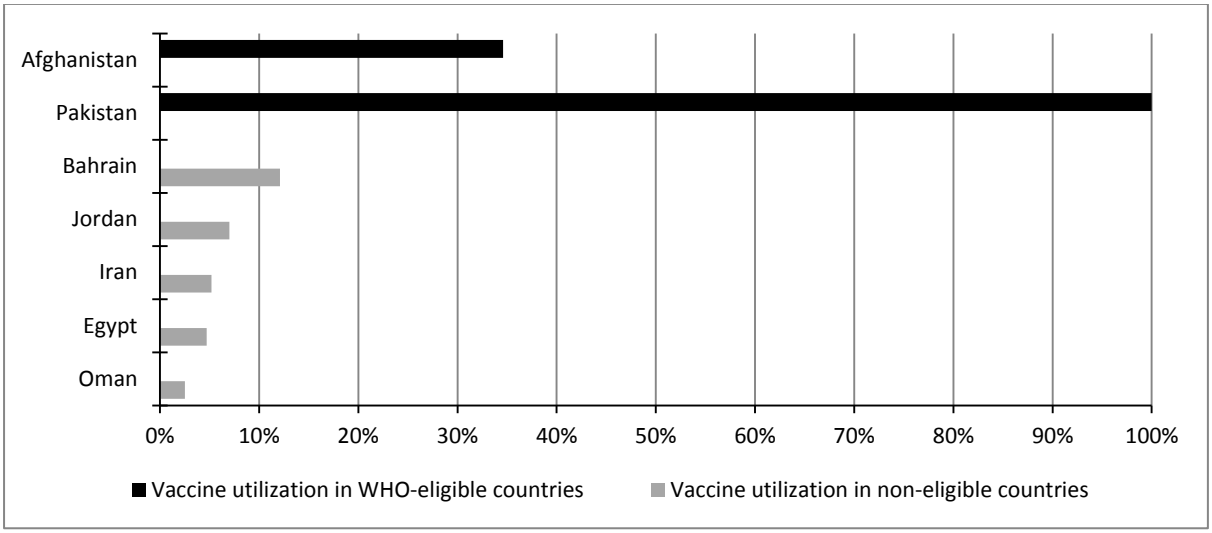



**Table 8: Number of doses administered and percentage of planned vaccination coverage compared with vaccination coverage for total population, Eastern Mediterranean Region**

| Country | Planned vaccine coverage (%) | No. of doses administered | Coverage by total country population (%) |
|---|---|---|---|
| **Afghanistan** | 2% | 174,600 | 1% |
| **Pakistan** | 2% | 3,668,700 | 2% |
| **Sudan** | n.r. | n.r. | n.a. |
| **Syrian Arab Republic** | n.r. | n.r. | n.a. |

Out of 22 Member States in EMR, four were eligible for WHO-deployed vaccine.

n.a. = not available. n.r. = not reported.

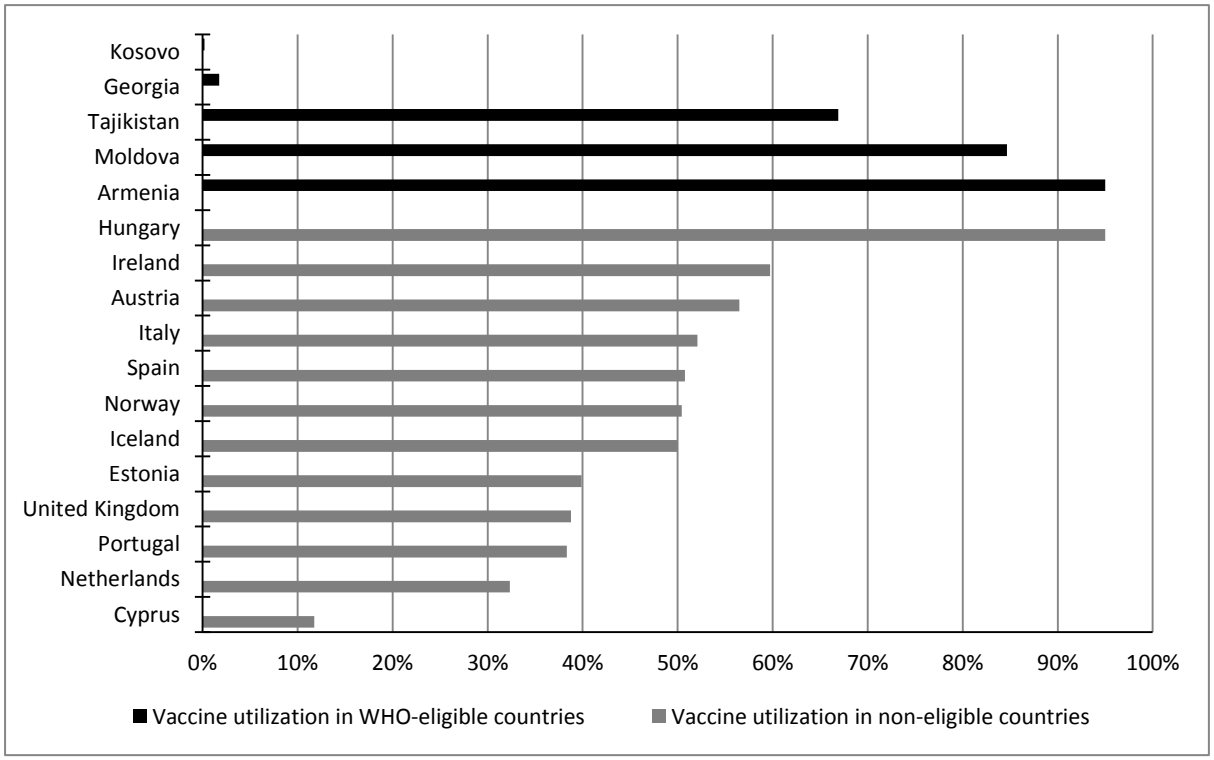
**European Region**

The European Region (EUR) has 53 Member States including 30 countries comprising the European Union/European Economic Area (EU/EEA). Of these countries seven (six Member States and one non-Member State) were eligible for WHO-deployed vaccines. Six of the seven recipients supplied verifiable data on pandemic A(H1N1) 2009 vaccine coverage and utilization.

Additional data for 29 EU/EEA countries on coverage by country population and target groups are available from the Vaccine European New Integrated Collaboration Effort Pandemic A(H1N1) 2009 Influenza Vaccination Survey, Influenza season 2009/2010 (hereafter, VENICE II Survey) (see Annex 3). Out of the 29, verifiable data were available for 12 countries.

Among the six WHO-eligible countries, the reported overall vaccine utilization rate was 53%, with an average total country population coverage of 3.5% (Figure 7). Targeted groups in EUR included: health-care workers, pregnant women, and individuals with chronic diseases as well as essential personnel. In addition, Moldova reported vaccinating children.

**Figure 7: Percentage of vaccine utilization in countries eligible and non-eligible for WHO-deployed vaccine, European Region**




Sources: WHO 2010 Survey and VENICE II Survey.

**Table 9: Number of doses administered and percentage of planned vaccination coverage compared with vaccination coverage for total population, European Region**

| Country | Planned vaccination coverage (%) | No. of doses administered | Coverage by total country population (%) |
|---|---|---|---|
| **Moldova** | 10% | 744,996 | 21% |
| **Tajikistan** | 10% | 448,260 | n.a. |
| **Azerbaijan** | 6% | n.r. | n.a. |
| **Kosovo** | 6% | 200 | n.a. |
| **Georgia** | 2% | 1,759 | n.a. |
| **Armenia** | n.r. | 10,925 | n.a. |

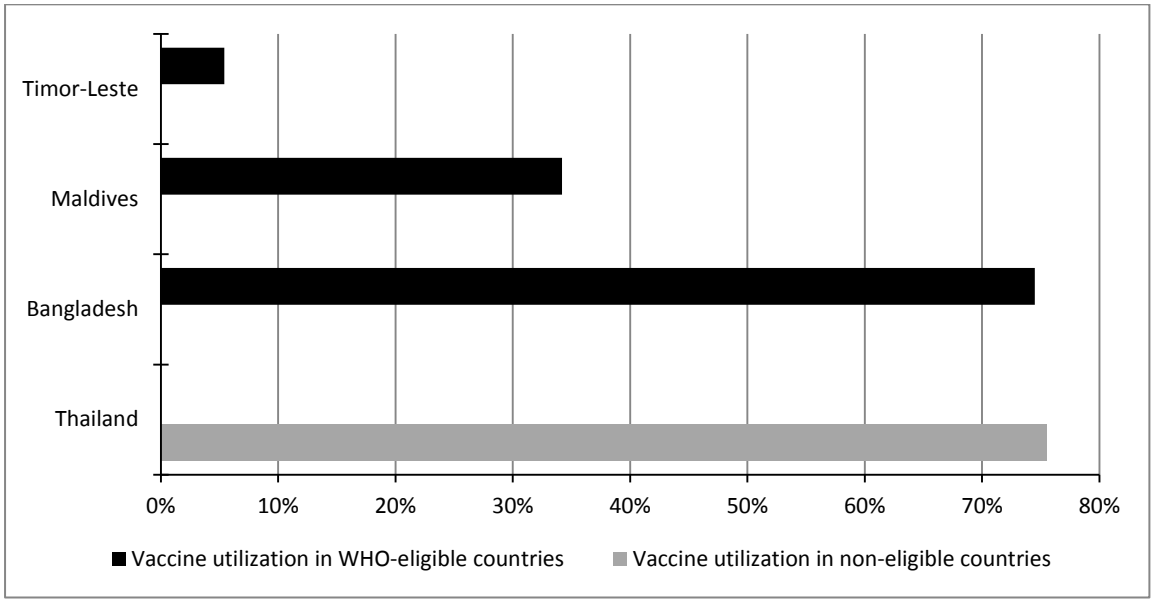
In the EUR, 52 countries are Member States, but there are 54 countries in the EU/EEA. Out of 54 countries, seven were eligible for WHO-deployed vaccine. Of those seven, five reported verifiable data through the WHO H1N1 Survey.

n.a. = not available. n.r. = not reported.

**South-East Asia Region**

Verifiable data on pandemic A(H1N1) 2009 vaccine coverage and utilization were available from eight of 11 Member States in SEAR, of which seven were eligible for WHO-deployed vaccines. Of those seven, four reported verifiable data for vaccine utilization (one of the four reported zero data). Out of 11 Member States that received vaccines through other donations or government purchases, only one reported verifiable data for vaccine utilization (Figure 8).

**Figure 8: Percentage of vaccine utilization in countries eligible and non-eligible for WHO-deployed vaccine, South-East Asia Region**




Vaccine utilization coverage by total country population for all reporting countries was 4.2% and 4.8% for those that received vaccines through WHO. The vaccine was administered as a priority to health-care workers, pregnant women, individuals with chronic diseases, and children. High vaccine utilization was reported among health-care workers, pregnant women, and individuals with chronic diseases. By total targeted populations, coverage ranged from 5.4% in Timor-Leste to 75% in Thailand.

Out of the seven Member States that participated in the WHO H1N1 Survey or for whom verifiable data were available, only four provided data for planned and total vaccine coverage (Table 10).

**Table 10: Number of doses administered and percentage of planned vaccination coverage compared with vaccination coverage for total population, South-East Asia Region**

| Country | Planned vaccine coverage (%) | No. of doses administered | Coverage by total country population (%) |
|---|---|---|---|
| **Bangladesh** | 10% | 11,621,322 | 8% |
| **Maldives** | 10% | 16,321 | 5% |
| **Sri Lanka** | 10% | n.r. | n.a. |
| **Timor-Leste** | 10% | 6,500 | 1% |

Out of 11 Member States in SEAR, seven were eligible for WHO-deployed vaccines. Of those seven, four reported verifiable data for planned coverage and doses administered.

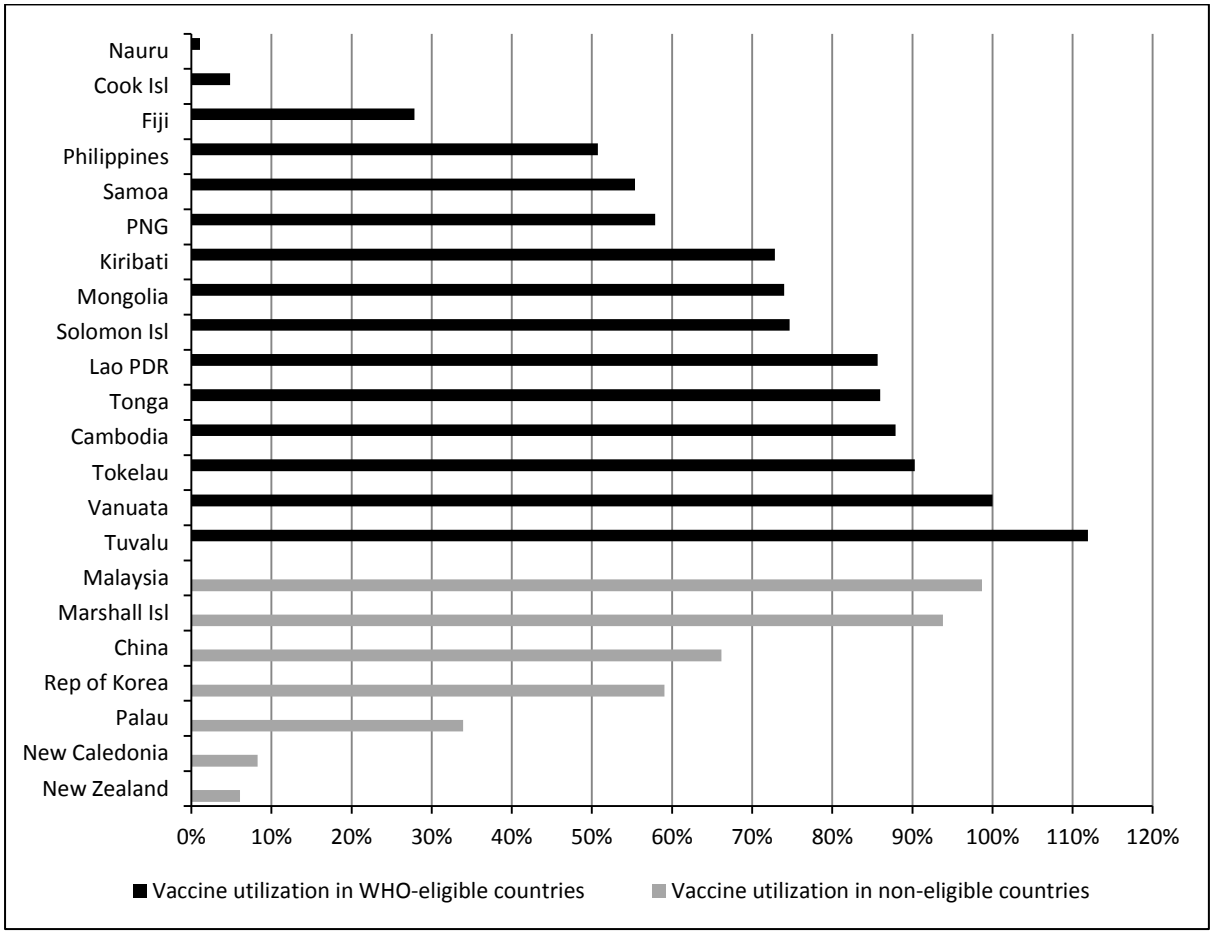
n.a. = not available. n.r. = not reported.

**Western Pacific Region**

Out of 27 Member States in WPR, verifiable data were available from 25 countries, of which 16 were WHO-eligible countries. For vaccine utilization, 21 Member States and one territory reported verifiable data.

In Tuvalu (pop. 10 000), nearly 1900 doses of vaccine were received and distributed, and 1119 doses were administered over their planned vaccination coverage of 10%. Contrast this with the Philippines (pop. 93.2 million), where 3.4 million doses were received. Nearly 3.1 million doses were distributed and 1.7 million were administered. The planned coverage rate was 4%, which resulted in a utilization rate of nearly 51% for targeted populations (Figure 9). As a percentage of total country population, the utilization rate was 2% (Table 11).

**Figure 9: Percentage of vaccine utilization in countries eligible and non-eligible for WHO-deployed vaccine, Western Pacific Region**



Within WPR, 16 countries were eligible for WHO-deployed vaccines. Nearly all 16 reported verifiable data for planned and total vaccination coverage (Niue did not report coverage by total country population).

**Table 11: Number of doses administered and percentage of planned vaccination coverage compared with vaccination coverage for total population, Western Pacific Region**

| Country | Planned vaccine coverage (%) | No. of doses administered | Coverage by total country population (%) |
|---|---|---|---|
| **Tokelau** | 105% | 1,445 | 102% |
| **Niue** | 104% | n.r. | 0% |
| **Cook Islands** | 102% | 963 | 5% |
| **Tonga** | 96% | 85,998 | 83% |
| **Nauru** | 88% | 95 | 1% |
| **Mongolia** | 21% | 629,577 | 23% |
| **Cambodia** | 18% | 2,384,968 | 17% |
| **Samoa** | 17% | 15,506 | 8% |
| **Fiji** | 10% | 24,569 | 3% |
| **Kiribati** | 10% | 7,282 | 7% |
| **Lao Democratic People's Republic** | 10% | 857,223 | 14% |
| **Papua New Guinea** | 10% | 405,148 | 6% |
| **Solomon Islands** | 10% | 41,080 | 8% |
| **Tuvalu** | 10% | 1,119 | 11% |
| **Vanuatu** | 10% | 25,000 | 10% |
| **Philippines** | 4% | 1,726,647 | 2% |

Out of 27 Member States and 3 Territories in WPR, 16 countries were eligible for WHO-deployed vaccine. Of those 16, all 16 reported verifiable data for planned coverage and number of doses administered.

n.r. = not reported.

## IV. Supply chain logistics

### Capacity for Supply chain and logistics

Overall, 56% of the countries (47 out of 84) across all regions reported sufficient capacity for supply chain and logistics. In total, 71% of countries in AFR, 61% of countries in AMR, 63% of countries in EMR, 43% of countries in EUR, 57% of countries in SEAR, and 44% of countries in WPR reported having sufficient supply chain and logistics capacity across all categories: storage; distribution; transportation and other (vaccination programmes and communications) (Table 12).

A majority of survey respondents reported relatively high warehouse and cold storage capacity (88%). Storage of ancillary items was also high, with 92% of countries reporting adequate storage capacity. In the logistics of vaccine distribution, 24% of countries reported inadequacies in ice making and 19% reported an inability to monitor temperatures in vaccine storage. Most countries reported sufficient supplies of cold boxes and cold packs (92% and 88%, respectively). Transport vehicles for vaccines were adequate for most countries (88%), but capacity for the collection and transport of waste materials was only 80%.

In terms of vaccination activities, vaccinators and trained supervisors were insufficient with 20% of countries reporting a lack of surge capacity in these areas. The number of vaccination sites faired only slightly better with 12% of countries reporting they did not have enough sites.

In 26% of countries, radios, telephones, mobile phones, and fax machines did not function at optimal levels, resulting in poor communication and reporting between the national and sub-national levels.

**Table 12: Percentage of countries reporting adequate supply and logistics capacity, by region**

| | | % of countries with adequate capacity | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Region** | **No. of countries responding** | **Warehouse/ cold store** | **Ancillary items in storage** | **Cold-boxes** | **Cold packs** | **Ice making** | **Temperature monitoring** | **Transport vehicles** | **Waste collection/ transport** | **Vaccinators** | **Trained supervisors** | **Vaccination sites** | **Communication hardware** |
| AFR | 14 | 93% | 100% | 93% | 93% | 93% | 100% | 100% | 93% | 93% | 86% | 93% | 64% |
| AMR | 23 | 87% | 87% | 91% | 83% | 70% | 78% | 78% | 74% | 70% | 78% | 87% | 74% |
| EMR | 8 | 88% | 88% | 88% | 88% | 75% | 88% | 88% | 75% | 88% | 88% | 88% | 75% |
| EUR † | 7 | 86% | 86% | 86% | 86% | 57% | 57% | 86% | 86% | 86% | 71% | 86% | 86% |
| SEAR | 7 | 86% | 86% | 86% | 86% | 71% | 71% | 86% | 71% | 71% | 57% | 71% | 57% |
| WPR | 25 | 88% | 96% | 96% | 92% | 80% | 80% | 92% | 80% | 80% | 84% | 92% | 80% |
| **Total** | **84** | **88%** | **92%** | **92%** | **88%** | **76%** | **81%** | **88%** | **80%** | **80%** | **80%** | **88%** | **74%** |

† Only countries eligible to receive WHO-deployed vaccine in EUR who responded to the 2010 WHO H1N1 Survey are included.

**Delivery of vaccine and ancillary items to end-user points as planned in the NDVPs**

Of the countries responding to the survey, 68% indicated that pandemic A(H1N1) 2009 vaccine and ancillary items were delivered to 80% of end users within 7 days of their receiving the material. In SEAR and WPR, 57% and 64% of the countries, respectively, reported that they were able to achieve delivery within 7 days. These regions include countries with geographical accessibility problems such as those with island groups or difficult terrains; consequently, distribution times for the vaccines varied. Some islands had vaccine and ancillary items delivered by air. Countries such as New Zealand and Singapore stated that vaccination was not done within the context of a campaign, so clinics placed orders as and when required based on demand from patients.

Some countries in AFR reported delays in delivery due to challenges posed by competing activities. For example, polio outbreaks occasionally occurred during the pandemic vaccination campaigns, thus interrupting these activities**.** Liberia reported a lack of adequate funds for logistics support, while some countries reported that mobilizing human and social resources took longer than expected.

In AMR, a delay in delivery was reported in countries with large populations, such as Brazil. Other reasons for delay included the breakdown of transport vehicles (Colombia). In EMR, some countries did not administer their pandemic A(H1N1) 2009 vaccinations as part of a separate campaign, but rather integrated them into their routine immunization programmes.

**Table 13: Percentage of countries in which their NDVP indicated vaccine and ancillary items will be delivered to 80% of end users within 7 days**

| Region | No. of countries responding to the 2010 WHO Survey | No. of respondents with an NDVP indicating delivery to 80% within 7 days | Percentage |
|---|---|---|---|
| AFR | 14 | 10 | 71% |
| AMR | 23 | 15 | 65% |
| EMR | 8 | 6 | 75% |
| EUR † | 7 | 6 | 86% |
| SEAR | 7 | 4 | 57% |
| WPR | 25 | 16 | 64% |
| **Total** | **84** | **57** | **68%** |

† Only WHO-eligible countries in EUR who responded to the 2010 WHO Survey are included.

## V. Public information and communications

### Public perceptions and concerns about pandemic A(H1N1) 2009 vaccine

Across all regions, 93% of countries eligible to receive WHO-deployed vaccine reported public perceptions and concerns regarding pandemic A(H1N1) 2009 vaccination in their country (see Table 14). Overall, the main public perceptions and concerns were vaccine safety (86%), the need for the vaccine (75%), vaccine efficacy (50%), and vaccine benefits (25%). Other concerns included vaccine availability and a desire to know why only target groups were immunized, as well as uncertainty about the origin and impact of the vaccine or how it should be utilized. Three countries cited negative press affecting their utilization of the vaccination and influencing the public's perception about the need or efficacy of the vaccine.

**Table 14: Primary concerns among the public about pandemic A(H1N1) 2009 vaccine, by region**

| | | | Primary concerns | | | | |
|---|---|---|---|---|---|---|---|
| **Region** | **No. of countries responding to the 2010 WHO Survey** | **No. of respondents with public perception concerns about the vaccine** | **Vaccine safety** | **Vaccine need** | **Vaccine efficacy** | **Vaccine benefits** | **Other** |
| AFR | 14 | 13 | 71% | 71% | 43% | 57% | 21% |
| AMR | 23 | 21 | 91% | 74% | 35% | 0% | 13% |
| EMR | 8 | 7 | 88% | 50% | 50% | 25% | 25% |
| EUR † | 7 | 6 | 86% | 57% | 43% | 0% | 43% |
| SEAR | 7 | 6 | 71% | 86% | 57% | 14% | 0% |
| WPR | 25 | 25 | 92% | 88% | 68% | 40% | 28% |
| **Total** | **84** | **78** | **86%** | **75%** | **50%** | **25%** | **21%** |

† Only WHO-eligible countries in EUR who responded to the 2010 WHO Survey are included.

**Communication strategies for priority groups**

Communication strategies were developed for health-care workers, pregnant women, and individuals with chronic conditions (see Table 15). Other groups included essential workers; dependents of health-care workers; fire, police, immigration, and border control; transport workers; media; energy; and other security personnel. Children, along with adults more than 65 years old, were also included in the communication strategies, as were hajj pilgrims and ethnic minorities in some countries. Several countries also made vaccines available to the general public and anyone not in targeted populations who requested vaccination.

**Table 15: Communication strategies and priority groups, by region and by target group**

| | | | | Communication strategies for target groups | | | |
|---|---|---|---|---|---|---|---|
| Region | No. of countries responding to the 2010 WHO Survey | No. of respondents with communication strategies and prioritization | % of respondents with enough funds to execute media activities | Health-care workers | Pregnant women | Individuals with chronic diseases | Others |
| **AFR** | 14 | 13 | 71% | 100% | 93% | 86% | 71% |
| **AMR** | 23 | 20 | 52% | 91% | 83% | 87% | 13% |
| **EMR** | 8 | 7 | 75% | 88% | 50% | 75% | 25% |
| **EUR †** | 7 | 6 | 57% | 57% | 57% | 57% | 29% |
| **SEAR** | 7 | 6 | 57% | 86% | 57% | 71% | 14% |
| **WPR** | 25 | 24 | 72% | 96% | 100% | 96% | 32% |
| **Total** | **84** | **76** | **64%** | **90%** | **82%** | **85%** | **31%** |

* Only countries eligible to receive WHO-deployed vaccine in EUR who responded to the 2010 WHO H1N1 Survey are included.

## VI. Post-marketing surveillance

The majority of countries (85%) reported the occurrence of adverse effects following immunization (AEFI) through their existing surveillance systems during the vaccination campaign (see Table 16). In countries with no such system, reporting sheets and standard operating procedures were developed for AEFI associated with pandemic A(H1N1) 2009 vaccination.

**Table 16: Post-marketing surveillance system for AEFI following seasonal influenza vaccine, by region**

| Region | No. of countries responding to the 2010 WHO Survey | No. of respondents with post-marketing surveillance for AEFI following seasonal influenza vaccination | Percentage of respondents with post-marketing surveillance |
|---|---|---|---|
| **AFR** | 14 | 12 | 86% |
| **AMR** | 23 | 21 | 91% |
| **EMR** | 8 | 6 | 75% |
| **EUR †** | 7 | 6 | 86% |
| **SEAR** | 7 | 6 | 86% |
| **WPR** | 25 | 20 | 80% |
| **Total** | **84** | **71** | **85%** |

† Only countries eligible to receive WHO-deployed vaccine in EUR who responded to the 2010 WHO Survey are included.

## VII. Lessons learned

### Communications

The most frequently cited area of concern, and where the lessons learned seem to be strongest, was the area of communications.(2) Lack of clarity about the pandemic vaccination campaigns, especially about the safety of the vaccine, a lack of transparency in the public health decision making process, and a lack of evidence-based counter messages against anti-vaccine statements resulted in resistance to receiving the pandemic vaccine among targeted groups. Surprisingly, among targeted populations where acceptance for the need of immunization is often high (i.e. health-care professionals particularly) coverage was low in the initial phases of the campaign. Advocacy and better communication targeted at public, health professionals, and government officials are needed in order to improve vaccine uptake. This will require an integrated approach that takes into account risk communication, social mobilization, and individual behavioral change.

### Vaccine packaging, availability, and transport issues

Timely availability of the vaccine needs to be improved, ensuring enough stocks are available from manufacturers and improving transport and other logistics. In the latter case, exceptional means of transport should be considered, for example using military trucks. In certain countries, especially in the AFR, multi-dose vaccine containers were considered problematic. It was suggested that single-dose vials and single-use syringes be made available in the future to limit vaccine loss due to leaving multi-dose vials remaining open after first use. Ancillary products should be made available at the same time as the vaccine or even earlier. Likewise, sufficient vaccine should be available as early as possible in the pandemic and regulatory and customs clearance processes need to be improved.

Across all components of the cold chain, a majority of countries reported adequate facilities and supplies for managing vaccine integrity. At least 92% of countries reported they had adequate cold boxes and sufficient ancillary items in storage. For warehouse/cold stores and cold packs, the numbers were slightly lower at 88% for reporting countries. Between 8%–12% of countries responded that cold chain logistics and supplies were insufficient. As a result, it was recommended that efforts be made to use a single type of vaccine for each country, so that monitoring and supervision activities can be made easier. It is also important that the expiration date of pandemic vaccines be extended, ensuring adequate time for their use.

### Planning and supervision

Improvements in planning and supervision of pandemic A(H1N1) 2009 vaccine campaigns are needed. Planning and implementation need to be flexible and based on a multi-sectoral approach involving all stakeholders, with a national task force in place to ensure smooth coordination. It was suggested that creating a database for tracking vulnerable populations would make identifying target groups easier in the future, especially since obtaining sufficient information about persons with underlying chronic diseases was a problem.

Several countries mentioned that more effort is needed to strengthen epidemiology and virology surveillance at local and national levels and additional training is needed to strengthen human resources capacity around deployment and vaccination activities.

Campaign coordination should be done locally and should be started several weeks before vaccination begins, with staff training as an important element. Data recording and reporting should be made as simple and straightforward as possible.

## CONCLUSIONS

Pandemic influenza A(H1N1) 2009 vaccination was one of the essential activities undertaken in response to the pandemic. Management and organization of the vaccination campaigns in the countries participating in this survey was uneven in quality, with barriers to vaccine importation causing inadequate availability and occasionally disrupting campaign plans. Vaccine distribution was generally achieved by the local level of country health systems according to schedules that were in place prior to the start of the pandemic, with variations in lead times among countries due to local circumstances, while team performance improved where there was greater supervision.

In several regions, WHO-deployed vaccine was either the only or the main source of vaccines and deployment and utilization was dependent on arrangements for vaccines and ancillary materials to be delivered free of charge from its main commercial suppliers. Vaccination coverage for target groups in some countries was difficult to track due to local circumstances and the evolution of the pandemic locally. However, in general, the overall goal of 2% or 10% coverage of targeted populations in eligible countries was achieved.

Generally, countries in all regions reported sufficient supply chain capacity for deploying and administering the vaccine and were able to deliver the vaccine and ancillary materials within the prescribed time period after receipt. Some reported disruptions in their campaigns due to competing activities such as emergency polio vaccinations due to unexpected outbreaks, while in certain instances there were delays in mobilizing human and social resources.

Public information and communications were focused primarily on responding to concerns over pandemic vaccine safety and the need for vaccination as well as vaccine efficacy and benefits. Communications strategies were formulated for priority groups and in most countries were able to find sufficient funding for these activities. However, in too many countries, funding for communication was problematic.

The majority of reporting countries also had functioning AEFI surveillance systems. The number of incidences varied among regions, with the majority of countries reporting a low rate of incidents.

Lessons learned most frequently concerned communications. Many countries recommended improving public communications campaigns, enhancing pre-campaign education, providing better focus on priority groups and proactively countering all anti-vaccination rumors. Vaccine availability needs to be timely and refrigeration infrastructure needs to be enhanced and better maintained. Planning and supervision need to be supported with better information and also need to be based on a multi-sectoral approach, with campaign coordination starting at least several weeks before actual activities begin.

Pandemic preparedness is an ongoing concern, and this study has provided information about the degree to which NDVPs were implemented. It has also identified strengths and weaknesses in implementing the constitutive activities of these plans. This information, along with the lessons learned, will be useful for future pandemic planning and will also direct attention to those regions and countries where help is most needed.

## REFERENCES

1. Report of the WHO Pandemic Influenza A(H1N1) Vaccine Deployment Initiative. Geneva, World Health Organization, 2012.
http://whqlibdoc.who.int/publications/2012/9789241564427_eng.pdf.

2. Hanquet G, Van Damme P, Brasseur D, et al. Lessons learnt from pandemic A(H1N1) 2009 influenza vaccination. Highlights of a European workshop in Brussels (22 March 2010). *Vaccine*, 2011;29(3):370-7.

# ANNEXES

## Annex I: List of countries that participated in the 2010 WHO A(H1N1) Survey

| | WHO vaccine-eligible countries | | Non-vaccine eligible countries | | |
|---|---|---|---|---|---|
| **Region** | **Number of countries participating in the survey** | **Country list** | **No. of countries participating in the survey** | **Country list** | **Total** |
| **AFR** | **14** | Central African Republic, Congo, Equatorial Guinea, Gambia, Guinea, Lesotho, Liberia, Mauritania, Namibia, Niger, Sao Tomé et Principe, Seychelles, Sierra Leone, Togo | **0** | | **14** |
| **AMR** | **9** | Bolivia, Chile, El Salvador, Guatemala, Guyana, Honduras, Nicaragua, Paraguay, Suriname | **14** | Argentina, Barbados, Belize, Brazil, Cayman Islands, Colombia, Costa Rica, Ecuador, Grenada, Jamaica, Panama, Santa Lucia, Trinidad and Tobago, Uruguay | **23** |
| **EMR** | **1** | Afghanistan | **7** | Bahrain, Egypt, Iran, Jordan, Lebanon, Oman, Syrian Arab Republic | **8** |
| **EUR** | **7** | Armenia, Azerbaijan, Georgia, Kosovo, Kyrgyzstan, Moldova, Tajikistan | **0** | | **7** |
| **SEAR** | **4** | Bangladesh, Maldives, Sri Lanka, Timor-Leste | **3** | Indonesia, Nepal, Thailand | **7** |
| **WPR** | **16** | Cambodia, Cook Islands, Fiji, Kiribati, Lao People's Democratic Republic, Mongolia, Nauru, Niue, Papua New Guinea, Philippines, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu | **9** | Australia, China, Malaysia, Marshall Islands, New Caledonia, New Zealand, Palau, Republic of Korea, Singapore | **25** |
| **Total** | **51** | | **33** | | **84** |

## Annex II: Percentage of vaccine utilization and coverage in countries eligible for WHO-deployed vaccine, by region

Data presented in these tables are for countries that received vaccines from WHO and participated in the 2010 WHO Survey. In total, 84 countries across the six WHO regions received vaccines from the Organization. Of the 84, 77 responded to the survey.

**African Region**

| Country | Vaccine utilization (%) | Coverage by country population (%) |
|---|---|---|
| **Central African Republic** | 71% | 10% |
| **Congo** | 42% | 6% |
| **Gambia** | 89% | 9% |
| **Guinea** | 93% | 10% |
| **Lesotho** | 47% | 4% |
| **Liberia** | 36% | 2% |
| **Mauritania** | 4% | 0.4% |
| **Namibia** | 64% | n.r. |
| **Niger** | 68% | 8% |
| **Sao Tome and Principe** | 76% | 8% |
| **Senegal †** | n.r. | n.r. |
| **Seychelles** | 24% | 3% |
| **Sierra Leone** | 9% | 1% |
| **Togo** | 102% | 11% |

n.r. = not reported.

† Senegal administered its vaccines but did not report data on utilization or coverage.

**Americas Region**

| Country | Vaccine utilization (%) | Coverage by country population (%) |
|---|---|---|
| **Bolivia** | 78% | 11% |
| **Chile** | 85% | 21% |
| **El Salvador** | 74% | 27% |
| **Guatemala** | 51% | 4% |
| **Guyana** | n.r. | n.r. |
| **Honduras** | 46% | 13% |
| **Nicaragua** | 84% | 11% |
| **Paraguay** | 99% | 18% |
| **Suriname** | 22% | 4% |

n.r. = not reported.

| Eastern Mediterranean Region | | |
|---|---|---|
| **Country** | **Vaccine utilization (%)** | **Coverage by country population (%)** |
| **Afghanistan** | 35% | 1% |

| European Region | | |
|---|---|---|
| **Country** | **Vaccine utilization (%)** | **Coverage by country population (%)** |
| **Armenia** | 95% | 0.4% |
| **Azerbaijan** | n.r. | n.r. |
| **Georgia** | 2% | 0.04% |
| **Kosovo** | 0.2% | 0.01% |
| **Kyrgyzstan ‡** | n.r. | n.r. |
| **Moldova** | 85% | 21% |
| **Tajikistan** | 67% | n.r. |

n.r. = not reported.

‡ Kyrgyzstan reported it canceled its vaccination campaign.

| South-East Asia Region | | |
|---|---|---|
| **Country** | **Vaccine utilization (%)** | **Coverage by country population (%)** |
| **Bangladesh** | 75% | 8% |
| **Maldives** | 34% | 5% |
| **Sri Lanka** | n.r. | n.r. |
| **Timor-Leste** | 5% | 1% |

n.r. = not reported.

| Western Pacific Region | | |
|---|---|---|
| **Country** | **Vaccine utilization (%)** | **Coverage by country population (%)** |
| **Cambodia** | 88% | 17% |
| **Cook Islands** | 5% | 5% |
| **Fiji** | 28% | 3% |
| **Kiribati** | 73% | 7% |
| **Lao People's Democratic Republic** | 86% | 14% |
| **Mongolia** | 74% | 23% |
| **Nauru** | 1% | 1% |
| **Niue** | n.r. | n.r. |
| **Papua New Guinea** | 58% | 6% |
| **Philippines** | 51% | 2% |
| **Samoa** | 55% | 9% |
| **Solomon Islands** | 75% | 8% |
| **Tokelau** | 90% | 102% |
| **Tonga** | 86% | 82% |
| **Tuvalu** | 112% | 11% |
| **Vanuatu** | 100% | 10% |

## Annex III: Percentage of vaccine utilization and coverage in non WHO-eligible countries by region

Data presented here for countries in AMR, EMR, SEAR, and WPR are derived from respondents to the 2010 WHO Survey. Data for EU/EEA countries in EUR are derived from the VENICE II Survey, which provided limited information on utilization and coverage for a few countries.

**Americas Region**

| Country | Vaccine utilization (%) | Coverage by country population (%) |
|---|---|---|
| **Argentina** | 69% | 20% |
| **Barbados** | 51% | 4% |
| **Belize** | n.r. | n.r. |
| **Brazil** | 79% | 46% |
| **Cayman Islands** | 6% | 1% |
| **Colombia** | 99% | 4% |
| **Costa Rica** | 100% | 4% |
| **Ecuador** | 96% | 700% |
| **Grenada** | 11% | 0.4% |
| **Jamaica** | n.r. | n.r. |
| **Panama** | 100% | 9% |
| **Santa Lucia** | n.r. | n.r. |
| **Trinidad and Tobago** | n.r. | 2% |
| **Uruguay** | 75% | 16% |

n.r. = not reported.

**Eastern Mediterranean Region**

| Country | Vaccine utilization (%) | Coverage by country population (%) |
|---|---|---|
| **Bahrain** | 12% | 1% |
| **Egypt** | 5% | 0.1% |
| **Iran** | 5% | 0.09% |
| **Jordan** | 7% | 1% |
| **Lebanon** | n.r. | n.r. |
| **Oman** | 3% | 1% |
| **Syrian Arab Republic** | 99% | n.r. |

n.r. = not reported.

| European Region † | | |
|---|---|---|
| **Country** | **Vaccine utilization (%)** | **Coverage by country population (%)** |
| **Austria** | 57% | 8% |
| **Cyprus** | 12% | n.a. |
| **Estonia** | 40% | n.a. |
| **Hungary** | 95% | n.a. |
| **Iceland** | 50% | n.a. |
| **Ireland** | 60% | n.a. |
| **Italy** | 52% | n.a. |
| **Netherlands** | 32% | n.a. |
| **Norway** | 50% | n.a. |
| **Portugal** | 38% | n.a. |
| **Spain** | 51% | n.a. |
| **United Kingdom** | 39% | n.a. |

n.a. = not available.

† Country specific data from the VENICE II Survey were not available for Belgium, Bulgaria, the Czech Republic, Denmark, Finland, France, Germany, Greece, Latvia, Lithuania, Luxembourg, Malta, Poland, Romania, Slovakia, Slovenia, or Sweden.

| South-East Asia Region | | |
|---|---|---|
| **Country** | **Vaccine utilization (%)** | **Coverage by country population (%)** |
| **Indonesia** | n.r. | n.r. |
| **Nepal** | n.r. | n.r. |
| **Thailand** | 76% | 2% |

n.r. = not reported.

| Western Pacific Region | | |
|---|---|---|
| **Country** | **Vaccine utilization (%)** | **Coverage by country population (%)** |
| **Australia ‡** | n.r. | n.r. |
| **China** | 66% | 8% |
| **Malaysia** | 99% | 1% |
| **Marshall Islands** | 94% | 25% |
| **New Caledonia** | 8% | 2% |
| **New Zealand** | 6% | 1% |
| **Palau** | 34% | 15% |
| **Republic of Korea** | 59% | 31% |
| **Singapore** | n.r. | n.r. |

n.r. = not reported.

‡ Australia administered its vaccine, but no data on utilization and coverage were reported.