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1 **Seasonal Influenza Vaccination Policies in the Eastern Mediterranean Region:**  
2 **Current State and the Way Forward**

3

4 **Abstract**

5 *Background:* The World Health Organization recommends annual influenza vaccination  
6 especially in high-risk groups. Little is known about the adoption and implementation of  
7 influenza vaccination policies in the Eastern Mediterranean Region.

8 *Methods:* A survey was distributed to the 22 EMR country representatives at the  
9 Ministries of Health between December 2016 and February 2017 to capture data on  
10 influenza immunization policies, recommendations, and practices in place.

11 *Results:* Of the 20 Eastern Mediterranean Region member states that responded to the  
12 survey, fourteen reported having influenza immunization policies during the 2015/2016  
13 influenza season. All member states with an influenza immunization policy  
14 recommended vaccination for persons with chronic medical conditions, health-care  
15 workers, and pilgrims. However, two countries fell short of targeting pregnant women.  
16 Eight countries used the northern hemisphere formulation, one used the southern  
17 hemisphere formulation, and nine used both. Vaccination coverage was not monitored by  
18 all member states and for all target groups, yet reported coverage of a number of target  
19 groups (i.e. health-care workers, children) was generally low. Furthermore, data on the  
20 burden of influenza and vaccine protection was scarce in the region.

21 *Conclusions:* The 2015/2016 survey permitted a regional assessment of national  
22 influenza immunization policies. Addressing disparities in influenza vaccine accessibility  
23 and strengthening surveillance systems may enhance influenza vaccine introduction and  
24 use.

25 **Keywords:** Influenza, vaccination, survey, policy, Eastern Mediterranean Region

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## 5 **1. Background**

6 Seasonal influenza is an acute viral infection that affects people of all age groups  
7 worldwide. As per the World Health Organization (WHO) estimates, influenza viruses  
8 infect between 5%–15% of the global population, annually causing an estimated 3-5  
9 million severe cases and up to 650,000 respiratory deaths [1]. Annual seasonal epidemics  
10 have also been associated with significant health care costs and productivity losses [2,3].

11 Annual vaccination is the cornerstone for preventing infection, severe disease, and  
12 mortality due to influenza [4]. Vaccination against influenza is particularly important for  
13 individuals at high risk for disease complications and those caring for them., The WHO  
14 recommends annual influenza vaccination for pregnant women at any stage of pregnancy,  
15 children aged between 6 months to 5 years, elderly individuals (> 65-year-old),  
16 individuals with chronic medical conditions, and health-care workers (HCWs) [1]. In  
17 countries where influenza vaccination programmes are still at their early stages or not  
18 well developed, the WHO recommends prioritizing vaccination for pregnant women,  
19 whereas other risk groups are not ranked by priority [5]. On the other hand, the United  
20 States Centre for Disease Control and Prevention (CDC) has taken a more universal  
21 approach recommending the use of annual influenza vaccine for all persons aged  $\geq 6$   
22 months [6]. However, during a vaccine shortage, the CDC recommends that vaccination  
23 efforts be focused on high-risk groups only with no order by priority [6].

24 The WHO Eastern Mediterranean Region (EMR), which consists of 22 member  
25 states (Afghanistan, Bahrain, Djibouti, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya,  
26 Morocco, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syrian Arab  
27 Republic, Tunisia, United Arab Emirates (UAE), and Yemen) is home for nearly 10% of

1 the world's population. However, the region's share of influenza vaccines is roughly  
2 2.2% of the globally distributed doses [7]. Noteworthy, the EMR falls on a number of  
3 migratory birds' flyways and is thus at risk for the emergence of novel influenza viruses  
4 [8]. Therefore, we undertook a survey to assess the adoption and implementation of  
5 influenza vaccination policies in the EMR to provide the data needed for evaluating and  
6 developing guidelines for influenza prevention with the goal of enhancing vaccination  
7 coverage.

## 8 **2. Method**

9 The survey consisted of a 38-item questionnaire that was developed based on  
10 available relevant literature pertaining to influenza vaccination. The self-administered  
11 survey was distributed by email to the country representatives between December 2016  
12 and February 2017. The survey included questions on: mechanisms in place to monitor  
13 influenza vaccination coverage; vaccination coverage; existence of national  
14 recommendations for vaccination; and planned policies with regard to the national  
15 influenza immunization programme.

## 16 **3. Results**

### 17 *Response rate*

18 In total, 20 countries from across the WHO EMR completed the questionnaire  
19 resulting in a response rate of 90.9%. Responses were not received from Bahrain and  
20 Djibouti.

### 21 *Seasonal influenza vaccination policies*

22 Among the 20 countries for which the data were available, fourteen (70%)  
23 reported having seasonal influenza vaccination policies at the time surveyed (Egypt, Iran,  
24 Iraq, Jordan, Kuwait, Lebanon, Libya, Oman, Palestine, Qatar, Saudi Arabia, Syria,  
25 Tunisia, and UAE). Of the above member states, five reported including the influenza  
26 vaccine in their national immunization program (Iran, Libya, Qatar, Syria, and Tunisia).

1 Morocco and Somalia, on the other hand, reported having plans regarding the  
2 implementation of official influenza vaccination policies in the next 5 years.

### 3 *Seasonal influenza surveillance for the 2015/2016 season*

4 Of the 20 member states, seventeen (85%) reported having active influenza  
5 surveillance systems (Afghanistan, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Morocco,  
6 Oman, Pakistan, Palestine, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, and Yemen). All  
7 but one member state (Pakistan) reported using existing surveillance systems to guide  
8 policymakers and to help ensure well-informed policy decisions.

9 While mortality surveillance data for influenza were reportedly amassed by 16  
10 (80%) countries (Afghanistan, Egypt, Iran, Iraq, Jordan, Kuwait, Libya, Morocco, Oman,  
11 Palestine, Saudi Arabia, Sudan, Syria, Tunisia, UAE, and Yemen), only ten provided  
12 mortality rates (Egypt, Iran, Iraq, Jordan, Kuwait, Morocco, Oman, Syria, Tunisia, and  
13 Yemen). These ranged from 0% in Jordan to 15% in Morocco during the 2015/2016  
14 season. Fifteen (75%) countries also reported collecting data on influenza-associated  
15 hospitalizations (Afghanistan, Egypt, Iran, Iraq, Jordan, Kuwait, Morocco, Oman,  
16 Pakistan, Palestine, Saudi Arabia, Syria, Tunisia, UAE, and Yemen), yet only nine  
17 provided data on hospitalization rates (Egypt, Iran, Iraq, Jordan, Morocco, Oman, Syria,  
18 Tunisia, and Yemen). Hospitalization rates ranged from 0.004% in Iran to 21.7% in Iraq.

### 19 *Influenza vaccine recommendations*

#### 20 *i. Children*

21 Among the countries having an influenza vaccination policy during the 2015/2016  
22 season, two countries, Libya and Qatar, included seasonal influenza vaccine in the  
23 childhood immunization schedule. Qatar targeted children <5 years of age. No  
24 specific age group was provided by Libya.

#### 25 *ii. Adults*

26 Four member states had influenza vaccination recommendations for adults during  
27 2015/2016. Countries recommending vaccination against influenza for adults were:

1 Oman, Qatar, Syria, and UAE. Oman and Qatar provided information on the age  
2 groups targeted, indicating that influenza vaccination was recommended for persons  
3 >60 years of age.

4 iii. Chronic illnesses

5 All member states with recommendations for influenza vaccination recommended  
6 the influenza vaccine for persons with chronic illnesses (e.g. diabetes, asthma, renal  
7 disease, etc.) (Table 1). All but two countries, Jordan and Lebanon, recommended  
8 influenza vaccination for persons with immunological disorders and/or HIV/AIDS.  
9 Ten countries recommended vaccination for individuals with morbid obesity (Egypt,  
10 Iran, Iraq, Kuwait, Libya, Palestine, Saudi Arabia, Syria, Tunisia, and UAE), and  
11 nine recommended vaccination for those with spinal cord injuries and disorders that  
12 can result in pulmonary impairments and respiratory illness complications (Iran, Iraq,  
13 Kuwait, Libya, Palestine, Qatar, Saudi Arabia, Syria, and Tunisia). However, only  
14 five countries recommended vaccination for individuals on long-term aspirin use  
15 (Iraq, Kuwait, Lebanon, Qatar, and Saudi Arabia).

16 iv. *Pregnant women*

17 Annual vaccination of pregnant women was recommended by all member states  
18 where an influenza vaccination policy exists, except Egypt and Lebanon, which had  
19 no specific recommendation for this group (Table 2). On the other hand, only Iraq,  
20 Kuwait, and Libya recommended maternal influenza vaccination during the early  
21 postpartum period.

22 v. *HCWs*

23 All member states with an influenza vaccination policy had recommendations for  
24 vaccination of hospital personnel against influenza during the 2015/2016 season  
25 (Table 3). All but two member states (Lebanon and Syria) also recommended  
26 influenza vaccination for laboratory workers. Furthermore, eleven countries  
27 recommended seasonal influenza vaccination for persons working at long-term care  
28 facilities (Egypt, Iran, Iraq, Jordan, Kuwait, Libya, Oman, Palestine, Qatar, Saudi

1 Arabia, and UAE), and ten countries recommended vaccination for persons working  
2 at out-patient care clinics (Egypt, Iraq, Jordan, Kuwait, Libya, Oman, Palestine,  
3 Qatar, Saudi Arabia, and UAE).

4 *vi. Occupational groups (non-health care settings)*

5 A smaller number of countries reported having influenza vaccine recommendations  
6 for one or more occupational groups (Table 4). Eleven member states recommended  
7 influenza vaccination for investigators of human influenza outbreaks (Egypt, Iran,  
8 Iraq, Jordan, Kuwait, Libya, Palestine, Qatar, Saudi Arabia, Syria, and Tunisia), yet  
9 only seven recommended vaccination for investigators of animal influenza outbreaks  
10 (Egypt, Iran, Iraq, Libya, Qatar, Saudi Arabia, and Tunisia). Furthermore, seven  
11 countries recommended seasonal influenza vaccination for airline crew members  
12 (Egypt, Iran, Iraq, Kuwait, Qatar, Tunisia, and UAE). For essential and emergency  
13 services (e.g. police, fire, and rescue staff), vaccination was recommended by six  
14 countries (Iran, Iraq, Kuwait, Libya, Tunisia, and UAE). Likewise, vaccination of  
15 military personnel was also recommended by six countries (Iran, Iraq, Kuwait,  
16 Libya, Oman, and Tunisia). Egypt, Iran, Iraq, Libya, and Tunisia had  
17 recommendations in place for persons working in the animal sector. Iraq was the  
18 only country in the region that had recommendations for families raising pigs,  
19 poultry, and/or waterfowl.

20 *vii. Other risk groups*

21 Eight countries recommended seasonal influenza vaccination for persons living at  
22 long-term care facilities (e.g. nursing homes and other chronic-care facilities) (Iran,  
23 Iraq, Jordan, Kuwait, Libya, Palestine, Qatar, and Tunisia) (Table 5). Furthermore,  
24 four countries had influenza vaccination recommendations for all household  
25 members and caregivers of children younger than 5 years of age and persons aged 50  
26 years and older (Kuwait, Libya, Tunisia, and UAE). In addition, six countries had  
27 recommendations for all household contacts of persons at high risk for influenza  
28 complications (e.g. individuals with chronic medical conditions; the

1 immunosuppressed; the elderly; children aged <6 months i.e. cocooning strategy)  
2 (Iran, Kuwait, Libya, Syria, Tunisia, and UAE).

3 viii. *Pilgrims, expatriates, and refugees*

4 Annual influenza vaccination of pilgrims was recommended by all member states  
5 with an influenza vaccination policy (Table 6). On the other hand, only five countries  
6 recommended influenza vaccination for refugees (Iraq, Kuwait, Libya, Syria, and  
7 Tunisia), and none recommended vaccination for expatriates.

8 *Vaccination monitoring and coverage*

9 Six countries reported data on influenza vaccination coverage among high-risk  
10 groups during the 2015/2016 season. These were Egypt, Jordan, Kuwait, Morocco,  
11 Oman, and Saudi Arabia. Kuwait was the only country in the Region that provided  
12 coverage data for children >5 years of age, reporting a vaccination rate of only 2%. Data  
13 on vaccination coverage for pregnant women was also reported by one country (Oman),  
14 where the vaccination rate was 90%. Three countries, on the other hand, provided  
15 information on coverage for persons with specific illnesses; vaccination uptake in this  
16 target group ranged from 2% for non-communicable disease (NCD) patients in Kuwait to  
17 >70% for high-risk patients in Saudi Arabia. Furthermore, information on coverage  
18 among HCWs was provided by six countries and ranged from 39% in Kuwait to 100% in  
19 Egypt. Finally, three of the 14 member states recommending influenza vaccination for  
20 pilgrims in 2015/2016 reported data on coverage; vaccination coverage was 100% in all  
21 the three countries.

22 *Formulation and type of seasonal influenza vaccine*

23 Eighteen countries provided information on vaccine formulation used, and of  
24 these, eight used the northern hemisphere formulation (Iran, Jordan, Lebanon, Morocco,  
25 Pakistan, Palestine, Syria, and Tunisia), one used the southern hemisphere formulation  
26 (Sudan), and nine used both formulations (Egypt, Iraq, Kuwait, Libya, Oman, Qatar,  
27 Saudi Arabia, UAE, and Yemen).



1           Seventeen countries, on the other hand, provided information on the type(s) of  
2 influenza vaccine licensed for use. Thirteen (76.4%) countries reported using inactivated  
3 trivalent influenza vaccines (Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Morocco,  
4 Oman, Pakistan, Qatar, Saudi Arabia, Syria, and Tunisia), three (17.6%) reported using  
5 inactivated quadrivalent influenza vaccines (Palestine, Qatar, and Tunisia), and one  
6 (7.6%) reported using the high-dose, inactivated, trivalent influenza vaccine (Libya).  
7 Sudan (7.6%) was the only country in the Region that used the live-attenuated trivalent  
8 influenza vaccine.

9 *Seasonal influenza vaccine providers and principal outlets for vaccination*

10           Seventeen countries reported data on seasonal influenza vaccine providers and  
11 principal outlets for administration. Influenza vaccine was available solely through the  
12 public sector in four (20%) countries (Iran, Iraq, Sudan, and Tunisia). In the remaining 13  
13 (65%), influenza vaccine was available through both the public and the private sectors  
14 (Egypt, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Pakistan, Palestine, Qatar,  
15 Saudi Arabia, Syria, and UAE).

16           The principal outlets for seasonal influenza vaccination reported by 14 (70%)  
17 countries were primary health care centers, hospitals, and out-patient care clinics (Egypt,  
18 Iran Iraq, Jordan, Kuwait, Lebanon, Libya, Oman, Palestine, Qatar, Saudi Arabia, Syria,  
19 Tunisia, and UAE). Furthermore, seven (35%) countries reported providing influenza  
20 vaccines through community pharmacies, albeit to a lesser extent than hospitals and  
21 clinics (Egypt, Lebanon, Morocco, Oman, Pakistan, Palestine, and Syria). Occupational  
22 health services and schools, on the other hand, were reported to be the least common  
23 outlets for the administration of seasonal influenza vaccine.

24 *Promotion of seasonal influenza vaccination*

25           The majority of countries (n=14) reported the use of a wide range of media  
26 activities as tools to foster vaccination programs (Egypt, Iran, Iraq, Jordan, Kuwait,  
27 Libya, Morocco, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, Tunisia, and UAE). The  
28 primary media activities used included television and radio advertising, leaflets, posters,  
29 and emails.

## 1 *Future plans*

2           Nine (45%) member states identified a number of planned strategies and  
3 operational policy changes needed to address the existing influenza vaccination  
4 impediments faced by most countries (Egypt, Kuwait, Libya, Morocco, Oman, Pakistan,  
5 Palestine, Qatar, Saudi Arabia, and UAE). Kuwait, for instance, has planned to  
6 implement regular influenza immunization campaigns for high-risk groups. Furthermore,  
7 Egypt has intended to expand the recommended groups for annual influenza  
8 immunization to include university students and vulnerable groups. Saudi Arabia has also  
9 prepared a plan to incorporate influenza vaccine in the national immunization schedule.  
10 Other plans included covering all risk groups in 2018 and progressing towards universal  
11 coverage by 2020 (Libya), adopting a recommendation of vaccination of people aged >60  
12 years and <2 years (Oman), implementing seasonal influenza vaccination policies  
13 targeting persons at high risk identified by the WHO (Morocco), as well as strengthening  
14 existing surveillance systems (Palestine). Somalia expressed interest in implementing a  
15 vaccination policy for influenza but highlighted the need for guidance on development of  
16 the policy, surveillance systems for influenza, capacity building, purchase of vaccines,  
17 and vaccination activities in the country.

## 18 **4. Discussion**

19           The 2015/2016 survey permitted a regional summary of the national influenza  
20 immunization policies. In general, our survey reveals an increase in the number of  
21 countries adopting an influenza immunization policy. Previously, a joint WHO/UNICEF  
22 report identified 12 countries in the EMR with seasonal influenza immunization policies  
23 in 2014 [9]. Whereas, our survey identified 14 EMR member states with influenza  
24 immunization policies in 2015/2016. Although trivial, the increased policy adoption  
25 reflects an improved awareness regarding influenza and the importance of vaccination in  
26 mitigating its burden. The findings provide essential information on the aspects that are  
27 critical for improving and strengthening the influenza vaccination policies and practices.

28           Surveillance of influenza is essential for the selection of appropriate vaccine  
29 strains and rapid detection of novel subtypes in humans [10]. Local surveillance data

1 provides country-specific information on the time and type of circulating influenza  
2 strains, which enables an informed-decision on the choice of the vaccine formulation to  
3 use. Local morbidity and mortality data are also required to provide a more complete  
4 picture of the burden of disease, which, in turn, is critical for the appreciation of threat of  
5 influenza to public health. This also provides evidence-based data needed for advocacy  
6 and assists in the development and updates of the prevention, control, and mitigation  
7 policies for influenza [10]. Seventeen out of the 22 EMR countries reported conducting  
8 surveillance for influenza. In fact, sixteen national laboratories in 15 countries are  
9 currently designated as National Influenza Centres, thirteen of which are tasked with  
10 detecting and isolating influenza [11]. Representative specimens are periodically shipped  
11 to the WHO collaborating centers for further analysis which provides data for vaccine  
12 strain selection. The number of influenza specimens reported to FluNet from participating  
13 centres in the EMR increased from 32,345 in 2011 to 66,000 in 2015 [11]. Currently,  
14 either one or both, the Northern and Southern Hemisphere vaccine formulations, are in  
15 use in the EMR countries. The increase in the availability of the local ERM influenza  
16 data will help optimize the recommendations for vaccine formulations in the EMR.

17         Seasonal influenza is a substantial cause of severe illness and hospitalization  
18 among infants younger than six months of age [12]. Studies found that, in many cases,  
19 the rate of hospitalization of children aged <6 months is three times that of children in the  
20 subsequent age group [12]. However, prevention of flu in this age group is problematic  
21 due to the absence of an approved vaccine, which, in turn, highlights the crucial need for  
22 other preventive strategies [12]. There is strong evidence to suggest that vaccinating  
23 pregnant women protects their newborn children for up to 6 months after they are born  
24 [13]. In fact, giving influenza vaccine to pregnant women was 91.5% effective in  
25 preventing hospitalization of infants due to influenza[14].Worth mentioning, not only  
26 does vaccinating pregnant women protect infants, but it also prevents influenza infection  
27 and its dramatic effects during pregnancy, ranging from miscarriages, to preterm  
28 deliveries and a high maternal mortality rate [13,15,16]. Nonetheless, influenza  
29 vaccination policies in two countries in the region fell short of recommending maternal  
30 influenza vaccination, and only one country reported on influenza vaccination rates  
31 within this population. In addition to vaccinating pregnant women, the American

1 Academy of Pediatrics and the Centers for Disease and Control Prevention recommend  
2 “cocooning” as a method to protect young infants from seasonal influenza by ensuring all  
3 family members and close contacts receive the vaccine [17,18]. Despite this, only six  
4 countries recommended vaccination for household contacts and caregivers of children  
5 aged <6 months in the EMR, and none reported on influenza vaccination rates within this  
6 group. Therefore, evidence-based data on influenza outcomes in infants in the EMR is  
7 critically needed to emphasize on the importance of this prevention strategy.

8         Certain avian influenza viruses are potential zoonotic disease agents that may be  
9 transmitted from infected poultry to humans [19]. As such, poultry workers and  
10 veterinarians have an occupational risk of exposure to avian influenza viruses [19]. Five  
11 countries (Egypt, Iran, Iraq, Libya, and Tunisia) in the EMR had recommendations in  
12 place for persons working in the animal sector, all of which have experienced outbreaks  
13 of avian influenza) [20–24]. In particular, cases of human illnesses with H5N1 virus  
14 infection were detected in Egypt every year from 2006 to 2016 [25–28]. During the ten  
15 year period, a total of 363 human cases with influenza (H5N1) virus infection, including  
16 116 deaths, were reported in Egypt [29]. Nonetheless, the rationale for vaccinating poultry  
17 workers with human influenza vaccine is not clear since there is no evidence that these  
18 vaccines protect against heterotypic avian influenza viruses [30]. One reason would be  
19 that vaccination of this group against human influenza can reduce the potential for an  
20 infection with a human virus, thus, minimizing the chance for a co-infection with an  
21 avian virus and the possibility of a subsequent reassortment event to occur between these  
22 viruses [31].

23         As the world’s largest mass movement and gathering of people, the annual Hajj  
24 pilgrimage to Mecca creates an optimal environment for the spread of respiratory  
25 infections including influenza [32–34]. Nearly 40% of pilgrims suffer from respiratory  
26 symptoms during Hajj, with influenza virus being one of the most common etiologies  
27 [33,35,36]. The Ministry of Health (MOH) of Saudi Arabia recommends that all pilgrims,  
28 particularly those at increased risk of severe influenza disease including pregnant women,  
29 receive the most recent influenza vaccine before departing for the Hajj [37,38]. In  
30 accordance with the Saudi MOH recommendations, fourteen EMR member states

1 recommended pre-departure vaccination for all their pilgrims, yet only three reported on  
2 influenza vaccination rates among this group. On the positive side, universal coverage  
3 among this population was reported in all three EMR countries. These data suggest  
4 satisfactory compliance with the vaccine recommendation. Yet, in view of the limited  
5 number of countries reporting on influenza vaccination rates among pilgrims, the  
6 available data are not sufficiently representative. Furthermore, the reported data  
7 contradicted with those in the literature. For instance, one study found that only 19.4% of  
8 Egyptian pilgrims were found to be vaccinated against influenza in the 2015 Hajj season  
9 [39]. Another study by Memish et al. reported that only 22% of the Hajj pilgrims from 22  
10 countries (including some EMR countries) received the influenza vaccine in 2013[40].

11 The accessibility of vaccines is one of the key barriers to improving vaccination  
12 rates, including for influenza [41]. Given their ubiquitous distribution, extended working  
13 hours, and walk-in policies, pharmacists are in an ideal position to provide influenza  
14 vaccines to the community and thus support the increase of immunization uptake [42,43].  
15 For instance, a study by Steyer et al. demonstrated an increase in influenza immunization  
16 rates in the United States among persons aged 65 years and older following pharmacist  
17 involvement in influenza vaccination programmes [44]. This is consistent with data from  
18 Canada that showed an increase in influenza immunization rates when allowing  
19 pharmacists to administer influenza vaccines [44]. Of note, the impact appeared to be the  
20 greatest among persons aged 65 years and older [44]. This may relate to the fact that  
21 elderly present to pharmacies more frequently than younger people, giving more  
22 opportunity for pharmacists to engage in recommending vaccination to this age group. In  
23 the EMR, only seven countries reported providing influenza vaccines through community  
24 pharmacies, suggesting that the impact of allowing pharmacists to provide influenza  
25 vaccines on the uptake of seasonal influenza immunization is under appreciated in the  
26 region. Considering policies to expand the pharmacists' role in immunization could  
27 improve the accessibility of influenza vaccination in the region and enhance vaccination  
28 rates.

29 In conclusion, despite widespread policy recommendations on influenza  
30 vaccination, attaining high coverage rates among the various populations including those

1 at risk continues to be a challenge in the EMR, as does the availability of influenza  
2 vaccines. In fact, in spite of the increase from previous years, the number of influenza  
3 vaccine doses distributed in the EMR in 2015 comprised only 2.2% of the global market  
4 [7]. Effective communication of influenza vaccination policies and strong advocacy  
5 initiatives are warranted to improve awareness of the public and health professionals  
6 about influenza and vaccines. In addition, equitable distribution and access to influenza  
7 vaccines will be critical for increasing uptake. Finally, encouraging and investing in  
8 influenza surveillance and research could be particularly valuable for controlling  
9 influenza in the EMR. Such research is important for making informed decisions on  
10 influenza vaccine introduction and expansion.

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1 **Table 1**

2 Seasonal influenza vaccine recommendations for clinical risk groups by EMR countries.

<i>Clinical risk groups</i>								
	<b>Chronic medical condition</b>	<b>Immunologic disorders</b>	<b>HIV/AIDS</b>	<b>Long-term aspirin use</b>	<b>Any condition</b>	<b>Extreme Obesity</b>	<b>Residents of nursing home and other chronic care facilities</b>	
<b>Afghanistan</b>			no seasonal influenza vaccination policy					
<b>Egypt</b>	R <sup>1</sup>	R	R	NR	-	R	NR	
<b>Iran</b>	R	R	R	-	R	R	R	
<b>Iraq</b>	R	R	R	R	R	R	R	
<b>Jordan</b>	R	NR <sup>3</sup>	NR	NR	-	NR	NR	
<b>Kuwait</b>	R	R	R	R	R	R	R	
<b>Lebanon</b>	R	NR	NR	NR	NR	NR	NR	
<b>Libya</b>	R	R	R	R	R	R	R	
<b>Morocco</b>			no seasonal influenza vaccination policy					
<b>Oman</b>	R	R	R	NR	NR	NR	NR	
<b>Pakistan</b>			no seasonal influenza vaccination policy					
<b>Palestine</b>	R	R	R	NR	R	R	R	
<b>Qatar</b>	R	R	R	R	R	-	R	
<b>Saudi Arabia</b>	R	R	R	R	R	R	R	
<b>Somalia</b>			no seasonal influenza vaccination policy					
<b>Sudan</b>			no seasonal influenza vaccination policy					
<b>Syria</b>	R	R	R	-	R	R	NR	
<b>Tunisia</b>	R	R	- <sup>2</sup>	NR	R	R	-	
<b>UAE</b>	R	R	R	-	-	R	R	
<b>Yemen</b>			no seasonal influenza vaccination policy					

3 <sup>1</sup>R, recommended

4 <sup>2</sup>-, no data

5 <sup>3</sup>NR, not recommended<sup>4</sup>UAE, United Arab Emirates

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1 **Table 2**

2 Seasonal influenza vaccine recommendations for women during pregnancy and early postpartum period by  
 3 EMR countries.

Country	Risk factor	
	Pregnant women	Women up to two weeks post-delivery
<b>Afghanistan</b>	no seasonal influenza vaccination policy	
<b>Egypt</b>	NR	NR
<b>Iran</b>	R	-
<b>Iraq</b>	R	R
<b>Jordan</b>	R	
<b>Kuwait</b>	R	R
<b>Lebanon</b>	NR	NR
<b>Libya</b>	R	R
<b>Morocco</b>	no seasonal influenza vaccination policy	
<b>Oman</b>	R	
<b>Pakistan</b>	no seasonal influenza vaccination policy	
<b>Palestine</b>	R	-
<b>Qatar</b>	R	-
<b>Saudi Arabia</b>	R	-
<b>Somalia</b>	no seasonal influenza vaccination policy	
<b>Sudan</b>	no seasonal influenza vaccination policy	
<b>Syria</b>	R	NR
<b>Tunisia</b>	R	NR
<b>UAE</b>	R	-
<b>Yemen</b>	no seasonal influenza vaccination policy	

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1 **Table 3**

2 Seasonal influenza vaccine recommendations for HCWs by EMR countries.

Country	Health-care setting			
	Hospitals	Out-patients care clinics	Laboratories	Long-term facilities
<b>Afghanistan</b>		no seasonal influenza vaccination policy		
<b>Egypt</b>	R	R	R	R
<b>Iran</b>	R	-	R	R
<b>Iraq</b>	R	R	R	R
<b>Jordan</b>	R	R	R	R
<b>Kuwait</b>	R	R	R	R
<b>Lebanon</b>	R	NR	NR	NR
<b>Libya</b>	R	R	R	R
<b>Morocco</b>		no seasonal influenza vaccination policy		
<b>Oman</b>	R		R	R
<b>Pakistan</b>		no seasonal influenza vaccination policy		
<b>Palestine</b>	R	R	R	R
<b>Qatar</b>	R	R	R	R
<b>Saudi Arabia</b>	R	R	R	R
<b>Somalia</b>		no seasonal influenza vaccination policy		
<b>Sudan</b>		no seasonal influenza vaccination policy		
<b>Syria</b>	R	NR	NR	NR
<b>Tunisia</b>	R	NR	R	NR
<b>UAE</b>	R	R	R	R
<b>Yemen</b>		no seasonal influenza vaccination policy		

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1 **Table 4**

2 Seasonal influenza vaccine recommendations for occupational groups by EMR countries.

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Country	Work setting							
	Essential services (police, firemen, etc.)	Military services	Veterinary services	Poultry industry	Families that raise pigs, poultry or waterfowl	Airline workers	Investigators of human influenza outbreaks	Investigators of animal influenza outbreaks
<b>Afghanistan</b>			no seasonal influenza vaccination policy					
<b>Egypt</b>	-	-	R	-	-	R	R	R
<b>Iran</b>	R	R	R	R	-	R	R	R
<b>Iraq</b>	R	R	R	R	R	R	R	R
<b>Jordan</b>	NR	NR	NR	NR	NR	NR	R	-
<b>Kuwait</b>	R	R	NR	NR	NR	R	R	NR
<b>Lebanon</b>	NR	NR	NR	NR	NR	NR	NR	NR
<b>Libya</b>	R	R	R	R	-	-	R	R
<b>Morocco</b>			no seasonal influenza vaccination policy					
<b>Oman</b>	NR	R	NR	NR	NR	NR	NR	NR
<b>Pakistan</b>			no seasonal influenza vaccination policy					
<b>Palestine</b>	NR	NR	NR	NR	NR	NR	R	NR
<b>Qatar</b>	-	-	-	-	-	R	R	R
<b>Saudi Arabia</b>	NR	NR	NR	NR	NR	NR	R	R
<b>Somalia</b>			no seasonal influenza vaccination policy					
<b>Sudan</b>			no seasonal influenza vaccination policy					
<b>Syria</b>	NR	NR	NR	NR	NR	-	R	NR
<b>Tunisia</b>	R	R	R	R	NR	R	R	R
<b>UAE</b>	R	-	-	-	-	R	-	-
<b>Yemen</b>			no seasonal influenza vaccination policy					

1 **Table 5**

2 Seasonal influenza vaccine recommendations for residents of long-term facilities and household contacts of  
 3 whom seasonal influenza vaccine is recommended by EMR countries.

Country	Risk group		
	Residents of long-term care facilities (nursing homes and other chronic-care facilities)	Household contacts and caregivers of children younger than 5 years and adults aged 50 years and older	Household contacts of persons for whom vaccination is recommended
<b>Afghanistan</b>		no seasonal influenza vaccination policy	
<b>Egypt</b>	NR	NR	-
<b>Iran</b>	R	-	R
<b>Iraq</b>	R	NR	NR
<b>Jordan</b>	R	NR	NR
<b>Kuwait</b>	R	R	R
<b>Lebanon</b>	NR	NR	NR
<b>Libya</b>	R	R	R
<b>Morocco</b>		no seasonal influenza vaccination policy	
<b>Oman</b>	NR	NR	NR
<b>Pakistan</b>		no seasonal influenza vaccination policy	
<b>Palestine</b>	R	NR	NR
<b>Qatar</b>	R	-	-
<b>Saudi Arabia</b>	NR	NR	NR
<b>Somalia</b>		no seasonal influenza vaccination policy	
<b>Sudan</b>		no seasonal influenza vaccination policy	
<b>Syria</b>	NR	NR	R
<b>Tunisia</b>	R	R	R
<b>UAE</b>	-	R	R
<b>Yemen</b>		no seasonal influenza vaccination policy	

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1 **Table 6**

2 Seasonal influenza vaccine recommendations for pilgrims, expatriates, and/or refugees by EMR countries.

Country	Risk group		
	Pilgrims	Expatriates	Refugees
<b>Afghanistan</b>		no seasonal influenza vaccination policy	
<b>Egypt</b>	R	NR	
<b>Iran</b>	R	NR	NR
<b>Iraq</b>	R	NR	R
<b>Jordan</b>	R	NR	NR
<b>Kuwait</b>	R	NR	R
<b>Lebanon</b>	R	NR	NR
<b>Libya</b>	R	-	R
<b>Morocco</b>		no seasonal influenza vaccination policy	
<b>Oman</b>	R	NR	NR
<b>Pakistan</b>		no seasonal influenza vaccination policy	
<b>Palestine</b>	R	NR	NR
<b>Qatar</b>	R	-	-
<b>Saudi Arabia</b>	R	NR	NR
<b>Somalia</b>		no seasonal influenza vaccination policy	
<b>Sudan</b>		no seasonal influenza vaccination policy	
<b>Syria</b>	R	-	R
<b>Tunisia</b>	R	NR	R
<b>UAE</b>	R	-	-
<b>Yemen</b>		no seasonal influenza vaccination policy	

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