

Summary report on the

WHO-EM/CSR/181/E

**Fourth intercountry meeting of  
the Eastern Mediterranean Acute  
Respiratory Infection Surveillance  
(EMARIS) network and the First  
scientific conference on acute  
respiratory infections in the  
Eastern Mediterranean Region**

Amman, Jordan  
11–14 December 2017



REGIONAL OFFICE FOR THE

**World Health  
Organization**

**Eastern Mediterranean**

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## **1. Introduction**

Emerging and re-emerging respiratory pathogens are becoming a major threat to global and regional public health security, and are having a significant impact on health and economic development in the World Health Organization (WHO) Eastern Mediterranean Region. In recent years, the majority of emerging viral pathogens have been of zoonotic origin, which pose an ever-present threat to human health. Acute respiratory infections (ARIs) such as pneumonia, influenza, and respiratory syncytial virus (RSV) are one of the major causes of morbidity and mortality worldwide, and are responsible for 4.25 million deaths each year. In recent years, many new respiratory pathogens with the potential to cause international public health emergencies have emerged globally, and some of these, such as Middle East respiratory syndrome coronavirus (MERS-CoV), avian influenza A (H5N1 and H7N9), have affected the Region. The threat of an influenza pandemic, heightened by recent cases of highly pathogenic avian influenza in humans, requires continued efforts regarding preparedness and control strategies to respond to such a potential pandemic. WHO has been supporting countries of the Region to develop and strengthen capacities for influenza surveillance, the detection of novel influenza viruses and other respiratory pathogens, and influenza preparedness and response, and to address gaps in knowledge related to the risk and burden of ARIs in the Region through research.

The Region has become the epicentre of major complex humanitarian emergencies, and many countries in the Region have been directly or indirectly experiencing protracted emergencies which have had a profound impact on already fragile health systems. This situation poses a major threat to the progress being made in preparedness and response to seasonal influenza outbreaks and novel influenza

pandemics, and provides opportunities for emerging health threats to develop. In light of the many risk factors in the Region, WHO, in collaboration with health authorities and other stakeholders, has taken steps to improve influenza surveillance, which can support evidence-based decision-making in policy development.

In recent years, the WHO Regional Office for the Eastern Mediterranean has been collaborating with the United States Centers for Disease Control and Prevention (CDC), the Global Disease Detection and Response Program of the U.S. Naval Medical Research Unit no. 3 (NAMRU-3), and the Pandemic Influenza Preparedness Framework Partnership Contribution (PIP-PC) to establish, expand and improve the surveillance system for influenza and severe acute respiratory infections (SARI) in the Region, and to improve national and regional influenza pandemic preparedness and response. The ultimate goal of the influenza programme is to strengthen the capacities of countries to prepare for the next influenza pandemic by improving influenza detection and surveillance, sharing the isolates of influenza viruses with pandemic potential, and increasing the availability of, and access to, vaccines and other important pandemic response products during influenza pandemics.

Influenza surveillance in the Region has made remarkable progress in the last few years; 19 out of the Region's 22 countries have functioning SARI or influenza-like illness (ILI) sentinel surveillance sites, and 18 countries have laboratory capacity to identify, detect and characterize seasonal influenza viruses. The improvement of national influenza surveillance capacities, including epidemiological and virological surveillance data collection and analysis, will eventually contribute to country compliance with the core surveillance and response capacity requirements of the International Health Regulations 2005. National influenza centres in the Region have contributed considerably to the

global vaccine selection process through the sharing of an increased number of influenza virus isolates with WHO collaborating centres.

In recognition of gaps in knowledge and the need to better coordinate ongoing influenza and other ARI activities, the Regional Office, in collaboration with CDC and Global Health Development (GHD)/the Eastern Mediterranean Public Health Network (EMPHNET), organized the Fourth intercountry meeting of the EMARIS network and the First scientific conference on acute respiratory infections in the Eastern Mediterranean Region, which were held concurrently in Amman, Jordan from 11 to 14 December 2017. The EMARIS network was established in 2006 and aims to improve the use of surveillance data for generating information on influenza and other respiratory pathogens, share best practices and important lessons on public health preparedness for pandemic influenza, and coordinate influenza and other respiratory surveillance activities in the Region. Although progress and challenges related to influenza surveillance in the Region were reviewed and discussed during the EMARIS meeting, the main focus was to present research findings on the epidemiology, disease burden, seasonality, and risk factors for influenza and ILI in the Region, and to review progress in policies and practice regarding the introduction of influenza vaccines and other control strategies for pandemic influenza preparedness using regional data and evidence. WHO has been encouraging young researchers in the Region to undertake innovative research studies using the available influenza data to generate new evidence to fill the gaps in knowledge concerning influenza risk factors, seasonality, transmission, prevention, vaccination, and treatment.

The meeting was attended by nearly 140 representatives from 20 countries of the Region, CDC, GHD/EMPHNET, and experts from WHO and regional and international academic institutions.

A total of 91 scientific abstracts were submitted by young researchers in the Region, out of which 38 were accepted for presentation either as oral or poster presentations at the First scientific conference on acute respiratory infections in the Eastern Mediterranean Region. One keynote speaker, 30 other thematic speakers, and seven panellists either presented or shared their work during the conference. Special awards to recognize the best oral and poster presentations were given to two young scientists from Pakistan and Bahrain, respectively. The objectives of the Fourth intercountry meeting of the EMARIS network were to:

- review achievements and progress in the influenza surveillance programme in the Region;
- share evidence and best practices related to the use of surveillance data for burden estimation, severity assessment and outbreak detection;
- discuss how the surveillance data can help in developing evidence-informed policies and programmes for influenza control in the Region; and
- showcase scientific achievements and research findings of the programme concerning the prevention and detection of and response to seasonal, novel and other emerging respiratory viruses.

## **2. Summary of discussions**

The theme of the conference was “Better understanding, better preparedness and better response,” and the four-day conference and meeting covered four major thematic areas: epidemiological surveillance, influenza at the human–animal interface, vaccination, and virological surveillance. Discussions on these areas took place in seven main sessions, which included oral and poster presentations and six panel discussions.

*Influenza surveillance in the 21st century: lessons from the past and vision for the future: plenary session*

Influenza viruses, both seasonal and zoonotic, constantly evolve and change. Influenza is becoming a major public health threat globally, and many experts believe that the prospect of another severe influenza pandemic is inevitable. It is therefore imperative to invest in the improvement of influenza surveillance and pandemic preparedness capacities at all levels. Seasonal influenza epidemics cause a substantial public health and economic burden in lower- and middle-income countries, where morbidity and mortality are likely to be higher. The Global influenza surveillance and response system (GISRS) network coordinated by WHO is responsible for monitoring which influenza viruses are circulating in humans around the world throughout the year. The GISRS network comprises 143 national influenza centres in 115 countries, five WHO collaborating centres, 12 H5 influenza reference laboratories and four essential regulatory laboratories. GISRS, a unique worldwide network able to rapidly identify and respond to influenza outbreaks including those with pandemic potential, celebrated its 65th anniversary this year. The global influenza surveillance system has improved significantly, and through the data collected is now able to tell us which influenza strains circulate globally, detect the emergence of novel influenza viruses, identify viruses for vaccine selection, and determine the epidemiology of respiratory illnesses. The GISRS network members meet twice a year to consider the surveillance data on recently circulating viruses in both the northern and southern hemispheres and on candidate vaccine viruses, and recommend suitable strains to be included among the next seasonal influenza vaccines.

A keynote speech by Professor Salman Rawaf, Director of the WHO Collaborating Centre for Public Health Education and Training, highlighted the importance of enhancing acute respiratory disease

surveillance through existing primary health care systems. Professor Rawaf described how the 2009 influenza pandemic reshaped health system and emergency preparedness at the national, regional and global levels, and stressed that the health and economic consequences of even relatively benign/mild ARIs are substantial. He stated that a lack of proper surveillance systems and limited financial resources are some of the key barriers to addressing ARIs in developing countries, and concluded by emphasizing the importance of taking urgent steps to prevent ARIs and their serious consequences both in developed and developing countries through effective influenza surveillance to monitor and manage ARIs, and also to implement prevention and control activities.

During the first panel discussion, participants discussed the sustainable actions needed at country level to improve the quality of data collection and analysis, and key actions to improve the collection and analysis of influenza data were suggested, including maintaining and strengthening the existing influenza surveillance systems for the detection and monitoring of threats from seasonal influenza and other emerging respiratory viruses; linking surveillance systems with defined goals, clear objectives and achievable targets in order to achieve a higher uptake of seasonal influenza vaccines among high-risk groups; integrating influenza into national surveillance systems and other programmes to maximize the use of the systems; ensuring that data collection and analysis are more systematic and of a better quality by promoting the timely and complete reporting of data and continuing to enhance timely virus sharing to avoid vaccine mismatch; promoting electronic reporting systems to improve data quality and quantity and avoided redundancy; and advocating the greater regional use of global and regional platforms for influenza data reporting.

*Influenza in the Eastern Mediterranean Region: plenary session*

The influenza surveillance system in the Region has been expanding in recent years, and more countries have established and operationalized SARI and ILI sentinel surveillance sites. There is a strong political commitment among countries of the Region to prioritizing and sustaining effective and sensitive seasonal influenza surveillance systems. The overall goal of the influenza surveillance and response programme in the Region is to minimize the impact of seasonal influenza by providing useful information to public health authorities to enable them to plan appropriate control measures more effectively. Major components of influenza surveillance in the Region are epidemiological surveillance, virological surveillance, disease burden estimation and baseline and threshold value calculation studies, and policies and programmes for the introduction and increased use of seasonal influenza vaccines. Nineteen out of the 22 countries of the Region have functional influenza surveillance systems, and seven countries are beneficiaries of PIP-PC. The required guidelines, protocols, standard operating procedures and reporting tools to guide the regional and national influenza surveillance systems have been developed and disseminated among countries, and more countries are now considering introducing and increasing the use of seasonal influenza vaccines. In addition, more national influenza centres are currently actively participating in virological surveillance and publicly sharing data and specimens with GISRS than before.

*Epidemiological surveillance and use of surveillance data for informed policy and practice: plenary session*

Effective use of available influenza surveillance data will allow public health officials and policy-makers to better understand influenza seasonality, risk groups, severity, and transmission zones, and to assess

their impact on health care systems. Morbidity and mortality data associated with seasonal influenza are needed to better understand the burden of disease, which, in turn, can provide useful information for policy-makers regarding the allocation of resources for prevention and control efforts. Out of the 19 countries with functioning influenza surveillance in the Region, 18 are currently consistently reporting through the regional EMFLU platform (14 countries) and/or the global FluNet platform (13 countries), or the global FluID platform (six countries). The increased use of the regional and global reporting platforms resulted in the production and publishing of monthly and weekly influenza situation updates for the Region from the beginning of 2017. With the increased availability of epidemiological and virological data, six countries (Egypt, Islamic Republic of Iran, Jordan, Lebanon, Oman, and Tunisia) have now completed influenza disease burden estimations using the available influenza surveillance data. Other countries are planning to undertake disease burden estimations and baseline/threshold value calculations for influenza in the coming months.

In the second panel discussion, panellists were asked which priority settings needed to be considered by countries in order to make better use of influenza surveillance data for public health decision-making. The discussion highlighted the importance of the following points: improving close collaboration between academics and private sector and health authorities on influenza surveillance; formulating policies that will facilitate collaboration and information sharing with all stakeholders; establishing a strong scientific network that will bring health authorities and academics together to maximize information sharing and optimize the use of available resources; promoting the involvement of academia to contribute to the capacity-building of key components of influenza surveillance, including research; improve confidence in and trust between academics and health authorities; and countries sharing best practice approaches with one another as well as

with WHO and other stakeholders. The use of electronic systems to improve data quality and quantity and reduced redundancy was also discussed, and participants agreed it was imperative to continue updating the existing technology with smart engines to increase efficiency and avoid paper-based work. Participants recommended that countries continue to integrate epidemiology and virology data and then connect to the existing electronic health information management systems for influenza data reporting. Participants also advocated the increased and more consistent use of the FluNet, FluID and EMFLU platforms for influenza data reporting, and ensuring that national influenza centres share influenza virological surveillance data with the GISRS network on a regular basis.

*Virological surveillance for influenza: enhancing understanding of influenza epidemiology and improving influenza preparedness*

Enhancing virological surveillance for influenza is essential for the identification, detection, and monitoring of circulating seasonal influenza viruses as well as other novel viruses with pandemic potential. Progress has been made in improving and expanding virological surveillance in the Region, which will contribute to regional and national preparedness efforts to effectively respond to influenza outbreaks or potential pandemics. There are 16 national influenza centres in 15 countries, and Saudi Arabia, Palestine, and United Arab Emirates each have one additional influenza laboratory; these centres and laboratories have the capacity to detect and isolate seasonal influenza viruses and other novel respiratory viruses. Of these national influenza centres and influenza laboratories, 19 have virus isolation capacity through real-time polymerase chain reaction, six have the ability to characterize influenza viruses using sequencing and viral neutralization assay, and one national influenza centre can perform antiviral susceptibility. WHO has exerted efforts to maximize the number of countries sharing viruses with the

GISRS network, and as a result, 14 countries shared influenza virus strains with WHO collaborating centres in 2017, and the proportion of countries sharing viruses with the GISRS network increased by 42% between 2014 and 2017.

Real-time polymerase chain reaction is increasingly becoming the first-choice laboratory test for diagnosing and monitoring influenza virus infections. The WHO External quality assessment project has been monitoring the quality of national influenza reference laboratories' performance of polymerase chain reaction diagnosis on an annual basis, and 16 national influenza centres and other influenza laboratories in the Region participated in Panel 16 of the External Quality Assessment Programme in 2017 with the aim of monitoring the quality of real-time polymerase chain reaction performance. All 16 participating laboratories achieved an overall test score of 100% in the proficiency panel.

In the third panel discussion, participants discussed the actions needed to improve quality, biosafety and biosecurity practices, and detection and sequencing capacities in order to maintain influenza virological surveillance in the 21st century. The discussion highlighted a number of common challenges hampering the improvement and sustainability of effective virological influenza surveillance, and ways to overcome these challenges. The most common challenges include the shortage of qualified laboratory professionals with extensive experience in virology; the lack of motivation among laboratory professionals; limited specialized regional training for laboratory staff; inadequate resources to improve biosafety and biosecurity infrastructure and practice at reference laboratories; and inadequate space and facilities in some reference laboratories. It was agreed that most of these challenges can be overcome with strong political commitment and the allocation of adequate resources by health authorities to improve the capacity and performance of national influenza centres.

*Influenza vaccine use in the Eastern Mediterranean Region: challenges for increased uptake*

Influenza causes substantial morbidity and mortality on a yearly basis, particularly among people aged over 65 years and among those with serious underlying comorbidities. Seasonal influenza vaccines represent a potentially important approach to preventing and reducing both influenza-related illness and death; however, strong political commitment and considerable investment are required to increase the availability and uptake of the vaccines. In 2003, the World Health Assembly adopted Resolution WHA56.19, which urged countries to increase influenza vaccination coverage for all people at high risk and to cover 75% of older people by 2010. The Regional Office has conducted a literature review of all studies published in English between 2006 and 2016 to assess current policies, coverage, and attitudes towards influenza vaccination, and has also administered an online survey to report on seasonal influenza vaccine policies and coverage rates in the Region in order to draw up a regional influenza action plan.

The results of the above literature review and online survey reported low vaccination coverage both among the general population and high-risk groups, which was mainly attributed to misconceptions about vaccine safety, efficacy, and recommendations. Desirable coverage levels for some of the at-risk groups, such as health care workers and pilgrims, were achieved in only a few countries. According to the online survey, 14 countries have implemented an influenza vaccine policy, while five countries have included influenza vaccines in their national immunization programmes. Seven countries reported that they measure vaccination coverage, but the data varied widely between these countries and among different age groups. Six countries reported vaccination coverage for health care workers, which ranged from 39% in Kuwait to 100% in Qatar.

The implemented influenza vaccine policies commonly covered the main risk groups, with some variability between countries. Recommendations for the implementation of influenza vaccination policies and improving vaccination coverage in the Region were discussed on the basis of the literature review and online survey findings. Overall, the survey showed a significant increase in the number of countries that have adopted an influenza vaccination policy since the last survey in 2011. While most countries correctly identified the risk groups for influenza vaccination in their policies, notable differences in national policy recommendations were observed.

In the fourth panel discussion, participants discussed the strategies that should be prioritized in order to increase the use and uptake of seasonal influenza vaccines in the Region, and stressed the importance of prioritizing the introduction of seasonal influenza vaccines for high-risk groups, health workers, pregnant women, and older people in particular. Participants also recognized possible challenges related to increasing the uptake of seasonal influenza vaccines among high-risk groups, and the need for the collective efforts in this regard of all stakeholders, including policymakers, public health experts, health care workers, and local communities. Discussions stressed that ministries of health must share the available morbidity and mortality data on influenza to policymakers, and advocate the development of national policies prioritizing and recommending seasonal influenza vaccination for high-risk groups. It was agreed that a better understanding of perceptions among high-risk groups and factors influencing decisions about receiving seasonal influenza vaccines would aid the development of effective strategies for improving seasonal influenza vaccine uptake. Participants also agreed that effective communication strategies should be implemented to increase awareness and knowledge about the risks of influenza infection and the benefits and safety of seasonal influenza vaccination among high-

risk groups, and that ministries of health should organize annual vaccination campaigns and provide free vaccines to high-risk groups to facilitate vaccine accessibility and uptake.

*Influenza surveillance at the human–animal interface: better data collection for better response*

Zoonotic influenza viruses pose a significant global public health risk. The location of the Region makes it an important region for influenza A virus circulation. Countries of the Region lie under four of the eight global migratory bird flyways, thus permitting the transmission of avian influenza viruses from migratory birds to resident wild birds, domestic poultry, mammalian species, and humans in the Region. The highly pathogenic H5N1 avian influenza virus spread rapidly through the Region in 2006, and transmission of H5N1 from infected birds to humans was confirmed, mostly in Egypt, but also in Djibouti, Iraq and Pakistan. Several countries have recently reported the newly emerging H5N8 virus in wild birds and poultry. In addition, H9N2 viruses are endemic in poultry in several countries of the Region, and seroepidemiological studies from a number of countries have found evidence of H9N2 antibodies. Factors that trigger human infection with animal influenza viruses progressing into a pandemic are poorly understood. It is therefore imperative to prioritize and enhance animal surveillance, which is an important tool to combat zoonotic influenza as it allows for the determination of the characteristics of the circulating viruses and an understanding of the epidemiological factors associated with viral circulation. Moreover, surveillance is an integral part of influenza pandemic preparedness and response; however, a review of the scientific peer-reviewed and grey literature has shown that very little surveillance in the animal sector is currently being conducted in the Region.

Surveillance at the human–animal interface therefore needs to be increased in the Region. This will require a One Health approach that will enable coordination of the various sectors to maximize benefits. The Regional Office has prepared a One Health framework which promotes the human–animal interlink within and between countries to provide a more conclusive picture of influenza viruses in the Region.

In the fifth panel discussion, participants discussed actions needed to be taken by countries regarding data collection and early response to potential zoonotic threats. Participants recognized the increased global threat of avian influenza to human and animal health, and the need for coordinated global efforts to reduce the risk to humans and animals from novel influenza strains and other zoonotic emerging infectious diseases through a One Health approach. The discussion emphasized the need for better integrated and coordinated animal and human surveillance strategies for avian influenza and other zoonotic diseases, and for WHO and other partners to team up in building national capacities to detect, monitor and respond to emerging influenza viruses with zoonotic potential.

*Surveillance for respiratory syncytial virus (RSV): lessons learned from the SARI surveillance platform*

Respiratory syncytial virus (RSV) is the leading viral cause of acute lower respiratory tract infections in infants and young children worldwide. In order to better understand RSV epidemiology and the burden of disease it causes, it is imperative to expand RSV surveillance by integrating it into existing influenza or other disease surveillance. The GISRS network has been promoting the establishment of RSV surveillance and its integration into existing influenza surveillance, with the aim of monitoring the global epidemiology of RSV and temporal and geographic patterns associated with the detection of RSV, parainfluenza

viruses, respiratory and enteric adenoviruses, and rotavirus. A number of GISRS laboratories have already included RSV and other respiratory pathogens in their surveillance programme. The primary objective of RSV surveillance is to provide information on the seasonality of RSV epidemics in different parts of the world and shed light on the burden of disease RSV infections cause in different geographical areas and population groups.

Although RSV surveillance data to estimate the RSV disease burden in the Region may not be available, many countries have already integrated RSV surveillance into the existing SARI sentinel sites. Most of the national influenza centres and other influenza laboratories are able to identify, detect and monitor the circulating respiratory syncytial virus genotype. Egypt and Pakistan are participating in the global RSV surveillance pilot project, which is being managed through the existing GISRS network, with the aim of assessing the suitability of existing influenza surveillance platforms for RSV surveillance without negatively affecting influenza surveillance.

In the sixth panel discussion, participants discussed the feasibility of using influenza surveillance platforms for RSV and other emerging respiratory virus threats. A number of countries across the world are currently participating in the global RSV surveillance pilot project. These countries have well-functioning sentinel influenza surveillance networks and national influenza centres, and the pilot RSV surveillance has therefore been integrated into the existing sentinel surveillance sites, while the RSV testing is being done through the existing national influenza centres. The epidemiological and virological RSV surveillance data from the pilot countries are being reported to WHO through the FluMart platform. Pilot countries are currently uploading the RSV data to FLuMart on a weekly basis. Participants advocated the current arrangement of integrating RSV surveillance, including detection and

reporting, into existing influenza surveillance structures. However, it was also agreed that in order to strengthen and sustain RSV surveillance, countries should receive technical assistance, such as guidelines, standard operating procedures, testing protocol, and reporting tools.

*Addressing pandemic influenza threats: recognition, prevention and response*

Next year marks the 100th anniversary of the greatest influenza pandemic in history (and one the greatest natural disasters the world has witnessed), the 1918 “Spanish flu” pandemic. In the past 100 years, there have been four influenza pandemics (1918, 1957, 1968 and 2009), and future pandemics appear inevitable. An influenza pandemic is an unpredictable but recurring event that can have serious consequences on human health and economic well-being worldwide. Advanced planning and preparedness are critical to help mitigate the impact of a pandemic. The 2009 influenza A (H1N1) pandemic was the first to occur following the production of the WHO pandemic preparedness guidance.

Despite hopes for improved pandemic prediction, this goal still remains beyond our capabilities. In recent years, new respiratory infections of zoonotic origin, including H5N1 avian influenza and MERS-CoV, which is affecting the Region in particular, have added to the potential threats and further demonstrate the gaps in our knowledge. As we are currently unable to predict influenza pandemics and novel infectious disease threats such as MERS, effective respiratory disease surveillance for early warning, together with strong preparedness measures, are essential. The foundation for this is influenza surveillance systems. Building on these systems will require an enhanced capability to collect and coordinate data across national borders and identify the pathogens in real time (or near real-time), and agreement on triggers for appropriate response activities.

As many pandemic influenzas appear to be of zoonotic origin, cross-species surveillance (a One Health approach) is essential. Technological advances in detection, reporting, communications, and data analysis make it increasingly feasible and cost-effective to develop a more comprehensive system from these building blocks. The Global Health Security Agenda and the revised International Health Regulations provide mechanisms and assistance for encouraging these enhancements and implementing consistent standards for surveillance and preparedness.

In the seventh panel discussion, participants discussed ways to accelerate progress in the prevention and early detection of and response to pandemic threats. It was agreed that the most important step to prevent, detect and respond to pandemic threats was the establishment of effective influenza surveillance systems with the ability to detect any novel influenza or other emerging respiratory viruses with epidemic potential. Countries must review and update their pandemic influenza preparedness plans in accordance with the WHO planning guidance and checklists, and the plans should be tested periodically using desktop or other simulation exercises.

Middle East respiratory syndrome coronavirus (MERS-CoV) is an emerging respiratory virus believed to be of zoonotic origin. The virus emerged in Saudi Arabia in 2012 and then spread to many other countries both within and outside the Region. To date, 27 countries have reported laboratory-confirmed cases of MERS-Cov to WHO, and most of these infections were linked directly or indirectly to the Arabian Peninsula. There have been more than 2081 confirmed cases worldwide, with at least 722 deaths, and a case fatality rate of 35%. The largest outbreak outside of Saudi Arabia occurred in South Korea in 2015. In South Korea, 186 cases were laboratory confirmed, with 36 associated deaths over a two-month period. Although most of these outbreaks and clusters of cases had limited transmissibility with a

tendency to spread among people and patients within health care facilities, WHO considers MERS-CoV a pathogen of public health concern that poses a global threat. This is based on its impact on human health and the economic consequences of the virus. Moreover, Many questions on MERS remain unanswered, including the origins of and reservoir for the virus, the route of transmission from animals to humans, seasonal trends of the virus, and specific human behaviour that facilitates transmission of the virus.

Participants agreed that despite gaps in knowledge on MERS-CoV, the most effective prevention and control measures to reduce the impact of the virus on health care systems include enhancing early detection, timely investigation to identify the source of infection, identification of close contacts, applying appropriate infection control measures, and proper case management. Since many health care workers have contracted the infection, it is important for all health care workers to practice appropriate infection control measures when taking care of patients with suspected or confirmed MERS-CoV, and proper monitoring mechanisms should be put in place. In line with the One Health approach, increased collaboration and research between human health and animal health agencies is necessary to identify not only the sources of infection but also the exact route of transmission from animals to humans.

### **3. Conclusions**

Every year, influenza illness causes a substantial disease and economic burden throughout the world. Influenza often causes epidemics, and influenza pandemics are unpredictable but unavoidable events. Enhancing influenza surveillance is the key to a better understanding of the impact of influenza epidemics and pandemics and implementing measures to limit or prevent them. The emergence of MERS-CoV in the Region in 2012 serves as a stark reminder that novel respiratory viruses

will continue to appear and present risks to national, regional and global health security. Participants at the meeting agreed that a vision for the future would be to build on progress achieved in the quality and effectiveness of epidemiological and virological surveillance systems for influenza in the Region by maintaining existing platforms for influenza surveillance, in order to detect and monitor threats from novel or emerging influenza viruses and other respiratory pathogens. This would include the timely sharing of data for public reporting and better use of surveillance data. Such evidence bases are necessary to make informed policy decisions to improve preparedness for and response to influenza epidemics and pandemics.

Participants also called for the finalization of the terms of reference, mandate and functions of the EMARIS network, and for the identification of ways to support countries to further enhance their influenza surveillance systems and to share their scientific achievements and progress.

#### **4. Recommendations**

##### *To Member States*

- Enhance and sustain epidemiological and virological surveillance for influenza using a standardized, uniform and consistent approach.
- Ensure sufficient laboratory diagnostic capacities in all countries, especially for molecular diagnosis and sequencing, and maintain quality standards for the rapid identification and detection of novel respiratory pathogens that may trigger an epidemic or a pandemic.
- Continue to advocate for the improvement of timely virus isolate sharing by national influenza centres with WHO collaborating centres.

- Advocate and enhance timely influenza data sharing with WHO through the existing regional EMFLU platform and the global FluNet and FluID platforms.
- Conduct influenza burden estimation and baseline/threshold value calculations using the available influenza surveillance and laboratory data, and use the outcome to identify the most appropriate risk-based prevention and control strategies, including the use of influenza vaccines.
- Undertake more behavioural studies to identify reasons for the hesitancy associated with seasonal influenza vaccine uptake among health care workers and other high-risk groups.
- To review and update existing influenza pandemic preparedness plans in order to be better prepared to recognize and manage an influenza pandemic. The existing plans should be revised in accordance with the latest WHO recommendations in the new WHO checklist tool *A checklist for pandemic influenza risk and impact management: building capacity for pandemic response. 2018 update* ([http://www.who.int/influenza/preparedness/pandemic/influenza\\_risk\\_management\\_checklist\\_2018/en/](http://www.who.int/influenza/preparedness/pandemic/influenza_risk_management_checklist_2018/en/)), and *Pandemic influenza risk management. A WHO guide to inform and harmonize national and international pandemic preparedness and response*.
- To promote greater collaboration with academia and other researchers to support research studies to better understand influenza epidemiology, virology, and vaccines and other control measures, and to minimize the impact of influenza in its seasonal, zoonotic and pandemic forms.
- To evaluate existing influenza surveillance systems at country level using a standardized tool to assess the quality of the ongoing surveillance systems.

*To WHO*

- Support and organize the biannual meeting of the EMARIS network combined with scientific conferences on acute respiratory infections in the Eastern Mediterranean Region.
- Maintain the technical and financial support provided to Member States to sustain progress achieved in the quality and effectiveness of epidemiological and virological surveillance systems for influenza in the Region.
- Facilitate the evidence-based research studies necessary to make informed policy decisions in order to improve preparedness for and response to influenza pandemics.
- Support countries by sharing experiences, protocols, lessons learned and country-based stories on challenges and best practices, and offering technical support.
- Finalize and disseminate the terms of reference, mandate and functions of the EMARIS network, and to identify ways to support countries to further enhance their influenza surveillance systems and to share their scientific achievements and progress.



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