

Comparative analysis

of national pandemic influenza
preparedness plans

JANUARY 2011



**World Health
Organization**

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Conflicts of Interest

WHO declares there was no conflict of interest present in the project. The funders of the study had no role in study design, data collection, data analysis, data interpretation, or in writing the report.

1. Executive Summary

This study evaluated publicly available national pandemic preparedness plans and determined national and regional states of preparedness at the start of the influenza A(H1N1) 2009 pandemic according to the five functional components in the WHO pandemic preparedness and response guidance: planning and coordination, situation monitoring and assessment, prevention and containment, health system response and communication (1,3). The outcome of the evaluation describes the level of preparedness related to these five components stratified by WHO region.

One hundred and forty plans were sourced and 119 were analyzed in this study, indicating that the majority of Member States have made significant progress towards pandemic preparedness planning. An assessment tool based on the 2005 WHO Checklist for Influenza Pandemic Preparedness and Planning (3) was used to extract essential information from national preparedness plans.

Key findings:

- The majority of Member States have developed pandemic preparedness plans.
- Over half of the plans were developed for a pandemic of avian influenza A(H5N1) origin.
- Most plans specified WHO as a collaborator in the event of pandemic influenza.
- Higher income countries and those with a greater overall level of health tended to have more comprehensive national pandemic preparedness plans.
- Many of the plans with overall and individual functional area completeness values in the 1st quartile were from the WHO Region of the Americas, WHO European Region and the WHO Western Pacific Region.
- In the functional area of planning and coordination, a major strength seen across plans was that nearly all had addressed the formation of a pandemic influenza planning committee and defined the responsibilities of various agencies to coordinate the response. However, sub-national planning is an area requiring further consideration in the revision of plans.
- In the functional area of situation monitoring and assessment, the majority of plans addressed inter-pandemic, enhanced, pandemic and animal surveillance, as well as plans for surveillance data exchange.
- In the functional area of prevention and containment, most plans addressed the use of both antiviral drugs and vaccines. The majority of plans specified priority groups to receive vaccines and antiviral drugs for prophylaxis. However, pharmacological monitoring strategies related to aspects such as drug resistance and adverse events were not detailed.
- In the functional area of health systems response, the majority of plans identified laboratories for diagnostic testing, virus isolation, sub-typing and confirmation. Other areas such as epidemiological investigation, case management, health facilities and health care worker training were also often well addressed.
- In the area of communication, communication channels were identified and planning for communication with health, non-health authorities and the public were well considered.

2. Abbreviations

AFR	WHO African Region
AI	Avian influenza
AMR	WHO Region of the Americas
ARI	Acute respiratory infection
ASEAN	Association of Southeast Asian Nations
AU/IBAR	African Union/Inter-African Bureau for Animal Resources
CA	Correspondence analysis
ECDC	European Centres for Disease Control
EISS	European Influenza Surveillance Scheme
EMR	WHO Eastern Mediterranean Region
EU	European Union
EUR	WHO European Region
FAO	Food and Agriculture Organization of the United Nations
GNI	Gross national Income
HCW	Health Care Worker
IHR	International Health Regulations
ILI	Influenza-like illness
MCA	Multiple Correspondence Analysis
PACE	Pan-African Programme for the Control of Epizootics
PPP	Pandemic preparedness plan
PPP Int \$	Purchasing power parity measured in International Dollars
SARI	Severe acute respiratory infection
SARS	Severe acute respiratory syndrome
SEAR	WHO South-East Asia Region
SPC	The Secretariat of the Pacific Community
UN	United Nations
WHO	World Health Organization
WPR	WHO Western Pacific Region

3. Background

Influenza A viruses cause annual seasonal epidemics, and less frequent pandemics (global epidemics) which can severely affect public health. Pandemics occur when a new strain of influenza A to which the global human population has little or no immunity emerges from its animal source and adapts to spread efficiently in humans. Three pandemics occurred in the 20th century, in 1918–1919, 1957–1958 and 1968–1969 of which the first was the most severe, causing the deaths of between 20–40 million people worldwide.

Once a pandemic begins, it will be too late to accomplish many of the activities required to minimize its impact. It is therefore crucial for countries to plan response actions before a pandemic emerges in order to effectively meet the challenges it will present. In 1999, the World Health Organization (WHO) published the “Influenza pandemic plan, the role of WHO and guidelines for national and regional planning” (5) in order to support its Member States to better respond to future threats of pandemic influenza. Since then the guidelines have been revised in 2005 and 2009 (1,2). WHO also published a checklist for pandemic preparedness planning (3) and other guidelines (4,6) which provide a framework by which preparedness and response actions can be organized.

The 1999 recommendations were updated in 2005 and again in 2009 to incorporate more recent developments, such as the practical experiences gained from responding to outbreaks of avian influenza A(H5N1) and severe acute respiratory syndrome (SARS), the development of new laboratory diagnostic techniques, advances in vaccine development, improved antiviral drug supply, and the implementation of the revised International Health Regulations (2005) (IHR 2005) (1,7). The WHO guidance provides a framework for national preparedness plans which should aim to define country-specific priorities and actions, identify the major components that must be put in place (e.g., coordination, resource identification and allocation, and capacity building) and response actions that can be strengthened.

Due to the emergence and the continuing spread of avian influenza A(H5N1) virus from South-East Asia to Africa and Europe and the increasing threat of a pandemic, many countries have developed pandemic influenza preparedness plans over the past five years. In April 2009, cases of a new virus subtype were reported from Mexico and the United States, prompting the declaration of a Public Health Emergency of International Concern (PHEIC). The virus quickly spread to other regions and on 11 June 2009, WHO declared pandemic influenza phase 6. Using pre-April 2009 pandemic preparedness plans as proxies, this study aims to assess the global state of preparedness and capacity to respond at the start of the influenza A(H1N1) 2009 pandemic.

This study evaluated publicly available national pandemic preparedness plans and determined national and regional states of preparedness at the start of the influenza A(H1N1) 2009 pandemic according to the five components in the WHO pandemic preparedness and response framework (1,3). The outcome of the evaluation describes the level of preparedness related to these five components and stratified by WHO region.

4. Methods

4.1 Data collection

Data were collected through a desktop review of national influenza pandemic preparedness plans available on WHO websites, government websites and other public internet resources. A structured assessment checklist was developed for data extraction and compilation. The checklist was based on WHO guidance documents (1,2,5) and is divided into the five functional areas of preparedness and response as identified by WHO: planning and coordination, situation monitoring and assessment, prevention and containment, health system response and communication. The checklist was formatted as a list of 88 indicators to extract essential information from the national preparedness plans (TABLE 1).

Table 1 Assessment indicators according to the WHO five components of preparedness

AREAS	NUMBER OF INDICATORS
Planning and coordination	22
Situation monitoring & assessment	11
Prevention and containment	26
Health system response	16
Communication	13
Total	88

During the evaluation process, evaluators examined the presence or absence of information regarding each indicator and, where relevant, graded the amount of information provided as either: 0=not mentioned, 1=considered for future implementation, 2=briefly mentioned, 3=described in detail. Each indicator was scored categorically, 0 to 3 and/or yes/no (ANNEX 1).

Table 2 National plans included in the analysis by WHO regions

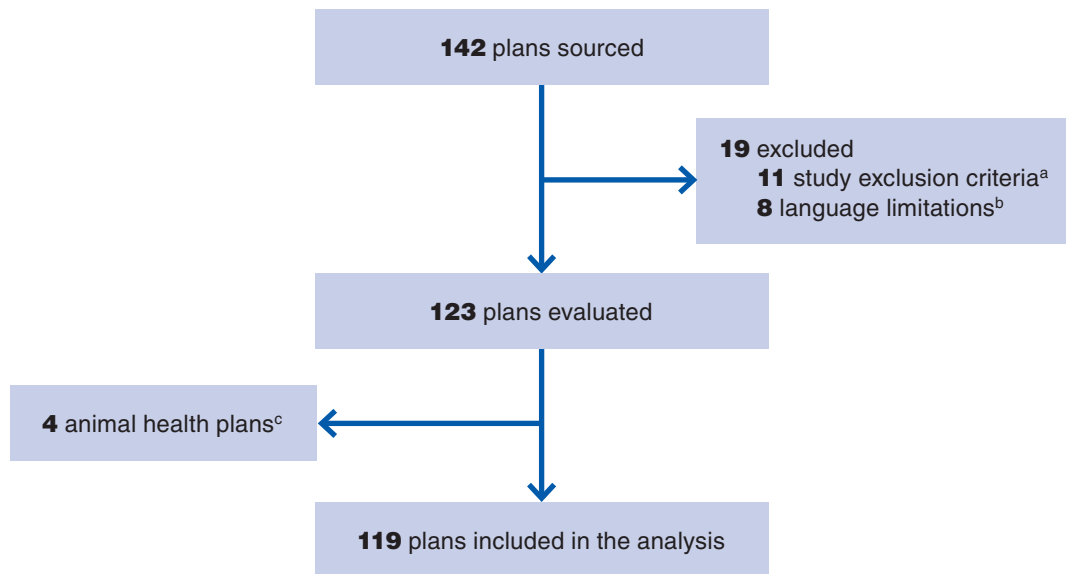
WHO REGIONS	NUMBER OF WHO MEMBER STATES	NUMBER OF PLANS SOURCED	NUMBER OF PLANS INCLUDED IN ANALYSIS	% MEMBER STATES INCLUDED IN ANALYSIS
WHO African Region	46	34	29	63
WHO Region of the Americas	35	24	20	57
WHO South-East Asia Region	11	11	10	91
WHO European Region	53	43	32	60
WHO Eastern Mediterranean Region	21	12	10	48
WHO Western Pacific Region	27	18 ^a	18	63
Total	193	142	119	61

^a Hong Kong, a Special Administrative Region of the People's Republic of China, had its own plan which was included in the analysis, but was not counted as a separate Member State.

A total of 142 plans were sourced (TABLE 2); 91 of which were written in English, 20 in French, 16 in Spanish, three in Arabic, and one each in Russian, Danish, German, Georgian, Latvian, Lithuanian, Portuguese, Romanian, Serbian, Slovene and Turkmen. Plans were not eligible for inclusion if published or revised after the start of the influenza A(H1N1) 2009 pandemic or if they were not developed

by WHO Member States.¹ Eligible plans (including annexes) were evaluated regardless of whether they were available in published, unpublished, draft or final versions. Of the 142 plans sourced, 23 plans were excluded because of language limitations, publication after April 2009, or the plan focused only on animal health (**FIGURE 1**). The final sample contained 119 plans representing 61% of the WHO Member States from all six WHO regions (**FIGURE 1** and **TABLE 2**).

Figure 1 Selection process of pandemic preparedness plans included in the analysis



^a Plans published after April 2009 – Ireland, Jamaica, Paraguay, Saint Lucia and Slovenia. Non-national plans – Republic of Korea, Liberia, Netherlands, Pakistan, Sudan and Nicaragua.

^b Denmark, Georgia, Latvia, Lithuania, Montenegro, Portugal, Romania and Kazakhstan.

^c Chad, Madagascar, Namibia and Nigeria

The evaluation team, consisting of seven evaluators and a project coordinator, reviewed the plans against the checklist of 88 indicators. At the beginning of the evaluation process, the checklist was pre-tested using selected plans from different WHO regions (English and French plans only). The purpose of the pre-test exercise was to familiarize the evaluators with the assessment tools, standardize data collection procedures, and to refine and revise the checklist as needed. To ensure consistency and minimize inter-rater variability among the evaluators, randomly selected plans representing 6% of the English and 20% of the French language plans were assessed by two evaluators separately. Subsequently, the plans were re-evaluated together to standardize assessment scores. The Arabic, French, German, Russian, Slovene and Spanish plans were evaluated by qualified native speakers. The project coordinator and evaluators thoroughly reviewed the completed checklists to ensure consistency.

4.2 Analysis

Descriptive statistics of plans and correlations with life expectancy, under 5 mortality rate and gross national income (GNI) were conducted using Microsoft Excel[®] and STATA[®]. Other analyses utilized ArcMap[®] (from ESRI ArcGIS) and SAS JMP[®].

In order to assess the comprehensiveness of each pandemic preparedness plan, a form of multi-criteria modelling, (multiple correspondence analysis (MCA)), was employed. MCA provides a mechanism for examining the relationship between multiple variables in a two dimensional manner. The horizontal distances between points indicates similarities in the assessment scores for groups of indicators extract-

¹ The plan of Hong Kong, Special Administrative Region of the People's Republic of China, was the only non-national plan included in the analysis.

ed from the preparedness plans. The computations used for MCA are based on matrix calculations and multi-dimensional mathematical projections, which are similar to those for Correspondence Analysis. It is closely related to principal components analysis except that the variables analysed are categorical rather than quantitative.

MCA was selected for the preparedness multicriteria assessment for the following reasons:

1. Inability of classical scoring systems to adequately differentiate preparedness profiles;
2. Ability to manage categorical indicators;
3. Objectivity and reproducibility without an arbitrary weighting system; and
4. Easily understandable by international and national health authorities.

For each of the five functional areas of pandemic preparedness, all indicators within the category were aggregated into a single value for each country representing how comprehensively each plan addressed the indicators. There was also an overall completeness value calculated for each plan from 73 graded preparedness indicators encompassing the five pandemic preparedness component areas as indicated in **ANNEX 1**. Next, the five synthetic pandemic preparedness functional area values and the overall synthetic pandemic preparedness values were categorized into quartiles and geographically presented.

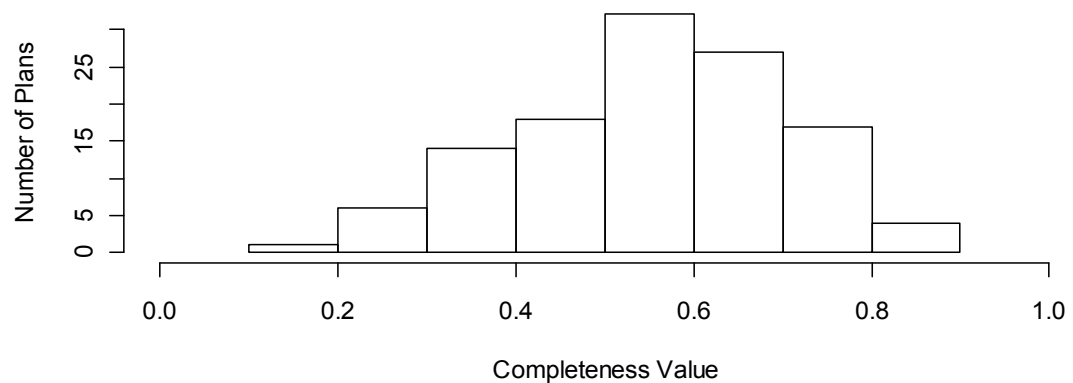
Completeness values from the MCA were also utilized to create correlation graphs as well as a graph visualizing the degree of convergence between pandemic preparedness plans. All indicators were aggregated to express 73 mathematical dimensions in two axes demonstrating similarities between overall preparedness characteristics.

5. Results

5.1 Overview

Most plans were published between 2005 (25%) and 2006 (45%) with an additional 15% published between January 2007 and April 2009. Two percent were published before 2005 and 13% had an unknown publication date. Plans ranged in length from three to 609 pages with a median length of 43 pages. National plans were diverse in terms of structure, content and the amount of information provided. Sixty-eight plans (57%) were developed mainly to respond to outbreaks of highly pathogenic avian influenza A(H5N1) virus.

Figure 2 Distribution of pandemic preparedness plan completeness values



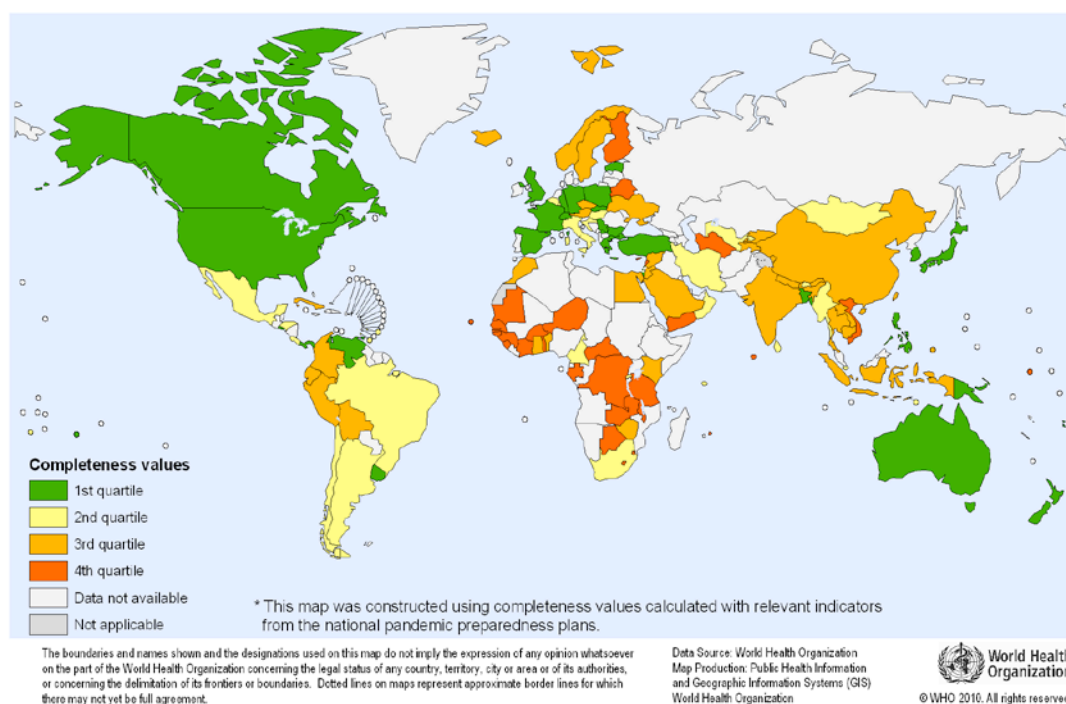
The overall national pandemic preparedness plan (PPP) completeness values were calculated using the aggregated values of the 73 indicators encompassing all five components of pandemic preparedness: planning and coordination, situation monitoring and assessment, prevention and containment, health systems response and communication.

The median value of the PPP completeness values was 0.563 (**FIGURE 2**), with median scores by region ranging from 0.384 to 0.661. The 1st quartile of PPP completeness values contained 12 plans from EUR, eight from WPR, seven from AMR, and one each from EMR and SEAR. The 2nd quartile contained eight from AMR, seven from EUR, four each from AFR, SEAR and WPR, and one from EMR. Twenty-one plans in the 4th quartile were from AFR, four were from EUR, two each were from EMR and WPR and one from SEAR (**FIGURE 3**).

The correlations below (**FIGURES 4–7**) demonstrate associations between national income level or health burden with their corresponding PPP completeness values. Life expectancy at birth in years and under-five mortality rates (probability of dying by age 5 per 1000 live births) (26) were used as proxies for overall national health burden. There was a positive association with life expectancy ($r=0.480$) (**FIGURE 4**) and a negative association with under-five mortality rate ($r=-0.470$) (**FIGURE 5**).

There was a logarithmic association between gross national income (GNI) per capita (PPP int. \$) (26) and PPP completeness values ($r=0.327$) (**FIGURE 6**). While the PPP completeness values varied widely in the lower income bracket, the higher income brackets tended to have higher PPP completeness scores. It should also be noted that there was a considerable amount of variance in completeness values highlighting the complexity of influences of pandemic preparedness that could not be explained by GNI (62%), life expectancy (61%) or under-five mortality rate (62%).

Figure 3 Review of national pandemic preparedness plans by April 2009: overall completeness*



The relationship between respiratory infection disability adjusted life years (DALYs) (log scale) (27) and completeness value was also evaluated (**FIGURE 7**). After adjusting for health expenditure, a higher burden of respiratory infection was associated with a lower completeness value (slope=-0.06, $R^2=0.20$).

Figure 4 Correlation between calibrated pandemic preparedness planning completeness value and life expectancy at birth



Figure 5 Correlation between calibrated pandemic preparedness planning completeness value and under-five mortality rate (log scale)

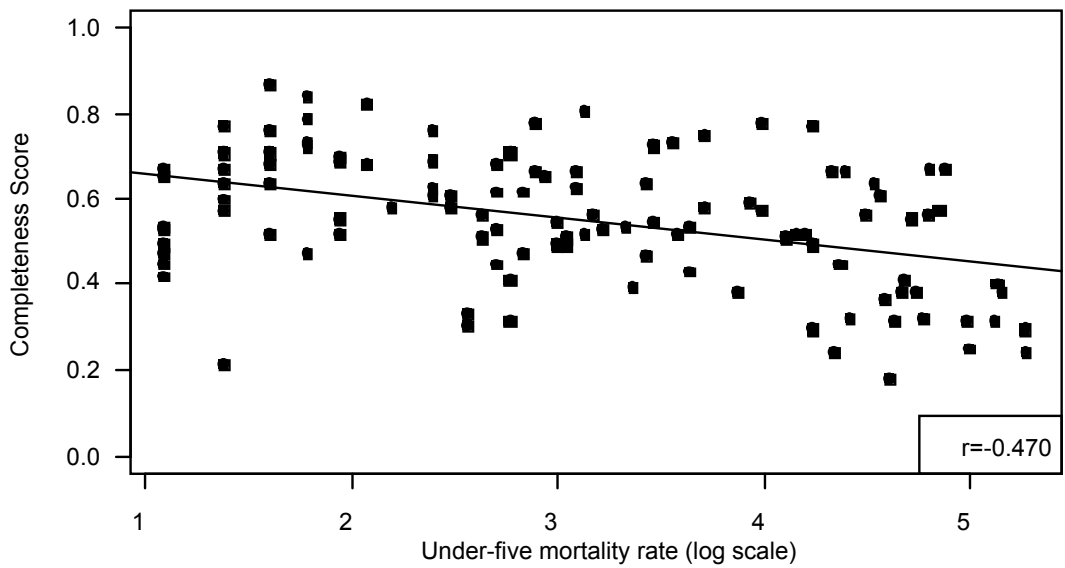


Figure 6 Correlation between calibrated pandemic preparedness planning completeness value and gross national income per capita

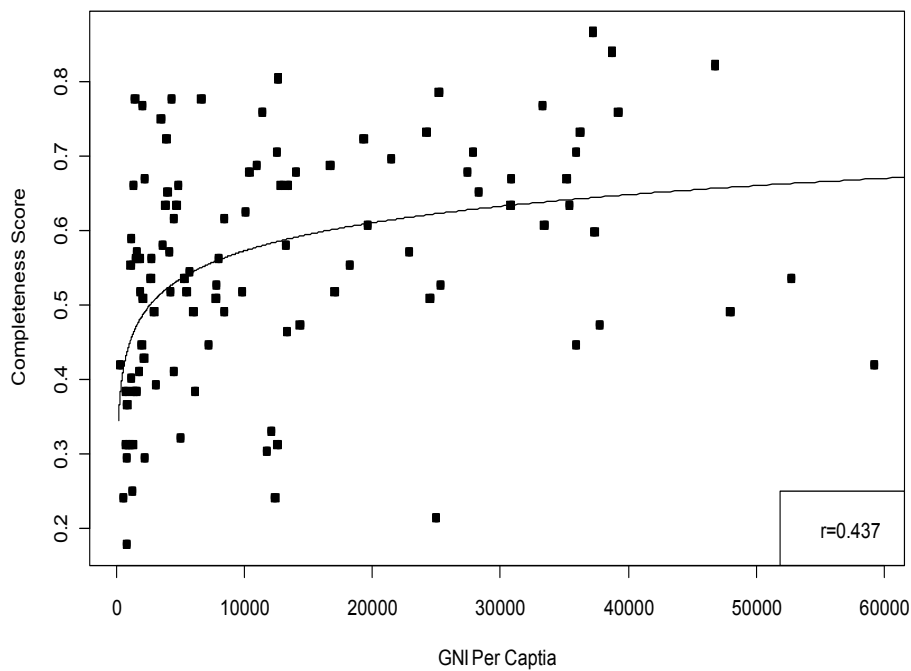
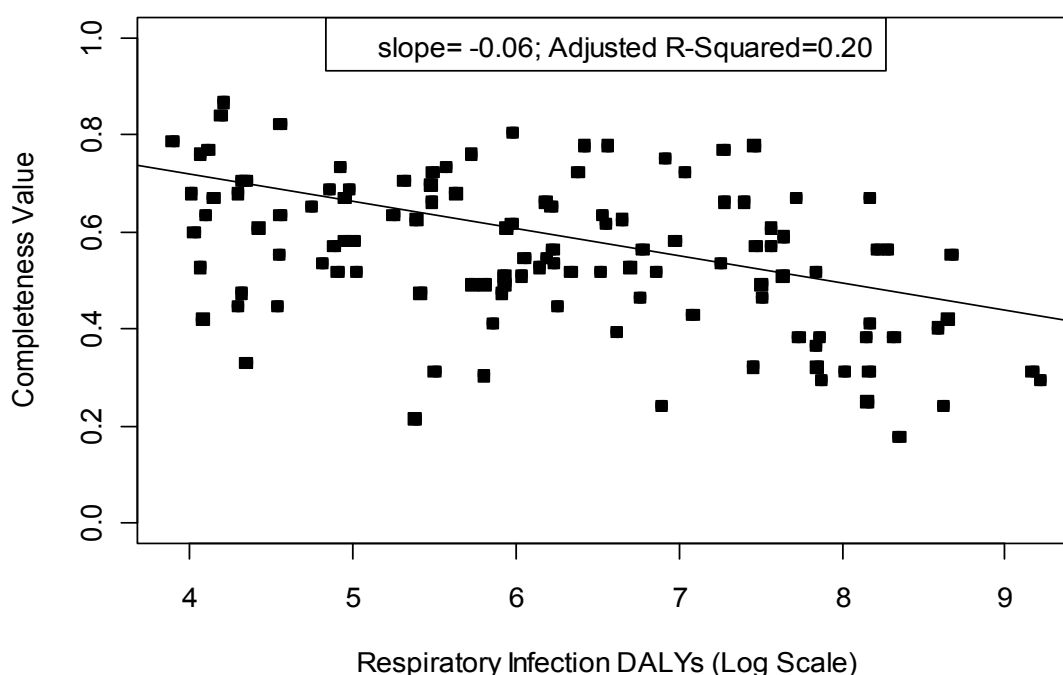


Figure 7 Correlation between pandemic preparedness planning completeness value and respiratory infection DALYs (log scale)



5.2 Planning and coordination

Overall, 80 plans (68%) outlined their pandemic response actions by the WHO pandemic phases. An additional four plans were organized by country-specific phases or periods (**TABLE 3**).

The majority of Member States in the study (72%) had established national pandemic committees¹ of which 59% outlined committee roles and responsibilities. Similarities in the responsibilities outlined by the Member States included: coordination of the pandemic planning process and responses, provision of technical guidance, monitoring the progress of response implementation and ensuring multi-sectoral cooperation. Committee members included representatives from the health sector (100% of the plans), veterinary sector (56%), and other ministries such as defence, finance and tourism (67%).

The command and control structures for management and decision-making processes during a pandemic were described in 76 plans (64%) (**TABLE 3**). Pandemic management was often delegated to crisis management centres and disaster units. Governing structures included higher level government bodies such as cabinets. Most Member States described coordination among different governmental bodies such as the Ministry of Health (MOH) and/or the pandemic planning committee. Intersectoral collaboration between the MOH and the Ministry of Agriculture (MOA) for surveillance, outbreak investigation and control were addressed in 76 plans (64%). However, most plans stated that intersectoral collaboration should be strengthened and maintained. A total of 25 countries (21%) incorporated or linked pandemic planning to their national disaster management or emergency response plans. In addition, 87 plans (73%) provided information on the communication and coordination structure for agencies involved in pandemic preparedness and response actions.

Specifics regarding monitoring and evaluation strategies such as indicators or targets for implementation of the plan were outlined in 27 plans (23%). Twenty-six plans (22%) specified an agency or committee responsible for monitoring and evaluating the implementation of the pandemic preparedness

¹ The function of a national pandemic planning committee varies by country. For this report, a national pandemic planning committee refers to a taskforce, commission or any other national body which was established for pandemic planning or response actions.

plan. Country-specific triggers that would change the level of response in a pandemic were identified in 53 plans (45%).

With regard to sub national level implementation, six Member States (5%) referred to plans developed at the district or provincial level while 35 (29%) considered developing preparedness plans at the sub national level (**TABLE 3**). There were 15 Member States (13%) which had already established sub national committees at district or provincial levels and an additional 24 Member States (20%) were considering establishing sub national committees.

Table 3 Overview of planning and coordination indicators

CHARACTERISTICS OF PLANS	NUMBER OF PLANS
	n (%)
Organization of the plan by WHO phases	80 (68)
Part of national disaster preparedness plan	25 (21)
Pandemic influenza planning committee	116 (97)
National committee established	86 (72)
Members identified	76 (64)
Responsibilities defined	70 (59)
Frequency of meetings specified	36 (30)
National committee to be established	29 (24)
Sub national committee established	15 (13)
Sub national committee to be established	24 (20)
Sub national preparedness plan	41 (34)
Developed	6 (5)
To be developed	35 (29)
Pandemic exercise	66 (55)
Considered	63 (53)
Carried out	9 (8)
Financial resources outlined	50 (42)
Command and control structure specified	76 (64)
Communication and coordination structure outlined	87 (73)
Monitoring and evaluation strategies outlined	27 (23)
Committee to monitor plan implementation	26 (22)
Responsibilities of other agencies defined ^a	103 (87)
Risk assessment of potential pandemic impact	52 (44)
Timeline for reviewing pandemic plan specified	61 (51)
Maintenance of essential services during a pandemic	65 (55)
Legislation or legal framework for implementation of the national plan	68 (57)
Country-specific triggers identified	53 (45)

^a Includes ministries of health and agriculture, National Red Cross and Red Crescent Societies, NGOs, WHO and UN.

International collaboration for pandemic preparedness and response actions was addressed in 90% of plans, all of which mentioned collaboration with WHO. The principal areas of collaboration included surveillance, laboratory diagnosis and confirmation, antiviral and vaccine supply, technical assistance and financial support (**TABLE 4**).

Table 4 Planned international collaboration in the event of pandemic influenza

COLLABORATOR SPECIFIED	NUMBER OF PLANS
	n (%)
WHO	107 (90)
Exchange of surveillance data	71 (60)
Antiviral drugs supply	19 (16)
Vaccine supply	14 (12)
Communication	76 (64)
Laboratory diagnosis/confirmation	64 (54)
EU, ECDC ^a	15 (13)
Exchange of surveillance data	5 (4)
Financial support	10 (8)
Neighbouring countries	52 (44)
Planning and coordination	52 (44)
Surveillance	22 (18)
FAO ^b (Exchange of surveillance data and financial support)	38 (32)
ASEAN, SPC ^c (Surveillance, financial and technical support)	3 (3)
PACE – AU/IBAR ^d (Surveillance, laboratory diagnosis and financial support mainly for animal sector)	2 (2)

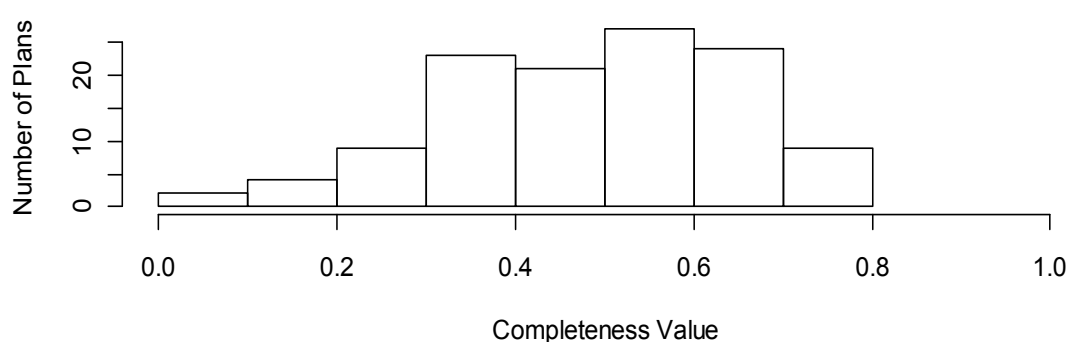
^a European commission (EU), European Centre for Disease Prevention and Control (ECDC).

^b Food and Agriculture Organization of the United Nations (FAO).

^c Association of Southeast Asian Nations (ASEAN), Secretariat of the Pacific Community (SPC) for countries in the WHO South-East Asia Region and the WHO Western Pacific Region.

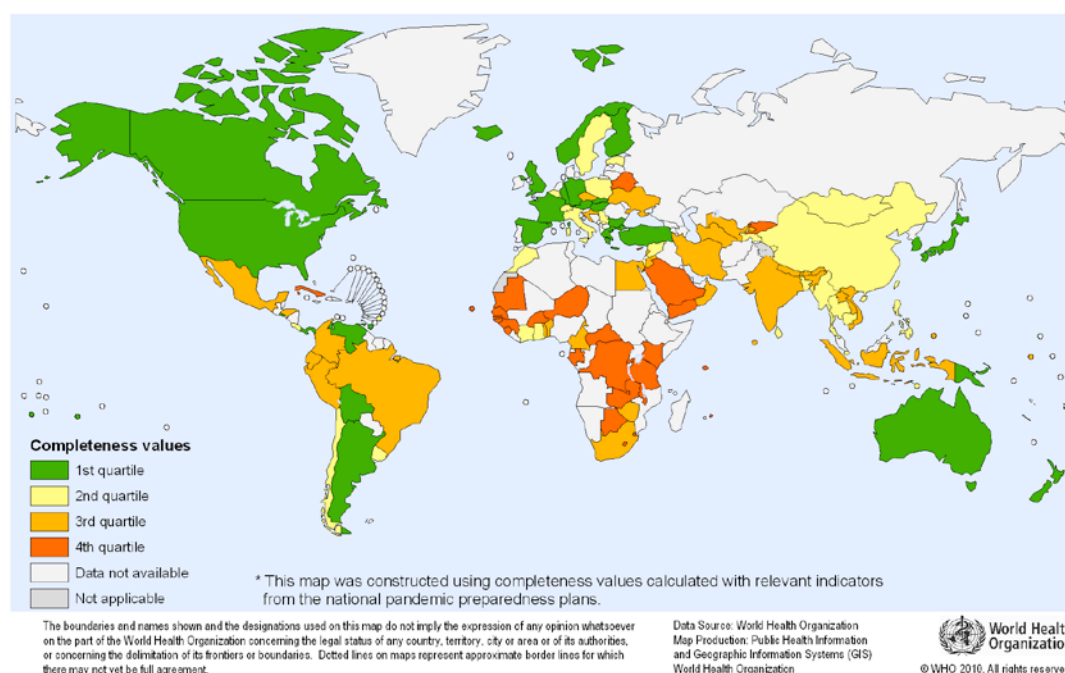
^d Pan-African Programme for the Control of Epizootics (PACE) – African Union/Interafrican Bureau for Animal Resources (AU/IBAR) for countries on the African continent.

The planning and coordination completeness values are aggregated values which reflect the 21 graded indicators of planning and coordination (**FIGURE 8**). The median score for planning and coordination was 0.511.

Figure 8 Planning and coordination completeness scores

Plans in the 1st quartile consisted of 12 from EUR, nine from AMR, and seven from WPR (**FIGURE 9**). Ten plans in the 2nd quartile were from EUR, five each from SEAR and WPR, four from AMR and two each from AFR and EMR. Out of plans in the 4th quartile, 22 were from AFR, three each were from EUR and EMR and one was from AMR.

Figure 9 Review of national pandemic preparedness plans by April 2009: functional area of planning and coordination*



5.3 Situation monitoring and assessment

All plans contained surveillance information related to Member States' capacity to conduct routine, enhanced and/or pandemic surveillance. Eighty-one plans (68%) described existing routine inter-pandemic influenza surveillance systems for conditions such as influenza-like illness (ILI) and/or acute respiratory infection (ARI) and severe acute respiratory infection (SARI) with or without laboratory support (**TABLE 5**) but surveillance of deaths or complications related to ILI, ARI, or SARI was only mentioned in 11 plans (9%). Surveillance data was mainly collected from sentinel sites (n=52) at general practices, health centres or hospitals.

Ninety plans (76%) specified enhanced surveillance for potential or new strains of pandemic influenza virus (**TABLE 5**). Early warning systems for detection and investigation of ARI/SARI outbreaks or investigation of unusual mortality due to ILI, ARI, or SARI either through routine influenza surveillance or reporting from health facilities or communities were addressed in 64 plans (54%). However, details of early warning implementation from detection to appropriate response were largely absent from plans. Eighty-four Member States (71%) considered reinforcing and enhancing surveillance activities among risk groups for avian influenza which included poultry farmers, veterinary health workers, cullers, travellers and health care workers.

Seventy-nine plans (66%) specified surveillance measures during a pandemic. These measures included monitoring morbidity and mortality, adapting case definitions, scaling down virologic testing and limiting or discontinuing routine early warning surveillance.

There were 95 plans (80%) which included information on how surveillance data is reported at the national and/or international level (**TABLE 5**). Surveillance information exchange with WHO was mentioned in 71 plans (60%). The European Influenza Surveillance Scheme (EISS) coordinates influenza surveillance activities in 29 European countries. Recently, the scheme has been expanded to include all countries in EUR. In this study, 14 plans from the 32 included from EUR mentioned participation in EISS for exchange of surveillance information.

Table 5 Overview of surveillance indicators

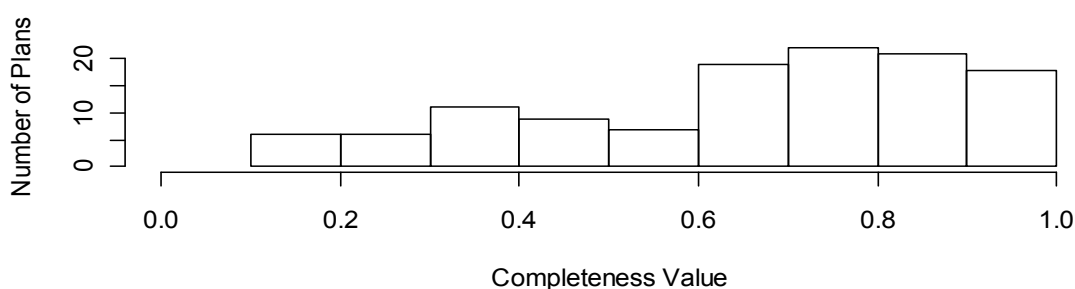
DESCRIPTION	NUMBER OF PLANS
	n (%)
Interpandemic surveillance	81 (68)
Routine surveillance	81 (68)
Sentinel surveillance	52 (44)
Enhanced surveillance	90 (76)
Early warning system	64 (54)
Surveillance among AI risk groups	84 (71)
Pandemic surveillance	79 (66)
Monitoring morbidity and mortality	63 (53)
Adjusting scope of surveillance	26 (22)
Modification of case definitions	47 (39)
Animal surveillance	96 (81)
IHR implementation	32 (27)
Surveillance data exchange	95 (80)
National	81 (68)
WHO	71 (60)
Neighbouring countries	20 (17)
EISS ^a	14 (12)

^a European Influenza Surveillance Scheme (EISS) is only relevant to the WHO European Region.

With regard to influenza surveillance in animals, 96 countries (81%) stated implementing influenza surveillance among birds (domestic and wild) while nine gave consideration to future implementation (**TABLE 5**). Seventy-six plans (64%) mentioned collaboration between animal and human health sectors for exchange of surveillance information, outbreak investigation and response.

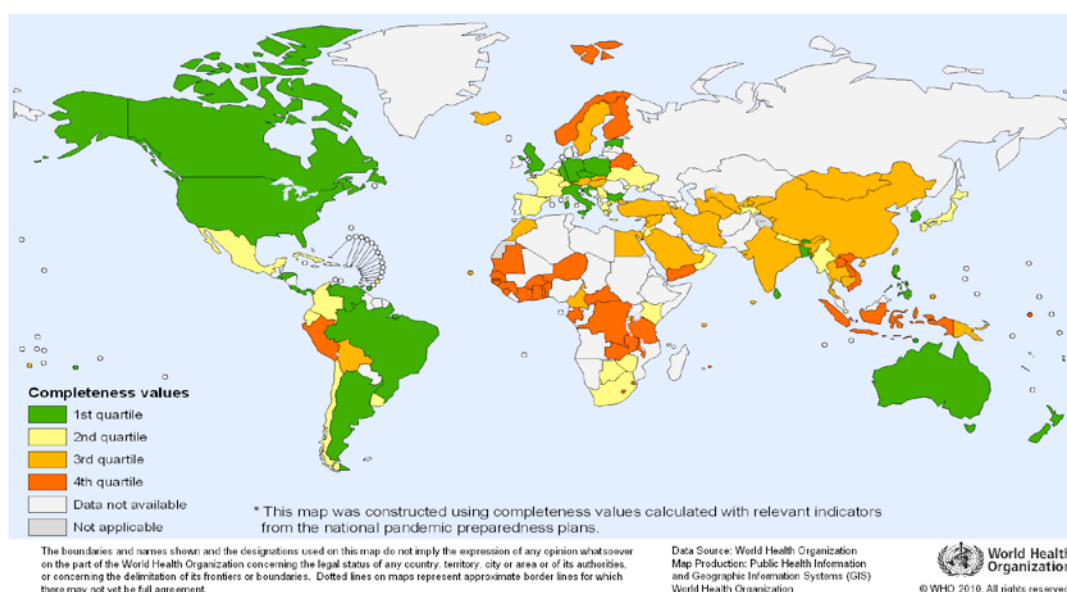
The revised IHR 2005 provides a framework for the international public health response to control cross-boundary infectious diseases and other public health events of international concern. Under the IHR 2005, each State Party is required to notify WHO within 24 hours of assessment of all events which may constitute a public health emergency of international concern within its territory (7). Thirty-two plans (27%) explicitly mentioned the IHR 2005 for notification of cases to WHO.

Situation monitoring and assessment completeness values were aggregates of scores assigned to the 10 graded indicators of situation monitoring and assessment. The median completeness value was 0.65, the highest of the five functional areas (**FIGURE 10**). Out of plans in the 1st quartile, 11 were from AMR, eight were from EUR, six were from WPR, four were from SEAR and one was from EMR (**FIGURE 11**). Out of plans in the 2nd quartile, 11 were from EUR, seven were from AMR, five were from AFR, three were from WPR and there were two each from EMR and SEAR.

Figure 10 Situation monitoring and assessment completeness values

Out of plans in the 4th quartile, 21 were from AFR, three each from EUR and WPR and one each from AMR, EMR and SEAR.

Figure 11 Review of national pandemic preparedness plans by April 2009: functional area of situation monitoring and assessment*



5.4 Prevention and containment

5.4.1 Pharmaceutical interventions

5.4.1.1 Antiviral drugs

A total of 110 plans (92%) described the use of antiviral drugs for treatment and/or prophylaxis (**TABLE 6**). Antiviral drug monitoring for resistance and adverse events was mentioned in 46 and 37 plans, respectively. However, only one country provided detailed information regarding when, where and how to conduct the tests, when and how to report adverse events, the responsible government agency and available networks for monitoring. The need to distribute antiviral drugs to health facilities and other sites was addressed in 62% of the plans. However, clear guidelines in terms of storage sites, distribution channels, responsible authorities, and resources required were often not provided.

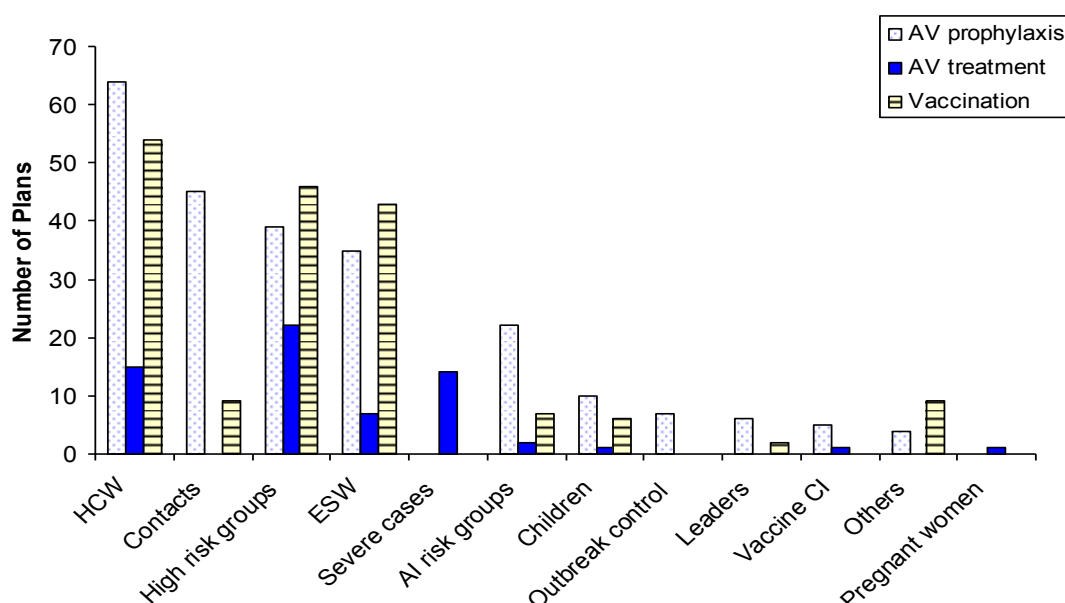
Table 6 Overview of pandemic pharmaceutical planning

CHARACTERISTICS OF PLANS	ANTIVIRAL DRUGS	VACCINE
	n (%)	n (%)
Planned use of pharmaceuticals	110 (92)	108 (91)
Use for treatment	73 (61)	NA
Use for prophylaxis	91 (76)	NA
Priority groups outlined		
Treatment prioritized	27 (23)	NA
Prophylaxis prioritized	91 (76)	NA
Vaccine prioritized	NA	73 (61)
Mass vaccination strategy	NA	23 (19)
Monitoring strategy		
Drug resistance	46 (39)	NA
Adverse events	37 (31)	41 (34)
Efficacy	29 (24)	35 (29)
Coverage	NA	23 (19)
Logistic guidelines		
Distribution	67 (62)	48 (40)
Storage	32 (30)	30 (25)

There were 73 plans (61%) which outlined antiviral drugs for treatment of influenza cases of which 27 (23%) specified priority groups for treatment (**TABLE 6**).

High risk groups¹ were prioritized most frequently (n=21) followed by health care workers (n=15), severely ill or hospitalized patients (n=14) and essential service workers (n=7) (**FIGURE 11**). Other targeted groups considered for treatment included Avian Influenza (AI) risk groups, children, pregnant women and unimmunized persons.

Figure 12 Planned priority groups to receive antiviral prophylaxis, antiviral treatment and/or vaccination in the event of pandemic influenza^a



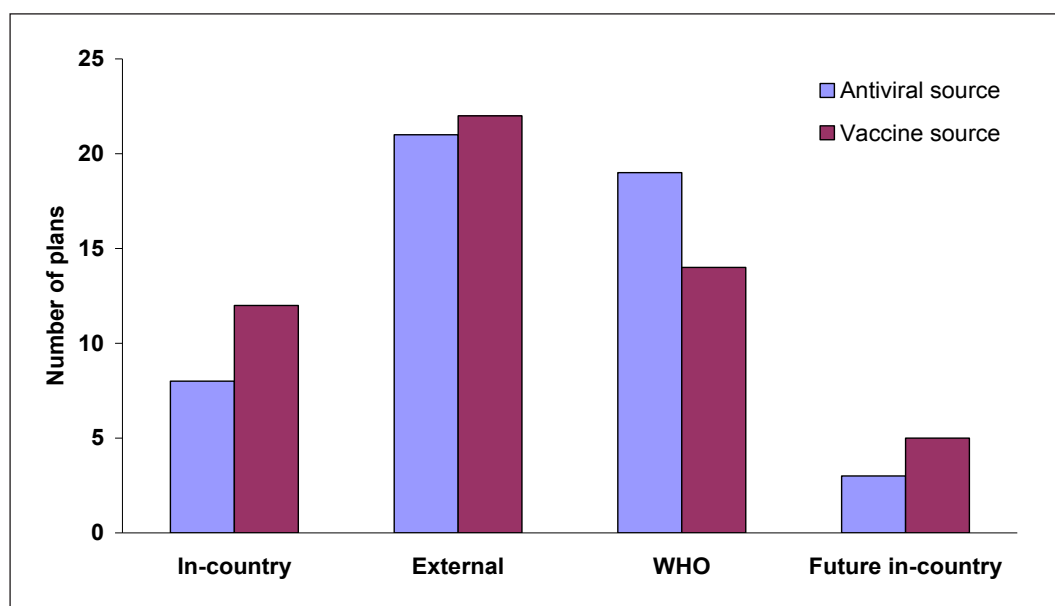
^a **HCW – Health care workers** mostly include health workers with direct patient contacts, and public health workers. Some plans include laboratory workers. Health care workers are included in the essential service workers list in some plans. **High risk groups** include individuals over 65 years of age and individuals (adults and children above 6 months) with underlying diseases such as cardiovascular, pulmonary, metabolic or renal disease, or immunocompromised. Some plans add children and pregnant women to this group. **ESW – Essential service workers** include community service providers, such as fire, water, telecommunication, sanitation, police personnel, etc. **Avian influenza (AI) risk groups** include farmers, poultry farm workers, veterinary and livestock workers. Vaccine contraindication (CI) for medical reasons.

The use of antiviral drugs for prophylaxis was mentioned in 91 plans (76%) (**TABLE 6**). Of these 91 plans, the main groups considered for prophylaxis were health care workers (n=64), contacts of influenza cases (n=45), essential service workers other than health care workers (n=35), high risk groups (n=39) and AI risk groups such as farmers, and veterinary workers (n=22) (**FIGURE 12**). Only seven plans that referred to prophylaxis for contacts explicitly stated that prophylaxis be provided only during phases 4, 5 and the early stage of phase 6. Almost all countries considered revising the priority groups in the event of a pandemic.

Information on antiviral drug supply and procurement was included in 96 plans (87%) of which 19 (14%) had stockpiles or had begun stockpiling at the time of writing their plan. In addition, 11 plans detailed strategies, including financial plans, for antiviral drug supply and stockpiling. Three of these plans estimated supply needs based on target groups for antiviral drug use while eight estimated needs using planned population antiviral coverage for treatment or prophylaxis, ranging from 0.5% to 30%. Twenty-one Member States considered external (out-of-country) manufacturers as a source for anti-

¹ High risk groups include individuals (adults and children aged more than 6 months) in the community who have chronic cardiovascular, pulmonary, metabolic or renal disease or are immunocompromised as well as individuals who are 65 years of age or older. These are based on WHO guidelines regarding the use of vaccines and antivirals during influenza pandemic (3).

Figure 13 Planned antiviral drug and vaccine sources in the event of pandemic influenza



ral drugs, 19 specified WHO as a source, 8 (including 2 developing countries¹) mentioned in-country production capacity and 3 (all developing countries) planned to build local capacity for domestic production of antiviral drugs (**FIGURE 13**).

5.4.1.2 Vaccines

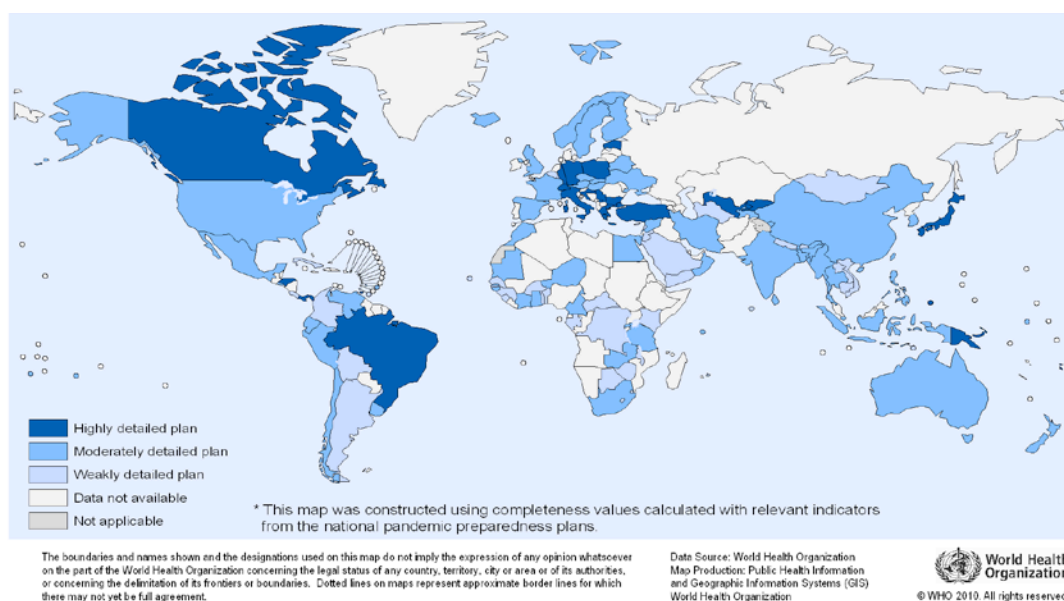
Vaccine use during a pandemic was considered by 108 Member States (91%) of which 73 (61%) outlined priority groups for pandemic vaccine (**TABLE 6**). The following groups were often prioritized as recipients of a pandemic vaccine: health care workers (n=54), high risk groups (n=46) and essential services workers (n=43) (**FIGURE 12**). Other population groups designated as a high priority included children (n=6), contacts of influenza cases (n=9), leaders (n=2) and AI risk groups such as farmers and veterinary workers (n=7). Almost all Member States considered revising the priority groups in the event of a pandemic. Some plans mentioned, for example, that priority groups would be reassessed when epidemiologic data on the specific pandemic virus becomes available. Furthermore, the final identification of priority groups was often tasked to the national, regional and/or local pandemic influenza committee. If adequate amounts of vaccine were to be available, mass vaccination was considered as an option by 23 Member States (**TABLE 6**).

Twenty-two Member States had highly detailed vaccine preparedness plans, 58 had moderately detailed plans and 39 had weakly detailed plans (**FIGURE 14**). The level of detail was assessed using eight indicators of vaccine preparedness: specification of vaccine use, outlining of priority groups, monitoring strategies, strategies for supply and procurement, sources of vaccine, guidelines for storage, guidelines for distribution and whether the plan mentioned mass vaccination (**ANNEX 1**).

In planning for vaccine supply and procurement, at the time of writing their plans, 15 governments had signed contractual agreements with vaccine manufacturers to secure vaccines during a pandemic and 14 countries were considering similar arrangements with manufacturers or vaccine importers. Provision of vaccines from external sources was considered by 22 Member States (**FIGURE 11**). Fourteen Member States specified WHO as a source, 12 (including one developing country) mentioned in-country vaccine production capacity and five developing countries planned for future in-country production of vaccines. Of the 108 countries considering vaccine use, 55 countries had not specified sourcing arrangements.

¹ World Bank country classification accessed from <http://siteresources.worldbank.org/DATASTATISTICS/Resources/CLASS.XLS>

Figure 14 Review of national pandemic preparedness plans by April 2009: pandemic vaccine preparedness*



5.4.2 Non-pharmaceutical interventions

During the early stages of a pandemic, non-pharmaceutical public health interventions, in conjunction with antiviral drugs, will be the principal prevention and containment measures pending the availability of an effective vaccine, estimated to be 4–6 months with currently available production technology. Particularly in low-income countries, antiviral drug availability will be extremely limited, further emphasizing the importance of non-pharmaceutical interventions. Implementation of public health interventions requires the support of a legal framework. In 42 plans, the need for reviewing or developing a legal framework to promote non-pharmaceutical public health interventions was addressed.

Table 7 Overview of pandemic non-pharmaceutical planning

COMPONENTS	N (%)
Individual infection control and prevention measures	65 (55)
Community infection control measures ^a	68 (57)
Isolation	85 (71)
Quarantine	72 (61)
Social distancing	
Closure of day care or educational institutions	72 (61)
Prohibition of mass gatherings	78 (66)
Travel and trade	
Travel advisories/restrictions	44 (37)
Trade restrictions	48 (40)

^a For the purpose of limiting animal to human transmission.

5.4.2.1 Individual household and community infection control measures

The provision of advice and education messages for individuals prior to and during a pandemic was mentioned in 65 plans. All included information on hygiene or risk avoidance, which included proper hand washing techniques and respiratory hygiene. Other advice frequently mentioned included cough etiquette (n=32), wearing masks (n=28) and voluntary isolation of the sick (n=23). Specific community infection control advice targeted to avian influenza A(H5N1) prevention or risk avoidance (e.g.,

environmental hygiene/bio security, food safety, avoidance of contact with infected poultry farms or live markets and hand washing after contact with birds) was included in 68 plans. Fifty-one plans addressed the need to update and revise public education messages with evolving epidemiological situations and new knowledge (**TABLE 7**).

5.4.2.2 Isolation, quarantine and social distancing measures

Eighty-five plans (71%) addressed the need to isolate sick individuals. In addition, 10 countries planned to isolate travellers with symptoms of influenza coming from affected areas. Isolation sites mentioned included homes, health facilities, communities and isolation sites at ports. Seventy-two plans (61%) mentioned quarantine measures of which 23 explicitly referred to quarantine of contacts of influenza cases and 18 considered quarantine of asymptomatic travellers from affected areas. Detailed strategies in terms of when and how to implement quarantine and isolation was not provided in most plans. Other public health measures such as school closure (n=72) and prohibition of mass gatherings (n=78) were stated without detailed implementation plans.

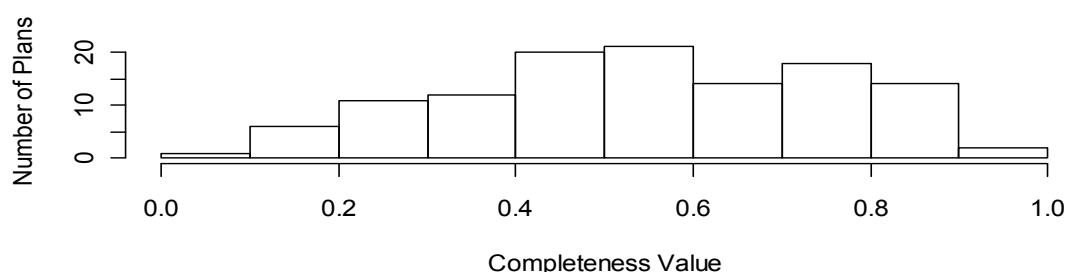
5.4.2.3 Travel and trade

Forty-four plans (37%) specified travel-related information (i.e., travel restriction and advisory) to and from affected areas. Forty-eight plans (40%) specified trade related information (i.e., trade restrictions) to and from affected areas.

5.4.3 Prevention and Containment completeness values

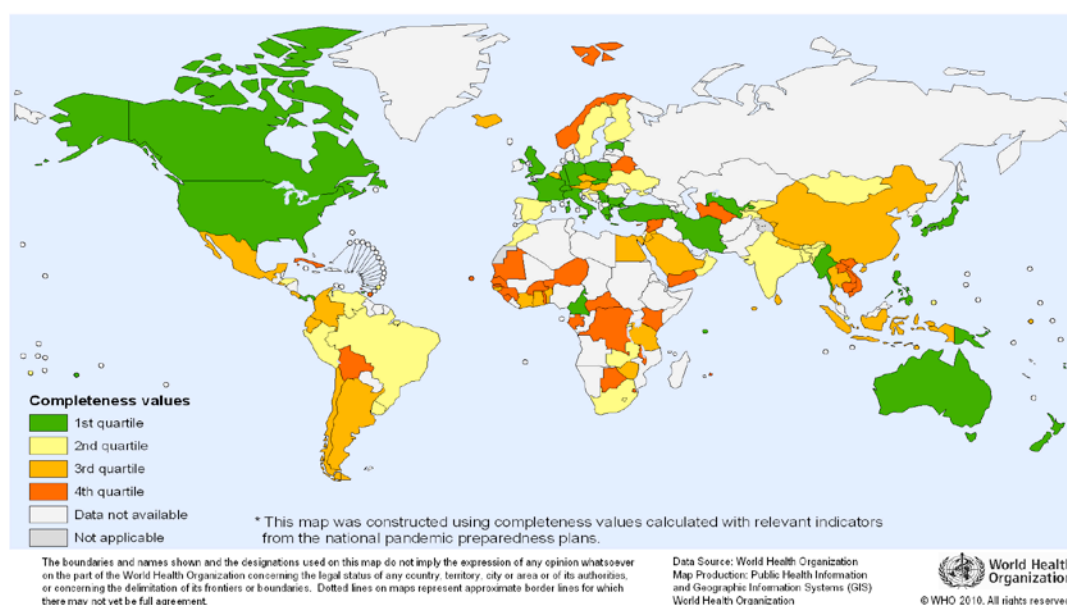
The prevention and containment completeness values were aggregates of scores assigned to the 19 graded indicators of prevention and containment. The median score of completeness values in the functional area of prevention and containment was 0.524 (**FIGURE 15**).

Figure 15 Prevention and containment completeness values



These values (including both pharmaceutical and non-pharmaceutical measures) were arranged in quartiles and represented in **FIGURE 16**. Out of plans in the 1st quartile, 13 were from EUR, eight were from WPR, four were from AMR, two each from AFR and EMR and one was from SEAR. Out of plans in the 2nd quartile, nine were from EUR, six were from AMR, five were from WPR, four were from AFR, three were from SEAR, and two were from EMR. Out of plans in the 4th quartile, 17 were from AFR, four were from EUR, three each were from AMR, EMR and WPR.

Figure 16 Review of national pandemic preparedness plans by April 2009: functional area of prevention and containment*



5.5 Health systems response

5.5.1 Laboratory capacity

Ninety-three plans (78%) stated existing in-country laboratory capacity for influenza diagnostic testing and 99 plans (83%) mentioned laboratories (inside or outside the country) with the ability to perform further investigation such as virus isolation, sub-typing and confirmation when required (**TABLE 8**). Half of the plans referred to protocols for specimen collection, handling, transport and disposal. However, only 25 plans provided detailed information. Seventy-two plans (61%) had strategies to share clinical material from confirmed cases and laboratory results with national and or international groups (i.e., WHO, neighbouring countries).

Table 8 Overview of health systems response planning

COMPONENTS	n (%)
In-country diagnostic laboratory capacity	93 (78)
Laboratories for virus isolation, sub-typing, confirmation	99 (83)
Epidemiological investigation	100 (84)
Case management	91 (76)
Health facilities	
Facilities for treatment	85 (71)
Potential alternate sites	54 (45)
Priorities and response strategies	71 (60)
Infection control	73 (61)
Health Care Workers	
Training	94 (79)
Surge capacity	62 (52)
Capacity to handle excess mortality	57 (48)

5.5.2 Epidemiological investigation

One-hundred plans (84%) included information on epidemiological investigation (i.e. assessing modes of transmission, disease presentation) of confirmed influenza cases caused by a new virus strain (Table 8). There were 61 plans (51%) with mechanisms for rapid and timely exchange of information resulting from epidemiological investigations with national and international bodies.

5.5.3 Case management and treatment

There were 91 plans (76%) with country-specific clinical guidelines for the management of pandemic influenza (TABLE 8). Twenty-one plans (18%) provided detailed case management information which included clinical presentation, epidemiological case definition, diagnosis and treatment with antiviral drugs. Four plans provided guidance on management of complications and the use of antibiotics.

5.5.4 Health facilities, health care workers and excess mortality capacity

Eighty-five plans (71%) described where patients could access treatment during a pandemic. Most plans indicated that uncomplicated cases could be managed at an outpatient clinic or general practice while reserving inpatient-level care for severe cases or cases with complications. Some plans specifically mentioned tertiary and secondary hospital treatment sites in the event of an H5N1 outbreak (avian flu wards or negative pressure rooms). Additionally, fifty-four plans (45%) identified potential alternative sites for medical care during a pandemic, such as schools, hotels and temporary influenza centres for outpatient care, triage or for recovery upon discharge from a hospital. Home-based health care was also considered in 20 plans (17%). Seventy-one plans (60%) identified priorities and response strategies of health facilities during a pandemic including triage, case referral and service prioritization. There were 56 plans that mentioned the use of triage during a pandemic for quick assessment and referral of cases to appropriate care.

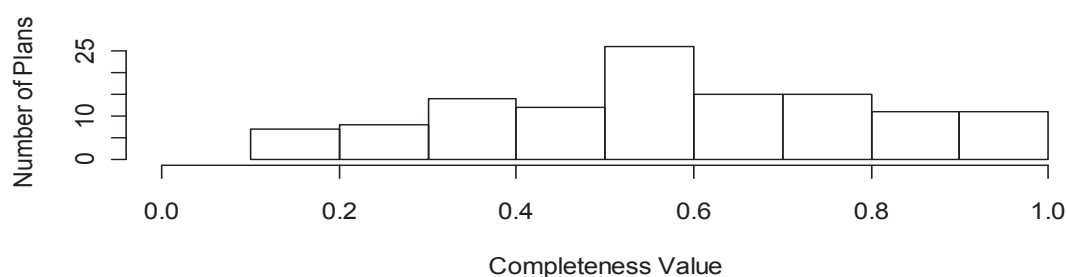
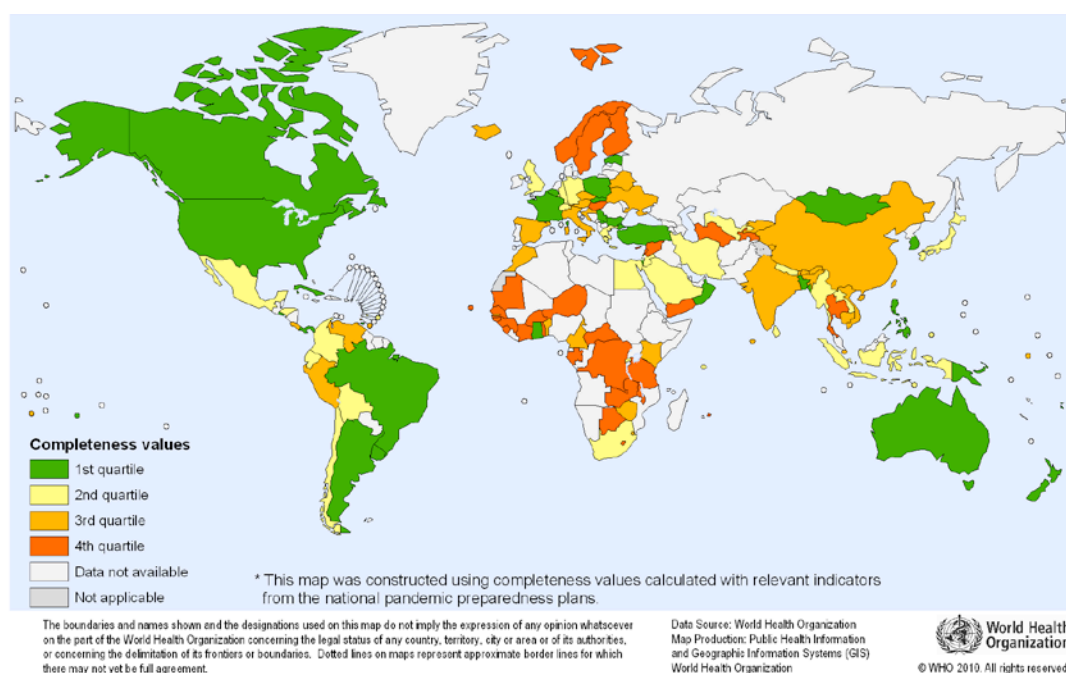
Information on infection prevention and control measures was provided in 73 plans (61%). All emphasized the need to enhance and improve standard infection prevention measures (TABLE 8). Of the 73 plans, 33 (45%) gave detailed information on additional measures specific to a pandemic, namely personal protection measures such as the use of masks and other protective equipment, patient isolation and disinfection. There were 100 plans (84%) which highlighted the need to provide medical supplies for infection control including personal protective equipment and disinfectants.

Additional health care worker (HCW) training specific to pandemic influenza was mentioned in 94 plans (79%). Surge capacity with regard to HCWs was considered in 62 plans (52%). These plans indicated that additional personnel could be mobilized through recruitment of retired health personnel or trained volunteers for specific tasks. Furthermore, consideration was given to the maintenance of essential services (such as food and water supply) during a pandemic in 65 plans (55%).

A total of 57 plans (48%) included information regarding the capacity to manage excess mortality in the case of a pandemic, of which 11 provided details on safe handling of corpses (TABLE 8).

Health systems response completeness values were aggregates of scores assigned to 13 graded indicators of health systems response. The median value for health systems response completeness value was 0.579, (FIGURE 17).

Out of plans in the 1st quartile, nine each were from AMR and EUR, eight were from WPR, two from EMR and one each from AFR and SEAR (Figure 18). Seven plans in the 2nd quartile were from AMR, six were from EUR, five were from SEAR, four each were from EMR and WPR and three were from AFR. Out of plans in the 4th quartile, 19 were from AFR, seven were from EUR, three were from EMR and one was from SEAR.

Figure 17 Health Systems Response completeness values**Figure 18 Review of national pandemic preparedness plans by April 2009: functional area of health systems response***

5.6 Communication

The majority of Member States had developed communication plans specific to certain groups such as the public (99%), health and non-health authorities (90%), international organizations (68%), the media (75%) and policy makers (45%). Forty-two plans (35%) indicated the designation of a pandemic communication spokesperson (**TABLE 9**). One-hundred and eight plans (91%) outlined appropriate channels of communication such as mass media (i.e., television, radio), telephone hotlines, newspapers, community-based resources for communication with the public, websites, emails, medical bulletins and briefings for health professionals. Thirteen countries (11%) specifically addressed communication with minority groups (i.e., ethnic minorities, refugees, immigrants, indigenous peoples). There were 57 plans (48%) that specified communication messages by pandemic phases (almost all used WHO pandemic phases). Fifty-one plans (43%) mentioned strategies to update communication messages with available new knowledge or feedback from the public, health sector, and other stakeholders.

Communication completeness values were aggregates of scores assigned to the 10 graded indicators of communication. The median value for communication completeness values was 0.600, (**FIGURE 19**). Out of plans in the 1st quartile for communication completeness values, 10 were from EUR, nine were from the AMR, eight were from WPR, and three were from EMR. Out of plans in the 2nd quar-

Table 9 Overview of communication planning

COMPONENTS	n (%)
Communication plan for	
Health and non-health authorities	107 (90)
International organizations ^a	81 (68)
Policy makers	54 (45)
Public	118 (99)
Media	89 (75)
Minority groups	13 (11)
Pandemic communication committee or spokesperson	42 (35)
Communication messages by pandemic phase	57 (48)
Communication channels identified	108 (91)
Plan to update communication messages	51 (43)

^a Includes WHO and the Food and Agriculture Organization of the United Nations (FAO).

tile, eight were from AFR, six were from EUR five each from AMR and WPR, four were from SEAR and two were from EMR. Out of plans in the 4th quartile, 16 were from AFR, five were from EUR, three were from WPR and two each from AMR, EMR and SEAR (**FIGURE 20**).

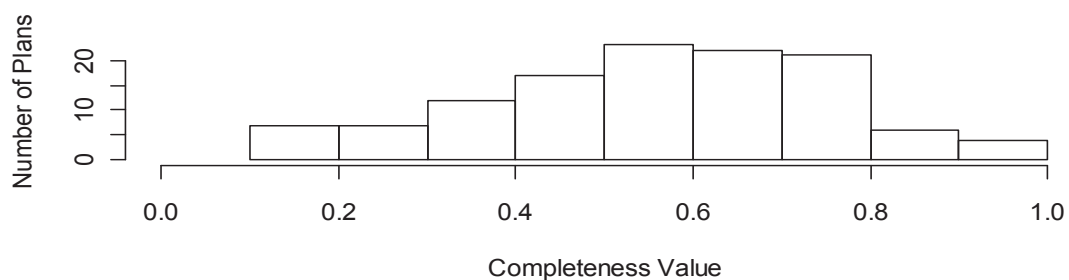
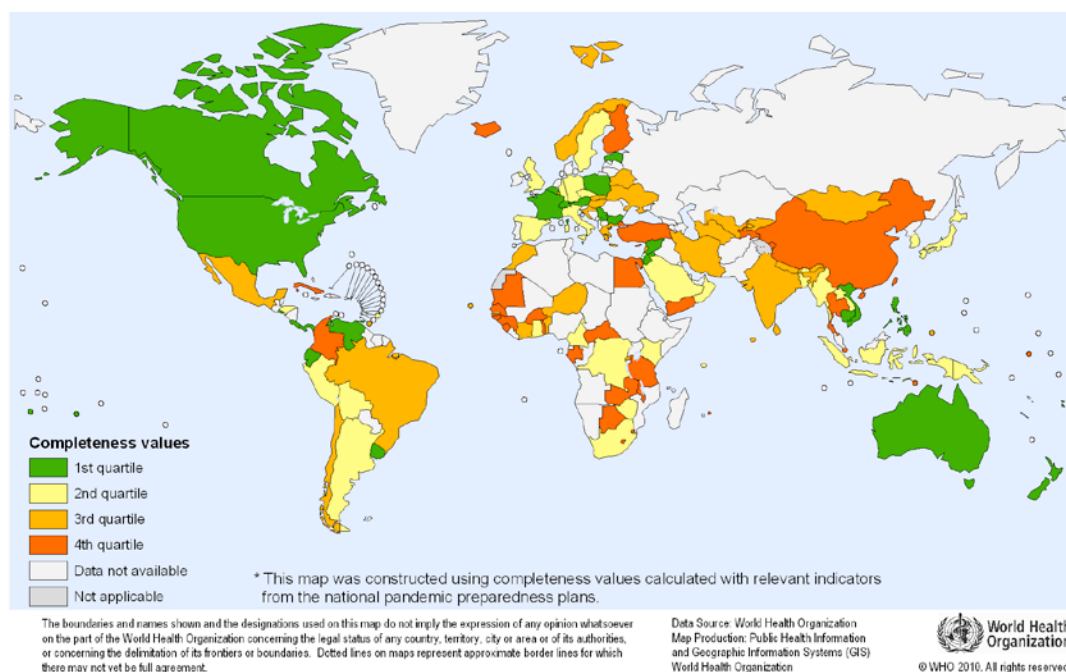
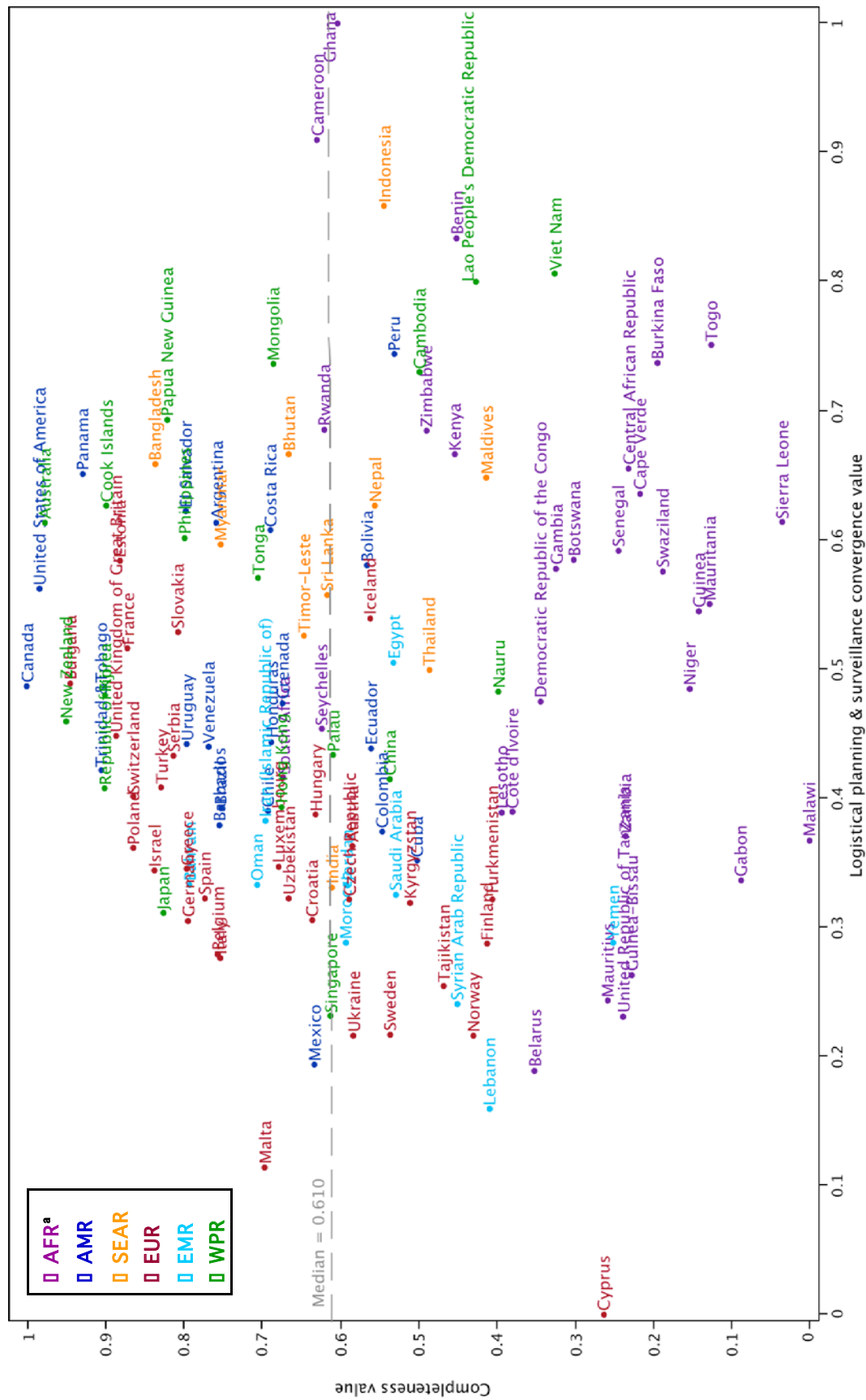
Figure 19 Communication completeness values**Figure 20 Review of national pandemic preparedness plans by April 2009: functional areas of communication***

Figure 21 Convergence between pandemic preparedness plans



^a AFR – WHO African Region; AMR – WHO Region of the Americas; SEAR – WHO South-East Asia Region, EUR – WHO European Region, EMR – WHO Eastern Mediterranean Region, WPR – WHO Western Pacific Region.

5.7 Regional analysis

FIGURE 21 illustrates the convergence and divergence PPP completeness values with respect to 73 indicators encompassing the five components of pandemic preparedness. The x-axis, 'logistical planning and surveillance convergence value,' represents an aggregate of variables primarily influenced by the following seven indicators that reflect several of the planning/coordination and surveillance aspects of plans: monitoring and evaluation strategies, planning for financial resources, timelines, specifying training needs, presence of an influenza surveillance system, surveillance sites, and influenza surveillance in susceptible animals. The function of the x-axis is to demonstrate the similarities between plans relative to these seven indicators. The actual values on the x-axis are therefore not as meaningful for our purposes as the relative horizontal distances between the national plans. The x-axis also provides more information about the convergence and divergence of plans as it adds a second dimension by which to visualize similarities between plans' characteristics. The completeness values represented on the y-axis are not dependent on the convergence values displayed on the x-axis.

Overall, convergence in plan characteristics could be observed most in pandemic preparedness plans from the same geographic and/or WHO region. The greatest amount of convergence in plan characteristics was between those from EMR and SEAR. Plans from EUR also demonstrated a high degree of convergence, clustered closely together horizontally. The most divergent plans within the same region were from AFR, distributing a wide degree of variability over the seven characteristics used for the X axis.

5.7.1 WHO African Region

The WHO African Region has 46 Member States. The majority of Member States in the region (74%) had developed pandemic preparedness plans which incorporated essential elements of preparedness and response actions. A total of 29 plans representing 63% of the Member States were accessed and analysed through publicly available internet sites. The majority of plans (93%) were developed for an influenza pandemic of avian influenza A(H5N1) origin. Twenty-five plans (86%) included a budget outlining the financial resources required to support activities during a defined period of time.

Several strong points of plans from the African Region were the following: 100% outlined communication with the public, antiviral and vaccine use were anticipated in 76% and 83% of plans, respectively, 79% planned for animal surveillance, 72% outlined communication with the health sector, 69% established pandemic influenza national committees, 69% mentioned isolation as a containment measure, and 66% outlined case management (**TABLE 10**). However, few plans described existing influenza surveillance and early warning systems (21% and 31%, respectively). Furthermore, few plans considered conducting risk assessments or a review of the plan (17%). Strategies for enhanced surveillance among avian influenza risk groups and community involvement in early identification of unusual occurrences was described in some plans.

The median preparedness plan completeness value for the African Region was 0.384, (**FIGURE 22**). Plans from the region were consistently strong in communication and prevention and containment, but require further consideration for planning and coordination, especially in the area of sub national planning.

Figure 22 Distributions of AFR pandemic preparedness plan completeness values

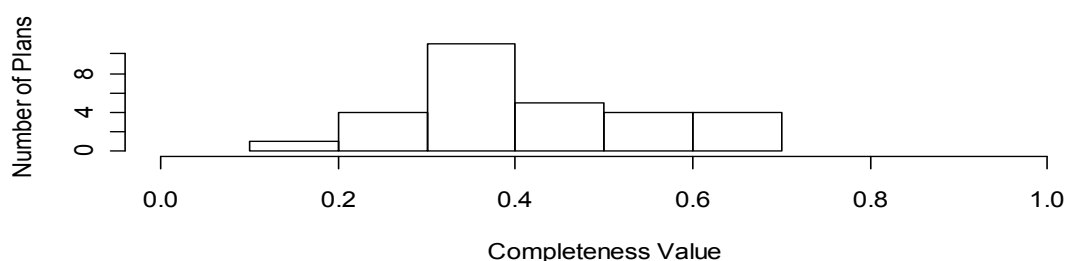


Table 10 WHO African Region summary of pandemic preparedness indicators^a

DESCRIPTION	NUMBER OF PLANS	DESCRIPTION	NUMBER OF PLANS
	n (%)		n (%)
Planning and coordination		Prevention and containment	
National committee established	20 (69)	Isolation	20 (69)
Members identified	14 (48)	Quarantine	9 (31)
Roles defined	15 (52)	Community education and advice	13 (45)
Sub national plan considered	4 (14)	Anticipated antiviral drug use	22 (76)
Sub national plan developed	0 (0)	Anticipated vaccine use	24 (83)
Sub national committee established	5 (17)	Health systems response	
Maintenance of essential services	4 (14)	Laboratory capacity	10 (34)
Command and control	12 (41)	Case management guideline	19 (66)
Risk assessment	5 (17)	Infection control mentioned	14 (48)
Consideration to review plan	5 (17)	Communication	
Pandemic exercise carried out	0 (0)	Communication with public	29 (100)
Situation monitoring and assessment		Communication with health sector	21 (72)
Routine surveillance	6 (21)	Revise educational messages	7 (24)
Early warning system	9 (31)		
Animal surveillance	23 (79)		
Surveillance data exchange	14 (48)		
Compliance with IHR mentioned	4 (14)		

^a The number of country plans analysed in the WHO African Region (n=29) is the denominator for the percentages calculated in the table.

5.7.2 WHO Region of the Americas

The WHO Region of the Americas has 35 Member States. There were 24 plans accessed through the public domain representing 69% of Member States in the region. A total of 20 plans representing 57% of the region's Member States were included in this analysis. Eleven plans (55%) were developed for an influenza pandemic of avian influenza A(H5N1) origin.

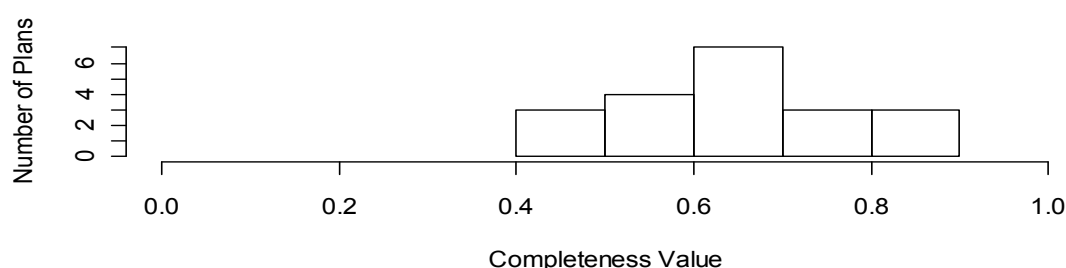
Table 11 WHO Region of the Americas summary of pandemic preparedness indicators

DESCRIPTION	NUMBER OF PLANS	DESCRIPTION	NUMBER OF PLANS
	n (%) ^a		n (%)
Planning and coordination		Prevention and containment	
National committee established	17 (85)	Isolation	18 (90)
Members identified	16 (80)	Quarantine	17 (85)
Roles defined	16 (80)	Community education and advice	10 (50)
Sub national plan considered	8 (40)	Anticipated antiviral drug use	20 (100)
Sub national plan developed	2 (10)	Anticipated vaccine use	18 (90)
Sub national committee established	2 (10)	Health systems response	
Maintenance of essential services	13 (65)	Laboratory capacity	20 (100)
Command and control	20 (100)	Case management guideline	15 (75)
Risk assessment	12 (60)	Infection control mentioned	13 (65)
Consideration to review plan	13 (65)	Communication	
Pandemic exercise carried out	0 (0)	Communication with public	19 (95)
Situation monitoring and assessment		Communication with health sector	19 (95)
Routine surveillance	19 (95)	Revise educational messages	12 (60)
Early warning system	13 (65)		
Animal surveillance	18 (90)		
Surveillance data exchange	20 (100)		
IHR	14 (70)		

^a The number of country plans analysed in the WHO Region of the Americas (n=20) is the denominator for the percentages calculated in the table.

National plans significantly varied in terms of scope, content and operational guidance in the Region of the Americas. Plans demonstrated overall strength in addressing planning and coordination (especially in outlining a command and control structure and in outlining the functions of the national committee), surveillance (especially in routine and animal surveillance as well as surveillance data exchange) and prevention and containment (particularly with anticipated pharmaceutical intervention usage and isolation and quarantine measures) (**TABLE 11**). Other areas of strength included addressing health systems response (particularly with laboratory capacity), communication (especially with the public and health sector) and integration of planning into an existing disaster preparedness system. However, few plans (10%) had developed a sub national plan or committee and no countries had carried out pandemic exercises. Plans from AMR had the highest median preparedness plan completeness value and were consistently strong through all five function areas of planning (**FIGURE 23**).

Figure 23 Distributions of AMR pandemic preparedness plan completeness values



5.7.3 WHO Eastern Mediterranean Region

The WHO Eastern Mediterranean Region has 21 Member States. A total of 12 plans representing 57% of the Member States were accessed through the public domain. The final analysed sample contained 10 plans representing 48% of the region's Member States. The majority (80%) of the plans were developed for a pandemic of avian influenza A(H5N1) origin.

Plans from the Eastern Mediterranean Region demonstrated strength in addressing the establishment of national committees and identifying members for the committees (70%) (**TABLE 12**). Other areas of strength in planning included addressing routine and animal surveillance (70% and 90%, respectively), surveillance data exchange (70%), overall prevention and containment (especially anticipated use of vaccines and antivirals, both at 90%), health systems response (especially laboratory capacity and case management both at 90%) and communication with the public and health sector at 100%. Areas of weakness from this region included many indicators in planning and coordination such as sub national planning, maintenance of essential services, risk assessment, early warning systems, command and control and consideration to review the plan. No countries had carried out pandemic exercises.

Overall completeness values from EMR are shown in **FIGURE 24**. The median value was 0.518.

Figure 24 Distributions of EMR pandemic preparedness plan completeness values

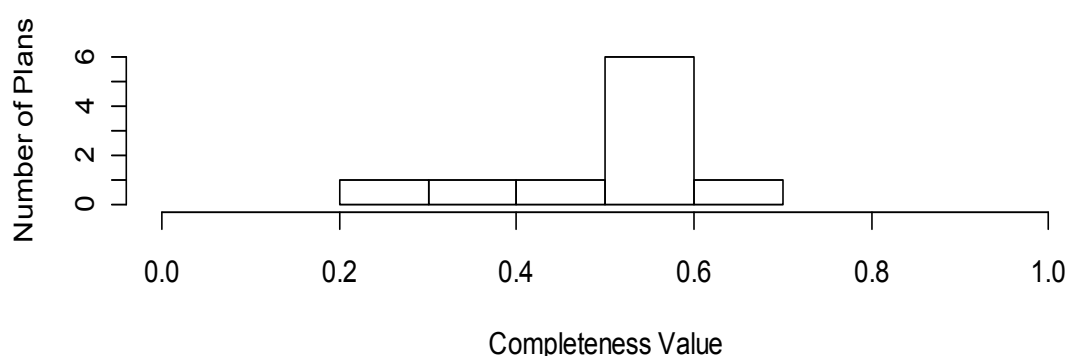


Table 12 WHO Eastern Mediterranean Region summary of pandemic preparedness indicators

DESCRIPTION	NUMBER OF PLANS	DESCRIPTION	NUMBER OF PLANS
	n (%) ^a		n (%)
Planning and coordination		Prevention and containment	
National committee established	7 (70)	Isolation	7 (70)
Members identified	7 (70)	Quarantine	7 (70)
Roles defined	3 (30)	Community education and advice	6 (60)
Sub national plan considered	2 (20)	Anticipated antiviral drug use	9 (90)
Sub national plan developed	0 (0)	Anticipated vaccine use	9 (90)
Sub national committee established	2 (20)	Health systems response	
Maintenance of essential services	3 (30)	Laboratory capacity	9 (90)
Command and control	3 (30)	Case management guideline	9 (90)
Risk assessment	2 (20)	Infection control mentioned	8 (80)
Consideration to review plan	3 (30)	Communication	
Pandemic exercise carried out	0 (0)	Communication with public	10 (100)
Situation monitoring and assessment		Communication with health sector	10 (100)
Routine surveillance	7 (70)	Revise educational messages	6 (60)
Early warning system	3 (30)		
Animal surveillance	9 (90)		
Surveillance data exchange	7 (70)		
IHR	1 (10)		

^a The number of country plans analysed in the WHO Eastern Mediterranean Region (n=10) is the denominator for the percentages calculated in the table.

Table 13 WHO European Region summary of pandemic preparedness indicators

DESCRIPTION	NUMBER OF PLANS	DESCRIPTION	NUMBER OF PLANS
	n (%) ^a		n (%)
Planning and coordination		Prevention and containment	
National committee established	21 (66)	Isolation	19 (59)
Members identified	18 (56)	Quarantine	17 (53)
Roles defined	16 (50)	Community education and advice	18 (56)
Sub national plan considered	13 (41)	Anticipated antiviral drug use	32 (100)
Sub national plan developed	2 (6)	Anticipated vaccine use	31 (97)
Sub national committee established	4 (13)	Health systems response	
Maintenance of essential services	21 (66)	Laboratory capacity	31 (97)
Command and control	21 (66)	Case management guideline	27 (84)
Risk assessment	20 (63)	Infection control mentioned	17 (53)
Consideration to review plan	26 (81)	Communication	
Pandemic exercise carried out	7 (22)	Communication with public	32 (100)
Situation monitoring and assessment		Communication with health sector	30 (94)
Routine surveillance	29 (91)	Revise educational messages	12 (38)
Early warning system	22 (69)		
Animal surveillance	20 (63)		
Surveillance data exchange	30 (94)		
IHR	11 (34)		

^a The number of country plans analysed in the WHO European Region (n=32) is the denominator for the percentages calculated in the table.

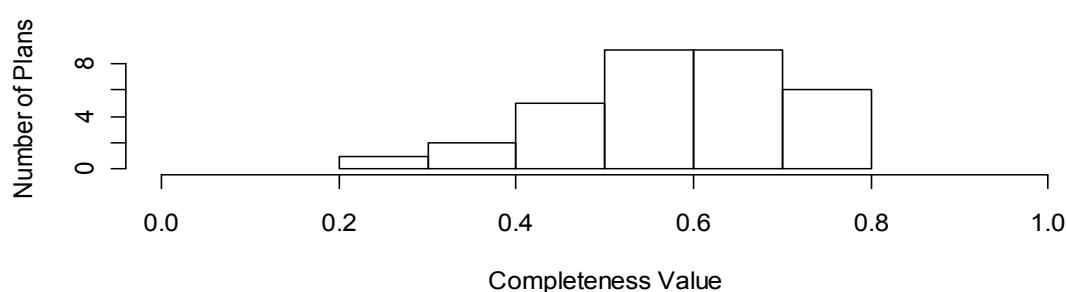
5.7.4 WHO European Region

The WHO European Region has 53 Member States. Forty-three plans representing 81% of the region's Member States were accessed through the public domain. The final analysed sample included 32 plans representing 60% of the region's Member States. Unlike plans from other regions, the majority of plans from EUR (81%) were developed for an influenza pandemic arising from a new and unknown strain.

Plans from the region demonstrated strength in addressing planning and coordination, surveillance data exchange (94%), anticipated pharmaceutical intervention use (antiviral and vaccines at 100% and 97%, respectively), health systems response (particularly laboratory capacity and case management at 97% and 84%, respectively) and communication with both the public (100%) and the health sector (94%) (**TABLE 13**). Out of the global total of nine Member States which had carried out a pandemic exercise, seven (78%) were from this region. Areas of weakness included sub national planning, animal surveillance and early warning systems.

Overall completeness values for EUR are shown in **FIGURE 25**. There was wide variation in completeness values with a median of 0.585.

Figure 25 Distributions of EUR pandemic preparedness plan completeness values



5.7.5 WHO South-East Asia Region

The WHO South-East Asia region has 11 Member States. Plans from all 11 Member States were accessed through the internet. A total of 10 plans, representing 91% of the Member States were included in the analysis. The majority of plans (90%) were developed for a potential pandemic of avian influenza A(H5N1) origin.

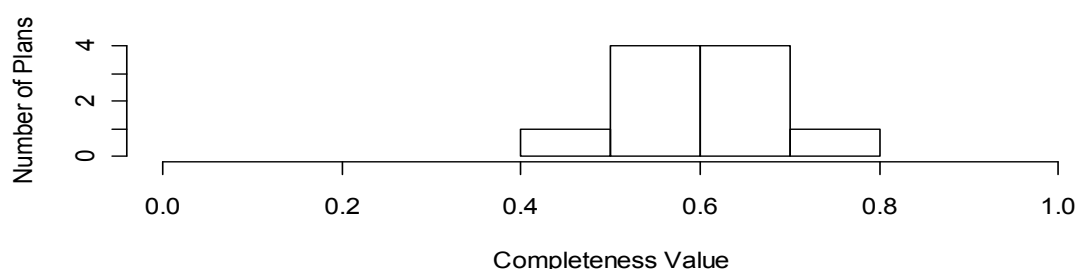
Plans in this region demonstrated strength in addressing health systems response (90% for laboratory capacity, case management and infection control) as well as communication with the health sector (90%) and the public (100%). Other areas that were frequently addressed included animal surveillance (90%), routine surveillance (80%), consideration to review the plan (90%) and anticipated pharmaceutical use (100% for both antivirals and vaccines) (**TABLE 14**). The majority of plans (88%) included budgets outlining the required financial resources to support activities during a defined period of time. Some areas of weakness included sub national planning and carrying out pandemic exercises.

The median value of PPP completeness values in SEAR was 0.603 (**FIGURE 26**). Plans were consistently strong through the five functional areas.

Table 14 WHO South-East Asia Region summary of pandemic preparedness indicators^a

DESCRIPTION	NUMBER OF PLANS	DESCRIPTION	NUMBER OF PLANS
	n (%)		n (%)
Planning and coordination		Prevention and containment	
National committee established	7 (70)	Isolation	7 (70)
Members identified	7 (70)	Quarantine	6 (60)
Roles defined	6 (60)	Community education and advice	4 (40)
Sub national plan considered	2 (20)	Anticipate antiviral drug use	10 (100)
Sub national plan developed	0 (0)	Anticipated vaccine use	10 (100)
Sub national committee established	1 (10)	Health systems response	
Maintenance of essential services	5 (50)	Laboratory capacity	9 (90)
Command and control	7 (70)	Case management guideline	9 (90)
Risk assessment	4 (40)	Infection control mentioned	9 (90)
Consideration to review plan	9 (90)	Communication	
Pandemic exercise carried out	1 (10)	Communication with public	10 (100)
Situation monitoring and assessment		Communication with health sector	9 (90)
Routine surveillance	8 (80)	Revise educational messages	4 (40)
Early warning system	5 (50)		
Animal surveillance	9 (90)		
Surveillance data exchange	8 (80)		
IHR	3 (30)		

^a The number of country plans analysed in the WHO South-East Region (n=10) is the denominator for the percentages calculated in the table.

Figure 26 Distributions of SEAR pandemic preparedness plan completeness values

5.7.6 WHO Western Pacific Region

The Western Pacific Region has 27 Member States. A total of 18 plans representing 63% of the region's Member States were included in the analysis. Nine plans (50%) were developed for a potential pandemic of avian influenza A(H5N1) origin.

National plans varied significantly in terms of scope, content and operational guidance among the Member States. Seventy-eight percent of plans from the region planned for a national committee and identified its members and roles. Planning for animal surveillance (94%) and surveillance data exchange (83%) were also common (**TABLE 15**).

Most plans outlined prevention and containment measures such as anticipated pharmaceutical intervention use (antiviral and vaccines at 94% and 89%, respectively), health systems response (particularly laboratory capacity and infection control at 78% and 89%, respectively) and communication with both the public (100%) and the health sector (100%). Areas of weakness included deficient sub national planning, lack of implementing pandemic exercises and lack of early warning systems.

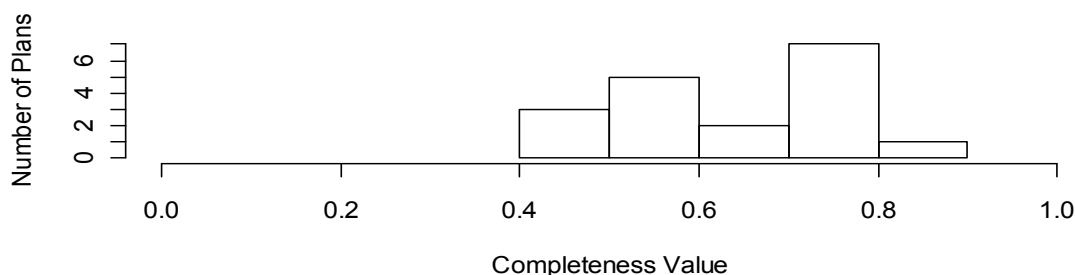
The median PPP completeness value across the region was 0.661. Plans were consistently strong in most of the five functional areas (**FIGURE 27**).

Table 15 WHO Western Pacific Region summary of pandemic preparedness indicators^a

DESCRIPTION	NUMBER OF PLANS	DESCRIPTION	NUMBER OF PLANS
	n (%)		n (%)
Planning and coordination		Prevention and containment	
National committee established	14 (78)	Isolation	14 (78)
Members identified	14 (78)	Quarantine	16 (89)
Roles defined	14 (78)	Community education and advice	15 (83)
Sub national plan considered	6 (33)	Anticipated antiviral drug use	17 (94)
Sub national plan developed	2 (11)	Anticipated vaccine use	16 (89)
Sub national committee established	1 (6)	Health systems response	
Maintenance of essential services	10 (56)	Laboratory capacity	14 (78)
Command and control	13 (72)	Case management guideline	12 (67)
Risk assessment	9 (50)	Infection control mentioned	16 (89)
Consideration to review plan	5 (28)	Communication	
Pandemic exercise carried out	1 (6)	Communication with public	18 (100)
Situation monitoring and assessment		Communication with health sector	18 (100)
Routine surveillance	12 (67)	Revise educational messages	10 (56)
Early warning system	5 (28)		
Animal surveillance	17 (94)		
Surveillance data exchange	15 (83)		
IHR	11 (61)		

^a The number of country plans analysed in the WHO Western Pacific Region (n=18) is the denominator for the percentages calculated in the table.

Figure 27 Distributions of WPR pandemic preparedness plan completeness values



6. Discussion

6.1 Overview

This study adds to previous comparative analyses of national pandemic preparedness plans which have been conducted (8–15), some of which have also been based on the 2005 WHO Checklist for Influenza Pandemic Preparedness and Planning (3).

The importance of planning has been highlighted by several studies that have already reported on lessons learned from responses to pandemic influenza A(H1N1) 2009 (16, 17), which show that creating pandemic preparedness plans greatly facilitates the ability of a country to address the challenges of a pandemic effectively. Plans from 74% of Member States were sourced, demonstrating that Member States have given priority, as well as invested resources, in the development of pandemic preparedness and response plans.

In terms of the overall level of preparedness, plans can be broadly divided into two categories: current and future preparedness. Those in the current preparedness category included plans which were built on existing systems and often provided operational guidance for implementation while plans in the future preparedness category envisaged capacity building and resource mobilization for future implementation with little operational perspective.

The majority of Member States published their pandemic preparedness plans in 2005 and 2006. This was most likely spurred by the push for better pandemic planning after outbreaks of avian influenza A(H5N1) began to emerge in 2003 as well as the publication of updated guidance documents for pandemic preparedness planning (2–4).

The vast majority of plans coming from SEAR, AFR and EMR were developed for a pandemic of avian influenza A(H5N1) origin. While the risk of a pandemic of A(H5N1) has not changed, the emergence of the influenza A(H1N1) 2009 pandemic virus in the Americas demonstrated the value of generic influenza planning for a virus of unknown origin.

As observed from pandemic influenza A(H1N1) 2009, viruses vary in severity and require different approaches. Given the uncertainty of the next pandemic virus, planning for pandemic influenza should not exclusively focus on any specific strain, but should be based on robust surveillance and evidence-based risk assessment.

There was some disparity between more and less affluent nations in pandemic preparedness planning, which is consistent with findings elsewhere (8). Countries with higher incomes tended to have higher pandemic preparedness plan completeness values compared to low-income countries. Developing countries have significant competing infectious disease priorities such as malaria, HIV/AIDS, tuberculosis and other vaccine preventable diseases in addition to increasing chronic disease burdens with scarcer resources and relatively few staff to tackle the immense issues at hand (18, 19). However, level of income is a less important associative factor of pandemic preparedness planning beyond a certain income threshold. Further, there was a considerable amount of variance observed which is not explained by knowing GNI signifying that there exists other factors which account for comprehensive pandemic preparedness planning. These may include components such as political will and leadership, perceived influenza burden, competency in pandemic influenza planning and governance structures.

There was also an observable disparity in planning between countries with different levels of health burden. Plans coming from countries with higher life expectancies and lower under-five mortality rates tended to have higher pandemic preparedness plan completeness values. The result that completeness values are also positively correlated with health in addition to income is not surprising given the well-known association between national wealth and level of health first demonstrated by Preston (20) in

the 1970s. However, a considerable amount of variance was not accounted for by life expectancy or under-five mortality rate. This demonstrates, as was the case with GNI, that there exist other factors which influence comprehensive pandemic preparedness planning.

The seven indicators which explained most divergence between plans were in the areas of logistical planning and surveillance. These indicators describe progress towards a comprehensive influenza surveillance system, financial planning, monitoring and evaluation and training needs for their responses and explain most of the variability in the plans. It is of interest to note the relative importance of these indicators in addressing variability within the plans.

For each of the functional area completeness values, the same group of countries generally tended to score within the same quartiles indicating consistent scoring across each of the functional areas.

6.2 Planning and coordination

The whole of society approach to pandemic influenza preparedness addresses the roles not only of the health sector, but of all other sectors, individuals, families and communities in mitigating the effects of a pandemic. This approach is outlined in the revised WHO guidance and Whole of Society guidelines (1, 25). Pandemic preparedness requires collaborative multisectoral planning to ensure an organized and coordinated response. Coordination of sectors such as the public and private health sectors, agricultural sectors, higher level governmental authorities and essential services such as water, electricity, transport and social services was clearly indicated in most plans. Consideration for maintenance of essential services during a pandemic was only mentioned in approximately half of the plans. Plans did, however, often address the responsibilities of groups other than the national pandemic planning committee. These groups included NGOs, ministries of health and agriculture, WHO and the United Nations. The most common intersectoral collaboration outlined in plans was between ministries of health and agriculture. This is not surprising as most of the plans reviewed were developed by the health and/or agricultural sector for a pandemic of A(H5N1). Non-governmental and community based organizations have close and direct contact with communities and are often well placed to raise awareness, communicate accurate information, counter rumours, provide needed services and support the implementation of government plans during an emergency. However, their involvement in the response was rarely mentioned in the plans reviewed.

WHO has the role of providing guidance and technical support to Member States in the areas of prevention and control of influenza pandemics and annual epidemics, including case management, strengthening pandemic influenza preparedness and response, sharing of influenza viruses, access to vaccines and other benefits (1). Among other collaborations, WHO works with Member States to coordinate responses under the IHR 2005 (7), designate global pandemic phases, recommends a switch to pandemic vaccine production, coordinate rapid containment operations and provide early assessments of pandemic severity. These functions are dependant on the collaboration of affected Member States and cooperation from all Member States.

WHO recommends that central governments establish a core national pandemic planning committee representing relevant organizations. The committee would be responsible for coordinating the pandemic response. It should involve the health sector, other government sectors, NGOs, communities and international agencies. Encouragingly, approximately three-quarters of all Member States included in this study had already established national planning committees; and almost all had mentioned some sort of pandemic influenza planning committee, either at the national or sub national level. One weakness among plans was the lack of sub national preparedness planning with over three quarters of Member States not considering the sub national component of response implementation. Another weakness observed was that few plans had been tested through carrying out pandemic exercises. Less than 10% Member States had actually carried out pandemic exercises, although over half had considered doing so. This type of exercising would highlight deficiencies in planning and response mechanisms, especially linking national and sub national responses. The A(H1N1) 2009 pandemic provided Member States an opportunity to real-time test plans from an operational perspective and revisions can be based on lessons learned evaluations. Revised plans should be exercised as a component of the revision process.

Approximately one-fifth of the plans assessed were part of a national disaster plan or had some links with disaster preparedness, such as the inclusion of disaster authorities on a pandemic planning committee. Given the uncertainty of when the next influenza pandemic will occur, pandemic influenza preparedness should be integrated into national emergency preparedness plans, frameworks and activities. Finding synergy with existing emergency plans and structures will ensure the efficient implementation of the emergency response, strengthen existing emergency response communication and coordination structures, and maximise use of resources.

WHO guidelines outline pandemic preparedness and response actions by the six pandemic phases and advise national authorities to subdivide certain phases (such as phases 2–5) to reflect the national situation (1,2). The phase-based planning approach is a global framework to guide countries to define goals, identify national priorities and direct preparedness and response actions by functional area for each phase. The majority of plans organized planning and response actions by pandemic phases or periods while some plans were organized by the WHO five functional areas: planning and coordination, disease monitoring and assessment, prevention and containment, health system response and communication. Further elucidation of activities in each of the five functional areas will improve the comprehensiveness of response planning and lead to a more coordinated, efficient response.

6.3 Situation monitoring and assessment

In this study, information on national surveillance strategies and planning such as existing systems for routine surveillance, considerations for enhanced and pandemic surveillance as well as communication structure for exchange of surveillance information was collected and analysed. The goal of monitoring and assessment is to collect, interpret and disseminate information on the risk of a pandemic before it occurs and, once under way, to monitor pandemic activity and characteristics and to evaluate effectiveness of response measures. The most mentioned type of influenza surveillance in plans was animal surveillance.

Routine influenza surveillance (inter-pandemic surveillance) through ILI or ARI/SARI surveillance coupled with laboratory-based surveillance (virological surveillance) is used to assess influenza burden in a country. This is essential for defining target groups for seasonal influenza vaccination programmes. Moreover, robust routine surveillance can serve as an early warning system to detect abnormal clusters of ILI. It is therefore worth noting that almost two-thirds of Member States included in this study had established routine ILI or ARI/SARI surveillance. However, in order to assess severity, hospitalization or mortality data needs to be collected and analysed. Very few plans described surveillance of acute respiratory distress syndrome or deaths.

When events with pandemic potential occur, enhanced surveillance will be needed to better monitor developments pertaining to the threat. The type of surveillance depends on whether a potential pandemic strain of influenza virus has first been recognized in animals or humans and where the new strain is known or expected to be geographically circulating. Three-quarters of plans addressed enhanced surveillance. Of these, 71% had specified surveillance among AI risk groups.

During a pandemic, only the essential data collection should be maintained as many services will be overwhelmed. The collection of a minimum volume of data must be maintained to monitor trends to enable the deployment of essential supplies to maintain services. For instance, laboratory confirmation of cases may not be necessary once a pandemic is confirmed since clinical symptoms will be sufficient to respond to health care demand.

The IHR 2005 (7) is a legally binding document for Member States that provides a global legal framework to prevent, control or respond to public health risks that may spread internationally. Under the IHR 2005, Member States are required to promptly inform WHO of all cases of “human influenza caused by a new subtype” in their territories within 24 hours of assessment in accordance with the case definition established by WHO for this specific purpose. Notification must be followed by ongoing communication of detailed public health information on the event, including, where possible, case definitions, laboratory results, source and type of risk, number of cases and deaths, conditions affecting the spread of the disease and the public health interventions employed. While a quarter of plans men-

tioned the implementation of IHR 2005 for monitoring and assessment in the pandemic response, the exchange of surveillance information with WHO was not commonly mentioned. This result is possibly an artefact of the publication dates of the plans, as adoption of the IHR 2005 by Member States which came into force in 2007, has legally binding implications for reporting.

Surveillance and laboratory capacities have been upgraded, additional National Influenza Centres (NIC) have been established, surveillance networks have been expanded, and there is ongoing capacity building through training and the implementation of the IHR 2005 (7).

6.4 Prevention and containment

Ideally, a layered containment strategy for pandemic influenza consisting of non-pharmaceutical interventions, antiviral medications and vaccines would be used in the case of a pandemic (21). Influenza vaccine is the most effective preventive measure available, significantly reducing morbidity and mortality in target risk groups. Antiviral medications can be used for early treatment and for prophylaxis in high risk groups. However, it is likely that access to vaccines early in a pandemic will be extremely limited, especially in countries with limited resources. Thus, non-pharmaceutical or public health measures, may, at times, be the only way of delaying the spread of disease.

6.4.1 Pharmaceutical interventions

Interventions involving antiviral drugs and vaccines can play a significant role in reducing morbidity and mortality and are a key part of a pandemic preparedness strategy (21,22). Most plans anticipated the use of antiviral drugs and vaccines and some incorporated essential elements with regard to supply, prioritization of certain subpopulations, as well as monitoring. However, with the exception of a few plans, most did not outline strategies for implementation of these measures.

The use of antiviral drugs in the initial response to a pandemic is an essential measure in managing pandemic influenza, especially if no effective vaccine is available. Antiviral drugs can be used for early treatment as well as for prophylaxis in people at risk. Antiviral drugs decrease virus shedding and are therefore thought to reduce the spread of influenza by infected persons. With increased antiviral drug use, there is a need to develop clear strategies and operational guidance to monitor and evaluate their effectiveness and to monitor and report resistance and adverse events.

While vaccines are the ideal means of influenza prevention, with the current manufacturing technologies available, it will take approximately four-six months before mass production of vaccines based on a new influenza strain can be achieved. Even then, most countries without vaccine production facilities will have limited access to vaccines during the first pandemic wave due to global supply and demand and capacity to pay. Countries with production facilities should support and ensure that rapid and large-scale production is possible during a pandemic. Countries without production facilities should prepare to implement a vaccination programme as soon as vaccines against the pandemic strain become available. While the difficulties in securing necessary vaccine supplies are well known, only around half of preparedness plans outlined strategies for procuring pandemic vaccines. The majority of plans were weakly to moderately detailed regarding vaccination strategies showing the abundant need for better vaccine planning globally and nationally. The need for strengthening pharmaceutical planning has also been noted in other studies (8).

Due to the scarcity of available vaccines and antiviral drugs, WHO encourages Member States to identify priority groups for receiving them in advance. However, many Member States did not outline priority groups in their preparedness plans. This review showed that almost two-thirds of the plans did not indicate priority groups for antiviral treatment and that one-third did not specify priority groups for pandemic influenza vaccination. When specific subpopulations were mentioned, the main groups considered for antiviral drugs and vaccine use were health care workers, essential service providers and high risk groups, in line with WHO recommendations (4). Most plans demonstrated flexibility in stating that priority groups are subject to revision as a pandemic unfolds and detailed epidemiological data become available. This is a vital function to ensure that high risk groups can be targeted quickly to reduce mortality and morbidity throughout the population at large.

In addition, while many plans prioritized contacts of influenza cases for antiviral prophylaxis, only six provided a rationale and implementation strategy. The WHO recommendation regarding this matter specifies the use of antiviral drugs for contacts depending on adequate supply (2,6). The critical issues with providing prophylaxis for contacts are operational challenges such as how to identify contacts, when to start prophylaxis as well as strategies to monitor clinical outcomes, compliance and adverse events.

Strategies for vaccine and antiviral drug logistics in terms of deployment of stockpiles were mentioned in approximately 60% of all plans although not detailed in most. For instance, strategies for estimation of vaccine and antiviral drug supply (prophylaxis or treatment) were often not clearly outlined. In plans where strategies were outlined, estimated required volumes were based on the size of the total population or specific target populations. Information on stockpiling of antiviral drugs was included in most of the plans analysed in this study. The pre-pandemic stockpiling of antiviral drugs is an important preparedness measure in enabling a nation to effectively respond to a pandemic (21). The planned proportion of the population to be provided with antiviral drugs ranged widely from 0.5% to 30%.

External manufacturers and WHO were referred to most frequently as sources for both antiviral drugs and vaccines. More countries specified in-country production for vaccines in comparison to in-country production of antiviral drugs. All Member States planning to build local capacity for future domestic production of antiviral drugs and vaccines were developing countries. The majority of countries with current in-country production capacity were developed countries with the exception of two developing countries able to produce antiviral drugs and one with current vaccine production capacity. Approximately 60% of the Member States in this study did not have plans for securing vaccines and/or antiviral drugs.

6.4.2 Non-pharmaceutical interventions

In addition to pharmaceutical interventions in a pandemic, non-pharmaceutical interventions are critical to limit transmission and spread of disease. Non-pharmaceutical interventions are crucial to an effective overall response and may in some cases be the only means of delaying the spread of a pandemic. Individual level measures are considered to be cost-effective mechanisms for slowing the spread of pandemic influenza (23).

Approximately two-thirds of all plans had considered non-pharmaceutical interventions such as school closures, quarantine, isolation and prohibition of mass gatherings. However, most plans did not outline practical operational considerations such as triggers for undertaking and ceasing such measures.

Travel and trade restrictions were mentioned in around 40% of plans. It is important that restrictions on travel and trade be rigorously evaluated for their ability to prevent influenza transmission as well as cost-effectiveness since these measures can be economically detrimental to the nations involved (16). Any travel or trade restriction implemented must be in-line with recommendations of WHO under the IHR 2005, or justifiable as providing greater public health protection but not be more restrictive of trade or travel nor more invasive than available alternatives that would achieve the same level of health protection as recommendations provided by WHO.

The recommendations given by Member States in this study on individual prevention and infection control measures such as hand-washing, cough etiquette and isolation were in line with findings elsewhere (24). There is little evidence to support the effectiveness of various types of hand hygiene measures, face masks, isolation and quarantine (21,24). Few randomized control trials have been undertaken to assess non-pharmaceutical interventions and more research is required to fill these knowledge gaps. Thus, real time evaluation and information-sharing should accompany the use of non-pharmaceutical interventions.

6.5 Health systems response

Planning for health systems response is one of the vital components of pandemic planning. Well functioning health systems are required to minimize the morbidity and mortality caused by a pandemic. Initial planning should assess health sector capacity and address gaps according to national resources.

Health systems planning should address key areas such as laboratory capacity, clinical management, infection prevention and control measures, rational personnel management and optimal use of facilities.

Planning for necessary laboratory capacity in the event of a pandemic was a strongpoint in most pandemic preparedness plans. The majority of plans outlined existing laboratory capacity for influenza testing and most mentioned the ability to access more advanced laboratory investigations (inside or outside the country). Locally-available basic diagnostic laboratory capacity is especially important in order to be able to quickly confirm suspected human cases of a new influenza strain. In countries with limited resources, it may be efficient to establish a network of laboratories which are able to carry out necessary tests. Even when local laboratories exist, countries should ensure that in case of an emergency, samples can be shipped to a WHO reference laboratory in or outside the country for rapid confirmation or determination, especially in the case of un-typable strains. Rapid determination is essential for proper risk assessment and to better target recommended measures.

Epidemiological investigation should be used with laboratory confirmation to identify the source and transmission patterns of a new influenza strain in suspected human cases, to assess the clinical impact of the disease and to determine the risk that infected persons or their environment may represent to others. Preventive measures may need to be adjusted based on investigations and specific actions, such as identification and prophylactic treatment of contacts or vaccination of risk groups may be implemented. Epidemiological investigation was addressed in the majority of plans.

Clinical guidelines, supplies and well-informed staff should be readily available to effectively treat suspected human cases of a new influenza strain. Planning for case management was mentioned in over three-quarters of plans. Guidelines for infection control are a crucial component of case management as they are used to reduce transmission in health care settings. Infection control guidelines in health facilities were included in over half of the plans.

Emergency standard operating procedures need to be developed for the rational management of personnel and optimal use of facilities and pharmaceutical resources. Facilities for treatment and potential alternate treatment sites were addressed in 71% and 45% of plans, respectively. Priorities and response strategies such as triage, case referral and service prioritization were addressed in 60% of plans. Consideration must be given to the experience of pandemic influenza A(H1N1) 2009, where the unprecedented speed with which the virus spread allowed it to reach as widely in six weeks as it had taken past influenza viruses to spread in six months. Nearly 80% of Member States included in this study planned to conduct additional training for HCWs in the event of a pandemic. It is clear that there will be limited time for further training while a pandemic is occurring. Strategies for training courses would thus need to be very well-defined or Member States would need to have ongoing training during inter-pandemic periods to maximize preparedness capacity.

6.6 Communication

Effective communication strategies are critical to managing a pandemic. Communicating relevant information with the public, primary responders, partners and stakeholders allows for well-informed decision-making and enables the parties involved to take actions to protect health and safety. Accurate and timely dissemination of information to the public and to those involved in the response are necessary to minimize social disruption, negative economic consequences, and increase the likelihood of effectively meeting the challenges of a pandemic. Building and maintaining public trust in health authorities before, during and after an influenza pandemic is one major goal of pandemic influenza communication. Another goal is to support the coordination and efficient use of limited resources among local, national, regional and international public health partners. The vast majority of plans demonstrated strength in communications planning and communication strategy development. The target groups mentioned most frequently in communication planning were the public, health and non-health authorities as well as the media. Half of the communication messages in plans were organized by pandemic phase and most had identified communication channels to disseminate messages.

7. Limitations

This study involved the assessment of 119 diverse national plans that varied in language, structure, content and length. As a result, the evaluation process necessarily involved some subjective judgements, although this was controlled for to the extent possible through the use of standardized data collection procedures. A related limitation is the potential presence of inter-rater variability. In order to minimize inter-rater variability several measures were put in place such as calibration and cross-checking of scores.

Further, pandemic preparedness plans are evolving documents which are continuously modified while some plans are confidential documents which cannot be accessed in the public domain. Two-thirds of the plans (n=83) were published in 2005-2006 and updated versions of these plans could not be obtained. Thus, the results of this analysis provide only a snapshot of the state of preparedness prior to the influenza A(H1N1) 2009 pandemic.

Another limitation is that a pandemic preparedness plan is not the only predictor of a country's actual preparedness for an influenza pandemic. While plans describe intended future response actions, the actual response depends on several factors including the Member States' capacity to mobilize resources (human, material, financial), characteristics of the pandemic virus and other determinants. Countries may further be prepared in areas that are not mentioned in their plans. Therefore, the results of this analysis should be used as a proxy of countries' preparedness and response capacity.

One must also reflect upon the 2005 WHO checklist (3) on which this study's assessment tool is based. The checklist provides a general approach to pandemic preparedness as guidance for countries in creating their plans. There is the possibility that the disparity seen between more and less affluent countries might be due to attributes of the checklist itself. For example, the assessment tool may not allow for sufficient flexibility to take into account the realities that developing countries face and the indicators may not be socially, economically or politically feasible in some cases.

8. Conclusions

The majority of Member States had dedicated time and resources to pandemic preparedness through developing their pandemic response plans with strong centralised structures. The importance of developing and maintaining national pandemic committees, outlining the responsibilities of various government bodies and NGOs and communication plans for non-health authorities, health authorities and the public was well recognised. However, a consistent gap in planning was the linkage to sub-national plans, which can be considered the operational and implementational arm of pandemic response. This is a significant area requiring further support and development.

There are many aspects of planning which could be strengthened. Many plans were specifically focused on avian influenza A(H5N1), whereas lessons learned from A(H1N1) 2009 indicate that plans should be generic and applicable to pandemics of any origin. Roles and responsibilities at all levels of government across all sectors involved must also be clearly defined so that once a pandemic hits, all stakeholders understand what to do. The amount of detail for many areas of planning was also lacking. For example, while most of the plans analysed in this study described the use of antiviral drugs and vaccines during a pandemic, many did not specify crucial elements such as priority groups, vaccine procurement strategies, or outline detailed strategies regarding antiviral drug supply and stockpiling. Similarly, non-pharmaceutical measures, which are critical to an effective pandemic response, were addressed in the majority of plans, but were lacking in detail. Furthermore, few plans were created as part of the national disaster plan, demonstrating the need to further integrate influenza pandemic plans into already existing structures. There was also the troubling finding that disparities exist among countries by region, GNI and level of health – all three of which are closely related.

Although there are gaps, significant progress has been made in pandemic planning. Most countries have developed plans and following their experiences with A(H1N1) 2009, have used the opportunity to update their existing plans.

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10. Annexes

10.1 Annex 1: Comparative analysis indicators and scoring

	USED FOR ANALYSIS		SCORES			
			0	1	2	3
INDICATORS FOR PLANNING AND COORDINATION						
National level						
1	x	Is the national pandemic influenza preparedness plan part of the national disaster preparedness plan?	Not mentioned (No)	To be part of the disaster plan	Pandemic plan is part of the disaster plan	
2	✓	Is there a national influenza pandemic preparedness planning committee/task force?	Not mentioned	Committee to be established	Briefly mentioned	Mentioned in detail
3	✓	Does the plan specify members of the national pandemic planning committee/taskforce? ^a	Not mentioned	Members to be identified	Briefly mentioned	Mentioned in detail
4	✓	Does the plan specify how often the national committee/task force meets?	Not mentioned	Mentioned, briefly	Mentioned, with timeframe	
5	✓	Does the plan identify and specify the roles and responsibilities of the national committee/ task force?	Not mentioned	Roles to be defined	Briefly mentioned	Mentioned in detail
6	✓	Does the plan specify the roles and responsibilities of other agencies? ^b	Not mentioned	Roles to be defined	Briefly mentioned	Mentioned in detail
7	✓	Does the plan have information on the management and decision making process (command and control structure) during pandemic?	Not mentioned (No)	Mentioned (Yes)		
8	✓	Does the plan outline communication and coordination structure for agencies involved in pandemic preparedness and response actions?	Not mentioned	To be established	Briefly mentioned	Mentioned in detail
9	✓	Does the plan include international co-operation for pandemic preparedness and response actions?	Not mentioned (No)	Mentioned (Yes)		
INDICATORS FOR PLANNING AND COORDINATION						
10	✓	Have considerations been given for maintenance of essential services during pandemic (such as food and water supply, etc.)?	Not mentioned (No)	Mentioned (Yes)		

^a Representative from ministries, authorities, local NGOs, international agencies, etc.

^b Such as the health sector, government authorities, NGOs, UN agencies, private sector, etc.

	USED FOR ANALYSIS		SCORES			
			0	1	2	3
11	✓	Are there timelines for completion of the various stages of the plan?	Not mentioned (No)	Mentioned (Yes)		
12	✓	Are there monitoring and evaluation strategies such as indicators, targets for the implementation of the plan?	Not mentioned	Strategies to be identified	Briefly mentioned	Mentioned in detail
13	✓	Is there an agency/a committee responsible for monitoring & evaluating the implementation of the plan?	Not mentioned (No)	Mentioned (Yes)		
14	✓	Is there a legislation or legal framework for the implementation of the national plan?	Not mentioned	To be developed	Have Legislations (to be reviewed)	
15	✓	Does the plan estimate/assess the potential impact of the pandemic (risk assessment) Such as morbidity, mortality, impact on health?	Not mentioned (No)	To be carried out	Risk estimation mentioned briefly	Risk estimation mentioned in detail
16	✓	Does the plan specify timeline for reviewing the national plan – How often?	Not mentioned	Mentioned but no timeline	Mentioned with timeline	
17	✓	Is there a plan to carry out pandemic exercise (simulation or desk-top) to test the national plan? When?	Not mentioned	Exercise planned	Exercise planned time set	Exercise done
18	✓	Are pandemic planning and response measures organized by the WHO pandemic phases?	Not mentioned	Partially by phase/ periods	All activities by phase	
19	✓	Does the plan identify country specific triggers that change the level of response?	Not mentioned (No)	Mentioned (Yes)		
20	✓	Are financial resources (funding, budget etc.) outlined in the plan?	Not mentioned	Mentioned briefly	Mentioned in detail	
INDICATORS FOR PLANNING AND COORDINATION						
Sub-national level						
21	✓	Is there a sub-national (province/district/state) pandemic influenza preparedness and response plan?	Not mentioned (No)	To be established	Mentioned (Yes)	
22	✓	Is there a sub-national influenza pandemic preparedness planning committee/task force at (at the province/district/states level)?	Not mentioned	Committee to be established	Committee has been established	

	USED FOR ANALYSIS		SCORES		
			0	1	2
INDICATORS FOR SITUATION MONITORING AND ASSESSMENT					
1	✓	Does the plan have communication mechanisms for the rapid and timely exchange of human surveillance information (national and international)	Not mentioned	To be established	Mentioned
2	✓	Does the plan mention the implementation of IHR for pandemic response? ^a	Not mentioned	To be established	Mentioned
3	✓	Is influenza part of the national infectious disease surveillance and response (IDSR) system?	Not mentioned (No)	Mentioned (Yes)	
4	✓	Are surveillance activities organized by the WHO phases or periods?	Not mentioned (No)	Mentioned (Yes)	
Inter-pandemic surveillance					
5	✓	Does the country have influenza surveillance system in place such as seasonal, ILI, SARI etc?	Not mentioned	To be established	Mentioned
6	✓	Are influenza surveillance sites mentioned in the plan such as sentinel sites, hospital, health centres?	Not mentioned	To be established	Mentioned
		Does the plan outline participation in the Global Influenza Surveillance Network?	(No)	(Yes)	
7	✓	Does the plan specify surveillance systems that detect unusual occurrence of influenza or unusual/unexplained event of respiratory illness that require appropriate investigation (early warning)?	Not mentioned	To be established	Mentioned
Enhanced surveillance					
8	✓	Does the plan specify enhanced surveillance for potential or new strains of pandemic influenza virus? ^b	Not mentioned	To be established	Mentioned
Pandemic surveillance					
9	✓	Does the plan specify surveillance measures during a pandemic? ^c	Not mentioned (No)	Mentioned (Yes)	
Animal Surveillance					
10	✓	Does the plan include influenza surveillance in susceptible animals (poultry, wild birds, pigs)?	Not mentioned	To be established	Mentioned

^a Such as case notification, international legislation for public health measures, etc.^b Such as identification and reporting of unusual respiratory illness morbidity or mortality, monitoring of risk groups (e.g., human health workers, animal health workers, travelers from infected regions, farmers, etc.), revision of case definition based on current trends^c Monitoring morbidity and/or mortality, adaptation of case definitions, scaling down virologic testing, limiting or discontinuing routine/early warning surveillance

	USED FOR ANALYSIS		SCORES			
			0	1	2	3
11	x	Does the plan specify communication strategy (sharing surveillance information, meeting etc) between human and animal surveillance ?	Not mentioned	To be established	Mentioned	
INDICATORS FOR PREVENTION AND CONTAINMENT						
Individual/household measures						
1	✓	Does the plan specify individual/household infection control measures to reduce the risks of influenza transmission? ^a	Not mentioned	Mentioned (Yes)		
Community infection control measures						
2	✓	Does the plan specify community infection control measures to limit animal-human transmission ? (from WHO 2005 checklist)	Not mentioned (No)	Mentioned (Yes)		
Social distancing						
3	✓	Does the plan specify a protocol & implementation plan for closure of educational institutions or day care facilities ?	Not mentioned (No)	Mentioned (Yes)		
4	✓	Does the plan specify how other social distancing measures such as prohibition of mass gatherings etc. will be implemented?	Not mentioned (No)	Mentioned (Yes)		
Travel and trade						
5	✓	Does the plan specify travel related information (restrictions, advisory) to and from affected areas?	Not mentioned (No)	Mentioned (Yes)		
6	✓	Does the plan specify trade related information (such as restrictions) to and from affected areas? (from checklist 2005)	Not mentioned (No)	Mentioned (Yes)		
Isolation and quarantine						
7	✓	Is there information regarding isolation/confinement of cases?	Not mentioned (No)	Mentioned (Yes)		
8	✓	Is there information regarding quarantine of contacts or others?	Not mentioned (No)	Mentioned (Yes)		
Antiviral drugs						
9	✓	Is there information regarding the use of antiviral drugs during pandemic (prophylaxis and/or treatment)?	Not mentioned (No)	Mentioned (Yes)		
10	✓	Does the plan specify the use of antiviral for treatment ?	Not mentioned (No)	Mentioned (Yes)		

^a Includes: 1. Personal hygiene (e.g., hand washing); 2. Respiratory hygiene (e.g., avoiding touching mouth and nose, use of single-use tissues, throwing away tissues in closed containers); 3. Cough etiquette (e.g., covering mouth when coughing or sneezing); 4. Taking prescribed medications; 5. Voluntary isolation or confinement of cases; 6. Seeking care when ill, including home-based care; 7. Avoiding sick persons and avoiding crowded places

	USED FOR ANALYSIS		SCORES			
			0	1	2	3
11	✓	Does the plan specify priority groups for antiviral prophylaxis ?	Not mentioned (No)	Mentioned (Yes)		
12	✓	Does the plan specify information on antiviral drugs supply/procurement strategy such as estimated amount, % of population, stockpiling?	Not mentioned (No)	Mentioned (Yes)		
13	✓	Does the plan specify sources antiviral drugs ?	Not mentioned (No)	Mentioned (Yes)		
14	✓	Does the plan have information /guidelines for antiviral drugs storage ?	Not mentioned (No)	Mentioned (Yes)		
15	✓	Does the plan have information/ guidelines for antiviral drugs distribution ?	Not mentioned (No)	Mentioned (Yes)		
16	✓	Does the plan specify monitoring strategy for antiviral drugs (such as monitoring usage, efficacy, adverse events or resistance)?	Not mentioned (No)	Mentioned (Yes)		
Vaccines						
17	✓	Does the plan specify vaccination use/policy for pandemic influenza?	Not mentioned (No)	Mentioned (Yes)		
18	✓	Does the plan specify priority groups for pandemic influenza vaccination ?	Not mentioned (No)	Mentioned (Yes)		
19	✓	Does the plan mentioned mass vaccination for pandemic influenza	Not mentioned (No)	Mentioned (Yes)		
20	x	Does the plan specify strategies for pandemic vaccine supply/ procurement (such as estimated amount, % of population, contract/ arrangement with manufacturers etc.)?	Not mentioned (No)	Mentioned (Yes)		
21	x	Does the plan specify the sources of pandemic vaccine ?	Not mentioned (No)	Mentioned (Yes)		
INDICATORS FOR PREVENTION AND CONTAINMENT						
22	x	Does the plan have information/guidelines for pandemic vaccine storage ?	Not mentioned (No)	Mentioned (Yes)		
23	x	Does the plan have information/guidelines for pandemic vaccine distribution ?	Not mentioned (No)	Mentioned (Yes)		
24	x	Does the plan specify monitoring strategy for pandemic vaccine (such as monitoring coverage, efficacy, or adverse events)?	Not mentioned (No)	Mentioned (Yes)		

	USED FOR ANALYSIS		SCORES			
			0	1	2	3
Other pharmaceuticals and supplies						
25	x	Does the plan specify other medications (antibiotics, antipyretics, etc.) procurement and logistics?	Not mentioned (No)	Mentioned (Yes)		
26	x	Does the plan specify medical supplies for infection prevention and control procurement and logistics?	Not mentioned (No)	Mentioned (Yes)		
INDICATORS FOR HEALTH SYSTEM RESPONSE						
Laboratory capacity						
1	✓	Does the country have laboratory/ies for routine influenza testing ?	Not mentioned (No)	Mentioned (Yes)		
2	✓	Does the plan specify any laboratory where samples should be sent for virus isolation and/or sub typing or a WHO reference laboratory for confirmation or determination of influenza virus (in or outside the country)?	Not mentioned (No)	To be identified	Mentioned (Yes)	
3	✓	Does the plan have guidelines for human specimen collection, handling, transport and disposal?	Not mentioned (No)	To be established	Mentioned Briefly (Yes?)	Mentioned in detail (Yes?)
4	✓	Does the plan specify guidelines for standard laboratory procedures ?	Not mentioned (No)	Mentioned (Yes)		
5	✓	Is there a strategy to share clinical material (from confirmed cases) and laboratory results with national agencies and/or International (WHO, neighboring countries, other countries etc.)?	Not mentioned (No)	To be established	Mentioned (Yes)	
6	✓	Does the plan specify monitoring strategy for antiviral drug resistance ?	Not mentioned (No)	Mentioned (Yes)		
Epidemiological investigation and contact management						
7	✓	Is there information on epidemiological investigation of confirmed cases of influenza caused by new strain (to assess modes of transmission, disease presentation etc.)?	Not mentioned (No)	Mentioned (Yes)		
8	✓	Does the plan have mechanisms for rapid and timely (daily) exchange of outcomes of epidemiological investigations with national and international agencies (WHO)?	Not mentioned (No)	Mentioned (Yes)		
Case management and treatment						
9	✓	Is there a country specific clinical guideline (which includes diagnosis, treatment, admission and discharge criteria etc.) for the management of pandemic influenza?	Not mentioned (No)	To be established	Briefly mentioned	Mentioned in detail

	USED FOR ANALYSIS		SCORES			
			0	1	2	3
Health facilities						
10	✓	Does the plan identify health facilities where patients access treatment during pandemic?	Not mentioned (No)	Mentioned (Yes)		
11	✓	Does the plan identify potential alternative sites for medical care during pandemic and specify the level of care?	Not mentioned (No)	Mentioned (Yes)		
12	✓	Does the plan identify health facilities priorities and response strategies during pandemic such as triage, case referral, service prioritization etc.	Not mentioned (No)	Mentioned (Yes)		
13	✓	Does the plan specify training needs for health workers (surveillance, laboratory, infection control, case management, antivirals, vaccines etc.)?	Not mentioned (No)	Mentioned (Yes)		
Infection control in health care settings						
14	x	Is there information on infection prevention and control at all level of health care facilities?	Not mentioned (No)	To be established	Briefly mentioned	Mentioned in detail
Health personnel						
15	x	Does the plan specify sources from where additional health care workers could be recruited (volunteers, retired staff, training additional workers etc)?	Not mentioned (No)	Mentioned (Yes)		
Excess mortality						
16	x	Is there a protocol for safe handling of corpse, including storage and disposal?	Not mentioned (No)	Mentioned (Yes)		
INDICATORS FOR COMMUNICATION						
1	✓	Does the plan specify communication plan for health and non health authorities ?	Not mentioned (No)	Mentioned (Yes)		
2	✓	Does the plan specify communication plan for international agencies (WHO, FAO)?	Not mentioned (No)	Mentioned (Yes)		
3	✓	Does the plan specify communication plan for policy makers ?	Not mentioned (No)	Mentioned (Yes)		
4	✓	Does the plan specify communication plan for the public and risk groups ?	Not mentioned (No)	Mentioned (Yes)		
5	✓	Does the plan specify communication plan for the media ?	Not mentioned (No)	Mentioned (Yes)		
6	✓	Does the plan outline mechanism for communication and information sharing between national/local authorities, regional authorities, WHO and other UN agencies?	Not mentioned (No)	Mentioned (Yes)		

	USED FOR ANALYSIS		SCORES			
			0	1	2	3
7	✓	Does the plan have pandemic communication committee/spokesperson ?	Not mentioned (No)	Mentioned (Yes)		
8	✓	Are the roles and responsibilities of the pandemic communication committee/coordinator identified and mentioned in the plan?	Not mentioned (No)	Mentioned (Yes)		
9	✓	Does the plan specify the roles of civil society and other community organization in public education or communication?	Not mentioned (No)	Mentioned (Yes)		
10	✓	Are public communication messages for each phase of the pandemic clearly identified in the plan?	Not mentioned (No)	Mentioned (Yes)		
11	x	Are communication channels clearly identified in the plan?	Not mentioned (No)	Mentioned (Yes)		
12	x	Does the plan ensure delivery of public communication message to hard to reach or minority groups such as refugees, displaced persons, migrants, ethnic minorities etc.)?	Not mentioned (No)	Mentioned (Yes)		
13	x	Is there any plan to update communication messages with available new knowledge or feedbacks from the public, health sector, other stakeholders etc.?	Not mentioned (No)	Mentioned (Yes)		

10.2 Annex 2: List of national plans included in the analysis

#	COUNTRY	REGION	DATE	TITLE	PAGES	LANGUAGE
1	Argentina	AMR	2007	Plan de Respuesta Integrada para Pandemia de Influenza	101	Spanish
2	Australia	WPR	2006	The Australian Health Management Plan for pandemic influenza. Annex for laboratory could not be found	184	English
3	Austria	EUR	2006	Influenza Pandemieplan Strategie für Österreich	70	German
4	Bahrain	EMR	2007	Avian Influenza (H5N1) the Contingency and Surveillance Plan	161	English
5	Bangladesh	SEAR	Jan-09	2nd National Avian and Pandemic Influenza Preparedness and Response Plan, Bangladesh 2009-2011 draft	133	English
6	Barbados	AMR	2006	Barbados national influenza pandemic preparedness plan	45	English
7	Belarus	EUR	2002	Influenza Pandemic Preparedness Plan	11	English
8	Belgium	EUR	Jul-06	Pandemic influenza preparedness plan (operational plan)	43	French
9	Benin	AFR	Feb 2006	Plan d'intervention d'urgence contre la grippe aviaire	48	French
10	Bhutan	SEAR	2006	National influenza pandemic preparedness plan	65	English
11	Bolivia	AMR	2007	Plan Nacional de preparativos y respuesta ante Influenza Aviar-Influenza Pandémica (Bolivia). Several guidelines not found surveillance, sentinel network, communication, case management	93	Spanish
12	Botswana	AFR	Not mentioned	Avian and pandemic influenza preparedness plan (draft)	29	English
13	Brazil	AMR	Sep-05	Brazil contingency plan to confront an influenza pandemic (preliminary version)	100	English
14	Bulgaria	EUR	2006	National plan for influenza pandemic preparedness of the republic of Bulgaria	100	English
15	Burkina Faso	AFR	Oct 2005	Plan stratégique pour la préparation et la riposte à d'éventuels cas de grippe aviaire au Burkina Faso en 2005-2006 (draft)	17	French
16	Cambodia	WPR	Not mentioned	Cambodia National Comprehensive Avian and Human Influenza Plan	127	English
17	Cameroon	AFR	2006	Plan National Intégré de prévention et de lutte contre la grippe aviaire au Cameroun (Mars-Octobre 2006)	70	French
18	Canada	AMR	2006	The Canadian pandemic influenza plan for the health sector	609	English
19	Cape Verde	AFR	Feb 2006	Plan national de lutte contre la grippe aviaire H5N1	20	French
20	Central African Republic	AFR	March 2006	Plan de preparation et de riposte a la grippe aviaire	21	French
21	Chile	AMR	2007	Plan nacional de preparación para una pandemia de influenza 11 annexes could not be found	32	Spanish

#	COUNTRY	REGION	DATE	TITLE	PAGES	LANGUAGE
22	China	WPR	Not mentioned	Preparedness and Contingency Plan for Influenza Pandemic of the Ministry of Health, PR China (Draft version)	15	English
23	Colombia	AMR	2005	Plan de prevención y mitigación del impacto de la pandemia de influenza	14	Spanish
24	Cook Islands	WPR	2007	Cook islands influenza pandemic action plan	38	English
25	Costa Rica	AMR	2008	Plan de Preparación y Respuesta en Situación de Pandemia de Influenza. Several guidelines could not be found such as clinical mx, vaccination policy, infection control, corpse disposal	109	Spanish
26	Côte d'Ivoire	AFR	Not mentioned	Plan d'action de lutte contre la grippe aviaire (draft zero)	11	French
27	Croatia	EUR	2005	National pandemic influenza preparedness plan	49	English
28	Cuba	AMR	2005	Plan para el enfrentamiento unico de una pandemia de influenza	53	Spanish
29	Cyprus	EUR	Not mentioned	Influenza Pandemic Preparedness Plan	3	English
30	Czech Republic	EUR	Apr-04	The national pandemic plan of the Czech Republic	53	English
31	Democratic Republic of the Congo	AFR	Not mentioned	Plan de préparation et de réponse à la pandémie de grippe d'origine aviaire en RDC	47	French
32	Ecuador	AMR	Dec-05	Plan nacional de contingencia para enfrentar posible pandemia de influenza en el Ecuador. Two annexes for surveillance not found	34	Spanish
33	Egypt	EMR	Not mentioned	National Strategic Preparedness Plan for Avian – Flu	46	English
34	El Salvador	AMR	Jan-07	Plan contingencial contra la pandemia de influenza	107	Spanish
35	Estonia	EUR	Jul-07	Influenza pandemic preparedness plan	55	English
36	Fiji	WPR	2005	Fiji National Influenza Pandemic Plan	40	English
37	Finland	EUR	2006	Proposal of the Working Group on National Pandemic Preparedness	25	English
38	France	EUR	2007	Plan national de prévention et de lutte Pandémie grippale	82	French
39	Gabon	AFR	Jan 2007	Plan national de prevention et de lutte contre la grippe aviaire : mesures d'urgence	18	French
40	Gambia	AFR	2006	Emergency Preparedness and Response Plan for Avian Influenza (AI)	26	English
41	Germany	EUR	2007	Title in German – National Pandemic plan – Part I-III plus annexes	192	German
42	Ghana	AFR	Feb 2006	Preparedness and response plan for avian and human pandemic influenza (2005–2006)	35	English
43	Greece	EUR	Oct-05	National influenza pandemic plan	44	English
44	Grenada	AMR	2006	National influenza pandemic preparedness plan operational manual. Annex not found (infection control manual, medical attention SOP, SOP for management of dead bodies),	68	English

#	COUNTRY	REGION	DATE	TITLE	PAGES	LANGUAGE
45	Guinea	AFR	Feb 2006	Plan national multi-sectoriel de préparation et de riposte à la grippe aviaire	24	French
46	Guinea-Bissau	AFR	2006	National strategic plan of prevention and fight against avian flu	14	English
47	Guinea-Bissau	AFR	2006	National strategic plan of prevention and fight against avian flu	14	English
48	Honduras	AMR	2005	Plan nacional de preparacion para la pandemia de Influenza Honduras,	34	Spanish
49	Hong Kong (Special Administrative Region of China)	WPR	2005	Framework of Government's Preparedness Plan for Influenza Pandemic	15	English
50	Hungary	EUR	2005	Preparedness Plan for Influenza Pandemic	22	English
51	Iceland	EUR	Mar-06	Summary of the Pandemic Influenza Preparedness Plan of the Health Services	16	English
52	India	SEAR	Not mentioned	Influenza Pandemic Preparedness and Response Plan (draft)	34	English
53	Indonesia	SEAR	2006	National strategic plan for avian influenza control and pandemic influenza preparedness	74	English
54	Iran (Islamic Republic of)	EMR	Not mentioned	I R. Iran Preparedness plan for pandemic influenza (primary draft 2005 -2006)	42	English
55	Israel	EUR	January 2006	Plan for the Preparedness of the Health System for Avian Flu and the Possibility of an Influenza Pandemic Outbreak	198	English
56	Italy	EUR	2006	National plan for preparedness and response to an influenza pandemic. Chapter 10 and Annex missing	32	English
57	Japan	WPR	Nov-05	Pandemic Influenza Preparedness Action Plan of the Japanese Government	75	English
58	Jordan	EMR	2006	Title in Arabic	126	Arabic
59	Kenya	AFR	Not mentioned	The national avian influenza strategic emergency preparedness and response plan	61	English
60	Kyrgyzstan	EUR	Jan-06	National Plan of the Kyrgyz Republic on Response to Pandemia of Highly Pathogenic Avian Influenza	69	English
61	Lao People's Democratic Republic	WPR	2006	National avian influenza control and pandemic preparedness plan	73	English
62	Lebanon	EMR	Oct-05	Influenza pandemic national preparedness plan – Lebanon 2005 Draft	10	English
63	Lesotho	AFR	2005	National preparedness and response plan for avian influenza pandemic	22	English
64	Luxembourg	EUR	2006	Governmental plan Flu pandemic	19	English
65	Malawi	AFR	2006	Avian influenza implementation plan for 2006	39	English
66	Maldives	SEAR	Mar-06	Republic of Maldives National Influenza Pandemic Preparedness Plan (updated 28, March 2006)	51	English

#	COUNTRY	REGION	DATE	TITLE	PAGES	LANGUAGE
67	Malta	EUR	2007	Influenza pandemic contingency plan	66	English
68	Mauritania	AFR	Jan-06	Plan strategique national de preparation et de riposte contre la pandemie de la grippe aviaire (AIHP) 2006–2007 (draft)	22	French
69	Mauritius	AFR	2006	Avian influenza contingency plan -Mauritius	22	English
70	Mexico	AMR	2006	Plan nacional de preparación y respuesta ante una Pandemia de Influenza. 10 annexes not found (case management, surveillance, communication, laboratory sample & transport, public health measures, & legal frame work, private business plans)	19	Spanish
71	Mongolia	WPR	Feb- 07& 08	Mongolia National Comprehensive Avian and Human Influenza Strategy and Action Plan (draft) 2007-2009, Mongolian National Contingency Plan for Preparedness and Response to Influenza Pandemic (Health)	139	English
72	Morocco	EMR	Oct-05	Plan national de preparation et de riposte a une pandemie grippale d'origine aviaire	36	French
73	Myanmar	SEAR	2006	National Strategic Plan for Prevention and Control of Avian Influenza and Human Influenza Pandemic Preparedness and Response	58	English
74	Nauru	WPR	2005	Ministry of Health Emergency Operations Plan for Pandemic Influenza. Annex G missing	13	English
75	Nepal	SEAR	Sep-05	National influenza pandemic preparedness plan (draft)	39	English
76	Niger	AFR	Feb 2006	Plan National d'Urgence de Prévention et Lutte contre la grippe aviaire au Niger	30	French
77	New Zealand	WPR	2006	New Zealand influenza pandemic action plan	198	English
78	Norway	EUR	2006	Norwegian National Influenza Pandemic Preparedness Plan. The plan of action was not found	39	English
79	Oman	EMR	2006	National Pandemic influenza preparedness plan	64	English
80	Palau	WPR	2005	Republic of Palau Pandemic Influenza Response Plan. Reference Attachments on case def and management, protocol for priority groups for vaccine, antiviral and distribution plans, containment and prevention strategies, risk communication strategy, infection prevention control, specimen protocol not found	19	English
81	Panama	AMR	Nov-07	Plan estratégico integrado MINSA-MIDA-ANAM-CSS ante las amenazas de la influenza aviar y la pandemia de influenza	242	Spanish
82	Papua New Guinea	WPR	Aug-06	Papua New Guinea National Contingency Plan for Preparedness and Response for Influenza Pandemic	152	English
83	Peru	AMR	2006	Plan nacional de preparación y respuesta frente a una potencial pandemia de influenza	51	Spanish

#	COUNTRY	REGION	DATE	TITLE	PAGES	LANGUAGE
84	Philippines	WPR	2005	Preparedness and Response Plan for Avian and Pandemic Influenza Republic of the Philippines	88	English
85	Poland	EUR	Not mentioned	The national influenza pandemic preparedness plan for Poland	80	English
86	Republic of Korea	WPR	2006	Pandemic Influenza Preparedness and Response Plan	188	English
87	Rwanda	AFR	Jan 2007	Plan d'urgence de prevention et de lutte contre la grippe aviaire au Rwanda	45	French
88	Saudi Arabia	EMR	Not mentioned	مخطط الاستجابة للطوارئ انفلونزا فيروسية	41	Arabic
89	Senegal	AFR	Oct-05	Plan national de prévention et de lutte contre la grippe aviaire au Sénégal	20	French
90	Serbia	EUR	Oct-05	Influenza preparedness plan before and during pandemic of the republic of Serbia	39	English
91	Seychelles	AFR	Not mentioned	The preparedness plan for the influenza pandemic	42	English
92	Sierra Leone	AFR	Jun-06	Emergency preparedness and response action plan for the prevention and containment of avian and human influenza (bird flu) in Sierra Leone	31	English
93	Singapore	WPR	July 2005	Influenza pandemic readiness and response plan – Draft	26	English
94	Slovakia	EUR	Oct-05	Detailed plan of measures in case of an influenza pandemic in the Slovak republic	103	English
95	South Africa	AFR	2006	Final Draft – Influenza Pandemic Preparedness Plan	38	English
96	Spain	EUR	May 05, Dec 06	National pandemic influenza preparedness and response plan (may 2005) and National pandemic influenza preparedness and response plan update December 2006	43	English
97	Sri Lanka	SEAR	Oct-05	National Influenza Pandemic Preparedness Plan Sri Lanka (draft)	112	English
98	Swaziland	AFR	2006	Swaziland HPAI preparedness and response plan (draft)	13	English
99	Sweden	EUR	Nov-05	Contingency planning for an influenza pandemic- national measures	23	English
100	Switzerland	EUR	Jan 2009	Stratégies et mesures en préparation pour le cas d'une pandémie d'influenza	239	French
101	Syrian Arab Republic	EMR	2006	Title in Arabic	9	Arabic
102	Tajikistan	EUR	2006	A comprehensive plan of actions on prevention and control of avian influenza caused by new virus strains	37	English
103	Thailand	SEAR	2008	The second national strategic plan for the prevention and control of avian influenza and preparedness for influenza pandemic	114	English
104	Timor-Leste	SEAR	Not mentioned	Preparedness and response plan for avian influenza pandemic	35	English
105	Togo	AFR	Feb 2006	Plan stratégique national de prévention et de lutte contre la grippe aviaire au Togo	18	French
106	Tonga	WPR	2006	National influenza pandemic preparedness and response plan	30	English
107	Trinidad and Tobago	AMR	Feb-09	Pandemic influenza preparedness and response plan	391	English
108	Turkey	EUR	2005	Pandemic influenza national action plan	86	English

#	COUNTRY	REGION	DATE	TITLE	PAGES	LANGUAGE
109	Ukraine	EUR	2005	Plan on influenza preparedness and protection of the population of Ukraine from the influenza pandemics	13	English
110	United Kingdom of Great Britain and Northern Ireland	EUR	2005	UK influenza pandemic contingency plan	177	English
111	United Republic of Tanzania	AFR	2006	National avian influenza: emergency preparedness and response strategic plan (2006/2007-2008/2009) (Draft). Annexes were not available	31	English
112	United States of America	AMR	2005	Health and human services Pandemic Influenza Plan	396	English
113	Uruguay	AMR	2006	Plan nacional de contingencia para una pandemia de influenza	80	Spanish
114	Uzbekistan	EUR	2006	National program for the republic of Uzbekistan on influenza prevention and control and pandemic preparedness (draft)	28	English
115	Venezuela	AMR	2006	Plan nacional de vigilancia, prevención y control ante una posible pandemia de influenza aviar. Annexes were not available (surveillance, guidelines for case management and biosecurity infection control)	63	Spanish
116	Viet Nam	WPR	May-06, Jan-06	Integrated national operational program for avian and human influenza (OPI), Integrated national plan for avian influenza control and human pandemic influenza preparedness and response	78	English
117	Yemen	EMR	Not mentioned	Emergency plan of action bird flu precautionary measures	9	English
118	Zambia	AFR	2005	Avian Influenza and Pandemic Influenza Threat National Response Plan Republic of Zambia (Draft)	16	English
119	Zimbabwe	AFR	Not mentioned	Preparedness and response plan for notifiable avian influenza	54	English



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