



Food and Agriculture  
Organization of the  
United Nations



World Health  
Organization

# Regional workshop on MERS-CoV and One Health

*27-29 April 2015*

*Doha, Qatar*

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## Doha Declaration

### BACKGROUND

Human infections with the Middle East respiratory syndrome coronavirus (MERS- CoV) continue to be reported from the Arabian Peninsula and the Middle East. Since April 2012, over 1 106 confirmed human cases, including 421 deaths, have been reported to the World Health Organization (WHO). The majority of cases have occurred in Saudi Arabia. Although the pattern of transmission appears relatively unchanged, the overall situation and the possibility of international spread remain of concern.

While infection has spread through human-to-human transmission in many cases, the primary cases in clusters are more likely to have been acquired through contact with non-human sources of the virus, including environmental or unknown animal sources. Several studies have suggested dromedary camels as a potential source of human infection. Some studies reveal that camel populations have antibodies that strongly react to MERS-CoV, but not to other related coronavirus. Others show the isolation of MERS-CoV virus from camels with mild clinical signs, and the genetic sequence similarity between the MERS-CoV genome obtained from camels and the virus from humans, with epidemiological links to the camels. Also, a study on a limited number of camels demonstrated that animals can be infected experimentally and that large quantities of virus are shed from the upper respiratory tract.

Despite these findings, the role of dromedary camels in the epidemiology of human infection remains unclear and further studies on the mechanisms by which MERS- CoV is transmitted from dromedaries to humans, whether by direct or indirect routes, are needed. Addressing these questions is crucial for developing and implementing messages and measures for reducing the risks to public and animal health.

Several committee meetings, technical consultations and workshops were convened on the Middle East Respiratory Syndrome Coronavirus (MERS-CoV), either jointly or separately by

the Food and Agriculture Organization of the United Nations (FAO), the World Organisation for Animal Health (OIE), and the World Health Organization (WHO).

All these meetings have contributed to increased awareness and understanding of the complex epidemiological features of MERS-CoV, including the role of animals, but many questions are still unanswered as of today.

As part of their ongoing efforts to respond to the threats of MERS-CoV, FAO and the State of Qatar in collaboration with OIE and WHO convened a Regional workshop on MERS-CoV and 'One Health' in Doha (Qatar) on 27–29 April 2015.

## **OBJECTIVES OF THE WORKSHOP**

The main objectives were:

- to present the latest research findings on the disease and the current knowledge in affected countries on the potential role of animal species in the epidemiological cycle of MERS;
- to analyze the recent developments in diagnostic and surveillance tools to support animal investigations;
- to review the 'One Health' practices with a focus on MERS-CoV in the affected countries, in relation to international standards, and ways for improving them;
- to identify the concrete steps and roadmap for coordinated actions at the sub-regional level with a view to halting the spread of the disease; and
- to discuss and agree on mechanisms for intra-regional and global cooperation in investigations, research and knowledge sharing and the role of international and regional organizations.

## **Recommendations and priority actions**

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Given the importance accorded to MERS-CoV in the region and around the world, and the suspected zoonotic transmission involving particularly dromedary camels, the participants agreed on the following:

### **MERS-CoV Surveillance**

Considering the importance of monitoring trends in virus circulation and tracing forward or backward the exposure to limit the risks of transmission between camels, from camels to humans and possibly from humans to camels, the participants recommended the following actions:

- 1- Establish targeted laboratory based surveillance in camels based on risk of human exposure:

- a. Focus surveillance in farms, slaughterhouses and other locations of camel gatherings. The participants recognized the challenges of testing camels at markets and racing venues, but the introduction of pre-race screening for MERS-CoV could be instituted as a practice when necessary
  - b. The sampling frame needs careful consideration as prevalence may be low. However, if possible, sampling should be age stratified random sampling
  - c. The recommended test for surveillance is PCR but additional tests (serology) and other validated tests could be considered
2. GCC countries to agree on a common MERS-CoV surveillance system for testing of imported camels into the region and the appropriate sanitary measures and certification requirements.
3. For farm surveillance within countries, if an animal is PCR positive, regardless of the epidemiologic link to human cases, the following actions should be taken:
  - a. Immediate notification to the animal health authorities for tracing forward (or backward) and testing the rest of the herd
  - b. Immediate notification of the public health sector for joint animal-human investigations
  - c. Immediate notification to OIE for the purposes of early warning and for sharing information with the international community
  - d. Isolation of infected camel(s) until PCR is negative
  - e. Use appropriate protective measures for humans in contact with infected animals
4. In the case of community acquired MERS-CoV human cases, the public health authorities should inform the veterinary authorities and:
  - f. Carry out joint animal health /human health investigations
  - g. Link basic epidemiologic data with samples
  - h. Carry out sequencing of viruses isolated from animals and humans
  - i. Report results from the investigations

## RESEARCH

In spite of research efforts over the last months, several unanswered questions remain as to the emergence of MERS-CoV and the mechanisms of its spread. There is an urgent need for further studies and specific research along the following:

1. More longitudinal investigations should be undertaken in naturally-infected camels in different production systems using different age groups to determine virus shedding in excretions (nasal, fecal, milk and urine) and the presence of the virus in meat and serological responses in camels over time, to obtain more information on the natural MERS-CoV infection.

2. Potential animal-related intervention studies should be performed. These include animal models and vaccine development. Studies should involve experimental infection of camels to discern reinfection of camels over time.
3. Joint research on risk factors for transmission of MERS-CoV between camels, from camels to humans and from humans to camels. In particular, specific interactions between camels and people should be addressed by epidemiologic studies. Transmission data should be compared within and between countries.
4. Continue characterization of the identified viruses, including viral genome sequence determination and comparing genome sequences from human cases to genome sequences from camels. Functional studies of newly obtained viruses should also be performed.
5. Validate diagnostic assays that are both sensitive and specific. Any new diagnostic assays should be evaluated and validated according to accepted standards.
6. Characterization and mapping of camel production systems and value chain analysis, and review specific legislation pertaining to camels and trans-boundary movements (racing, breeding, slaughterhouse management and compliance, husbandry practices). Research studies in camels should also consider quarantine stations at the points of entry.
7. Although more is known regarding testing of livestock for MERS-CoV, more work needs to be done because this is a novel coronavirus. Other than in dromedary camels, animal testing should be driven by epidemiologic analysis and basic science. In addition, further works should include testing of bats and comparison of bat sequences for a better understanding of possible infection dynamics.

## **FOOD SAFETY AND ENVIRONMENT**

Considering the traditional consumption of raw fresh milk and even urine for nutritional and therapeutic purposes, in particular by immune-compromised people, the increasing demand for camel products in the GCC countries, and the lack of scientific data regarding the risk of exposure to the virus in milk, meat and urine and the risk for human health of consuming contaminated products, the participants recommended the following actions:

1. Implement studies to assess:
  - o The persistence and inactivation of MERS-CoV in the environment
  - o The infectivity of the milk, meat, urine and hides of infected camels
  - o The transmissibility of the MERS-CoV to human by consumption of camel products
  - o The traditional practices for the production, processing and consumption of camel products

2. Allocate funding for research initiatives to address research gaps and priorities and encourage collaboration between the GCC countries and international organizations, including Qatar Foundation, WHO, FAO, and OIE

## **RISK COMMUNICATION**

GCC countries should establish a risk communication strategy with the assistance of relevant international organizations. The communication strategy shall be based on the following principles:

1. Establish national and regional risk communication multidisciplinary task forces to lead the policy and research plans. Sharing of information and material between these task forces is highly recommended
2. Involve all relevant stakeholders (e.g. governmental sectors, community leaders, camel owners etc.)
3. Direct the risk communication activities to target high risk groups (e.g. health care workers, camel farm workers, camel farm owners, contacts of MERS-CoV human cases etc.) rather than to the general public
4. Produce simple and clear messages based on evidence and addressing the different hazards, considering the level of risk
5. Involve the media in the development and distribution of MERS-CoV related communication materials

## **INTER-SECTORAL COLLABORATION**

Considering the need to address MERS-CoV issues under a 'One Health' approach, the participants recommend the following actions:

1. National and regional level
  - a. Establish/strengthen multidisciplinary teams from the animal and human health sectors with the different specialities to carry out joint investigations of MERS-CoV infection in humans and animals
  - b. Establish mechanisms for sharing of MERS-CoV related information and research results
  - c. Establish joint projects between relevant sectors and between countries
  - d. Review the legislations to define the roles and responsibilities of each sector and avoid overlapped activities and meet the gaps
  - e. Allocate proper resources, financial and human, to facilitate the work of the joint committees and the implementation of recommendations
  - f. Enhance the monitoring and evaluation of the implementation of recommendations of joint committees

2. Global level
  - a. Facilitate sharing of experience and good practices among countries and with the international organizations
  - b. Facilitate joint research studies among countries to answer different questions

## REGIONAL COORDINATION

Considering the international and regional importance of MERS, all countries of the the Near East and North Africa region should consider establishing a regional network on MERS-CoV for coordination, information sharing on research, surveillance, new tools, approaches, methodologies, ..etc, the participants recommended the following actions:

1. Establish a sub-committee within the GCC Secretariat with direct link to decision makers and with financial resources to coordinate all activities on MERS and other tranboundary animal disease threats. The sub-committee should have permanent and close coordination with neighbouring countries having important camel populations as well as livestock and camel trade relations
2. Countries should agree collectively on a common approach of one health in responding to the threats of MERS-CoV and other zoonotic diseases
3. Urging the countries of the GCC to respond to the proposal of FAO of a regional program on animal health and food safety to serve as a framework for region specific program on MERS and other emerging disease threats
4. International organizations should establish and update the technical standards for compliance by the countries in such areas as:
  - a. Reporting of MERS-CoV cases
  - b. Harmonization of testing methods
  - c. Quarantine ad animal movement control
  - d. Risk communication and awareness messages
  - e. Vaccination strategy, if any

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