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Report on the

Consultation to develop guidelines for infection prevention and control for viral haemorrhagic fevers in health care facilities

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1. INTRODUCTION

1.1 Background

Viral haemorrhagic fevers (VHFs) are a group of illnesses that are caused by several distinct families of viruses. While some of these viruses can cause relatively mild illnesses, many may cause severe, life-threatening diseases with multiple haemorrhagic disease manifestations. VHFs are examples of some of the emerging infectious diseases around the globe with high public health impact.

The pathogenic viruses associated with VHF are mostly zoonotic in origin with reservoir in animals or arthropods. Although the characteristics of these viruses are well defined, the occurrence of VHF is still unpredictable. Often these diseases show varying epidemiological patterns with unusual and sometimes overlapping clinical manifestations. Most VHFs are epidemic-prone. With its unexpected mode of transmission including high risk of nosocomial acquisition, long term persistence, discovery of new viruses, its ability to cause high fatalities with no specific treatment and vaccines to control its spread, except for yellow fever, make this group of diseases as major public health concern globally.

Human cases of VHFs have occurred frequently in the WHO Eastern Mediterranean Region in the past and often in epidemic patterns. During the past decade, outbreaks of VHFs were reported from at least 12 out of the 23 countries in the Region. These include outbreaks caused by filoviruses, such as the Ebola haemorrhagic fever outbreak in South Sudan in 2004. Other haemorrhagic fevers reported in the Region during the same period were caused by arthropod-borne viruses. These include outbreaks of Alkhurma haemorrhagic fever in Saudi Arabia in 2010; Rift valley fever in Sudan in 2007; yellow fever in Sudan in 2005; dengue/dengue haemorrhagic (DF/DHF) fever in Djibouti, Pakistan, Saudi Arabia, Somalia, Sudan and Yemen almost every year; and Crimean–Congo haemorrhagic fever (CCHF) in Afghanistan, Islamic Republic of Iran, Pakistan and Sudan, in both endemic and epidemic patterns.

These outbreaks of VHF have often resulted in a high number of cases including deaths in the affected countries. There has been a well-documented and published report of nosocomial infections in health care workers in South Sudan during an outbreak of Ebola haemorrhagic fever in 2004, resulting in deaths of a number of health care workers infected.

The high risk of nosocomial outbreaks of CCHF was first recognized in 1976 in Pakistan when a laparotomy was performed on a patient with abdominal pain, haematemesis and melenae. Eleven secondary cases in hospital staff resulted in three deaths, including deaths of a surgeon and an operating-theatre attendant. Since then, similar nosocomial outbreaks were reported in Afghanistan, Islamic Republic of Iran, Iraq, Sudan and in the United Arab Emirates with high mortality among hospital staff. Anecdotal evidence suggests that such transmission occurred in health care workers as a result of contact with infected blood or body secretions from patients while providing medical care in hospitals.

Review of published literature and unpublished data sources shows that many of these nosocomial infections in health care workers were the result of poor application of basic infection control measures, as well as paucity of knowledge and lack of proper understanding among health care workers of the mode of transmission and nosocomial risks of VHFs. These reported incidents underline the need for educating the health care workers on strict implementation of infection control measures within health care facilities while providing care to suspected and confirmed patients with VHFs.

As CCHF is an acute and highly contagious viral zoonosis among the VHFs, endemic in many countries in the Region with frequent reports of nosocomial infections in health care workers, the countries facing such outbreaks of CCHF requested the WHO Regional Office for Eastern Mediterranean for dissemination of evidence based recommendations on appropriate infection control measures in health care for treating CCHF patients. As, currently, no such evidence-based guidance exists at the global level on infection control procedures for CCHF at health care facilities, such requests from the countries seem to be urgent, pressing and indispensable.

Available evidence also suggests that the CCHF may spread further in the Region in the future. Climate factors may contribute further spread of the vector and to a consequent expansion of the geographic range of CCHF from its current transmission focus in Afghanistan, Islamic Republic of Iran and Pakistan to other countries, with the highest risk to be expected in the neighbouring countries with already established endemicity. International travel, increasing human population densities, wider dispersal of competent vectors and increased trans-boundary movement of animals, goods and agricultural products may also further escalate the spread of CCHF in the Region.

The repeated occurrence of VHFs in the Region, especially CCHF, with history of frequent nosocomial transmission of infection among health care workers, continues to threaten regional health security and pose a significant challenge to countries for its efficient control in health care settings.

In view of high risk of amplification of epidemics from these haemorrhagic fevers in health care settings involving human to human transmission, the WHO Regional Director for the Eastern Mediterranean was requested by the WHO Regional Committee for the Eastern Mediterranean to provide technical support to countries for the establishment of evidence-based practices and measures for infection prevention and control in health care settings in order to ensure safer health care for patients, visitors and health care workers. These requests were made by the Fifty-fourth and Fifty-seventh sessions of the Regional Committee in resolutions EM/RC54/R4 (2007) and EM/RC/57/R.6 (2010), respectively. The Regional Office is supporting countries in the Region to implement infection prevention and control programme in health care at both national and facility level.

1.2 Objectives and methods of work

Given the scale, severity and documented evidence of nosocomial infections with CCHF virus in health care workers in the Region, the WHO Regional Office for the Eastern Mediterranean invited a group of experts to attend a technical consultation to develop guidelines for infection prevention and control in health care facilities for viral haemorrhagic fevers. The consultation was held in Cairo, Egypt on 20–21 June 2012. The meeting provided an opportunity to assess the current needs and availability of any existing guidance document on infection control for CCHF which is evidence-informed or has used scientific evidence to provide best recommendations on appropriate infection control practices while providing care to a suspected or confirmed CCHF patient in health care settings. The specific objectives of the meeting were to develop guidance on infection prevention and control for VHFs in health care settings for the countries of WHO Eastern Mediterranean Region, and to develop a training package for health care workers on infection prevention and control for VHFs.

At the time the technical consultation meeting was convened, at least three countries in the Region, Afghanistan, Islamic Republic of Iran and Pakistan, reported human cases of CCHF. Nosocomial infections in health care workers were also reported from the Islamic Republic of Iran. This situation once again highlighted the substantial risks that are associated with health care for CCHF patients when standard infection control measures are either not practiced or ignored. The situation also called for an urgent need for widely disseminating appropriate recommendations and guidance on best practices for safer health care in order to reduce risk of transmission of CCHF infection in health care.

The meeting participants comprised infectious disease experts from selected countries in the Region, infection control professionals working with the WHO collaborating centres, epidemiologists, infection control specialists and public health physicians working with WHO headquarters and the regional offices for the Eastern Mediterranean and Europe. Also attending were WHO staff members with several years of field experience in managing outbreaks of VHF, including CCHF. Many of the meeting participants and WHO staff members were also involved in managing nosocomial outbreaks of VHF in health facilities as well as providing rapid advice on case management including infection control measures for preventing nosocomial infections in health facilities. The meeting programme and list of participants are presented in Annexes 1 and 2, respectively.

The WHO Temporary Advisers attending the meeting completed the required WHO declaration of interests and no conflicts of interest with the subject matter of this meeting or with WHO were identified.

Before and during the meeting, the participants had access to documents and published literature related to the issues discussed from WHO and other sources. A list of these documents and published literature is shown in Annex 3.

2. SUMMARY OF PROCEEDINGS

The meeting recognized that VHFs pose a significant public health challenge to health and health security in the Region, as many of the human cases occur in remote areas with varying epidemiological and clinical patterns and medical services are not often available in those remote areas. This group of disease is zoonotic in origin and as such its occurrences are highly unpredictable. These diseases have high case fatality rates and the potential for human-to-human transmission, and are often caused nosocomial transmissions in health facilities.

Although many types of VHF have been reported in the WHO Eastern Mediterranean Region, CCHF stands out as the most reported condition among the VHFs in the Region. While serological evidence of antibodies to CCHF virus was reported from Sudan only, human cases have been reported from Afghanistan, Bahrain, Islamic Republic of Iran, Iraq, Kuwait, Oman, Pakistan, Saudi Arabia, Sudan and the United Arab Emirates. Nosocomial infections were reported in health care workers from Afghanistan, Islamic Republic of Iran, Pakistan, Sudan and United Arab Emirates. Available reports show that lack of knowledge, awareness and poor application infection control practices in health care facilities are aggravating the risk of nosocomial transmission. Even where the knowledge and skills exist in certain settings, the available knowledge is often not applied by the health care workers. One of the other lessons learnt during these repeated nosocomial outbreaks was the country's lack of priority accorded to infection control in health care as a proper scientific discipline. Wider dissemination of knowledge and skills on evidence-based precautions in an environment that allows effective organization and practice of such precautions would certainly improve the current situation.

A review of current knowledge on infection prevention and control for VHFs was made through searching published reports and literature. The documented incidences and risks of transmission of VHFs to health care workers were analysed from 12 countries over the past 40 years. The majority of these documented cases were CCHF and predominantly occurred when resources and infrastructure were not in place or not appropriately applied owing to lack of culture of self-protection. Although no one single factor or cause led to the exposure of health care workers and their subsequent infection, blood contact and needlestick injuries were found to be the predominant mode of exposure in health facilities. Infections and deaths among health care workers were often the first sign of an outbreak of VHF in many countries. Many of the published accounts lacked information on the modes of transmission of CCHF in health care settings and the recommended infection prevention and control practices that best suit the transmission mode of the CCHF.

Owing to the established endemicity of CCHF in the Region, many countries have accumulated a wealth of experience on managing risk of nosocomial infections among health care workers. While analysing the current infection prevention and control practices in these countries, it was revealed that many of the good infection prevention and control practices in the Region are not documented. There is also underutilization of available knowledge gained

and lessons learnt by these countries to reduce the risk of transmission of CCHF virus in health care settings.

The meeting discussed the currently available recommendations on best infection prevention and control practices for VHF, especially for CCHF. WHO produced, in 2008, interim infection control recommendations for care of patients with suspected or confirmed filovirus (Ebola, Marburg) haemorrhagic fever[1] which provide a summary of infection control recommendations for direct or indirect care to patients with suspected or confirmed filoviral haemorrhagic fever only. These recommendations do not cover diseases such as CCHF, which is caused by arthropod-borne viruses. It was identified that some of the current infection prevention and control practices for CCHF are of good quality, although they may not be evidence-based, as they are drawn from institutional experience. The technical discussions focused on consolidating these practices and translating them into a set of affordable and implementable recommendations on infection prevention and control measures in health care for CCHF through a systematic process. In addition, existing knowledge gaps in some of the key areas of disease manifestation that required probing for more scientific evidence for developing optimum recommendations on infection prevention and control measures were considered.

Through exchange of ideas and sharing of key learning on CCHF disease manifestations globally as well as regionally, the scope of a proposed guidance document on infection prevention and control recommendations in health care was defined along with issues that it would cover, the target audience for its use and the research questions that need to be addressed for advising on best practices for infection control in health care.

The meeting was informed that WHO uses the GRADE approach for the development and review of recommendations, which is based on the systematic review of the scientific evidence. The initial steps are to identify key topics, formulate the Population, Intervention, Comparison and Outcomes (PICO) questions, scope the literature to identify whether evidence reviews exist or recent evidence can be assessed, formulate a comprehensive search strategy, and identify and retrieve relevant evidence, systematically reviewing the evidence using the GRADE method and assessing the values and preferences among key stakeholders.

3. SUMMARY OF RECOMMENDATIONS

A preliminary literature search was conducted before the consultative meeting to get an idea of what scientific information or evidence is currently available in both published and unpublished studies, reports and other text formats that can guide the development of recommendations for this guidance document.

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[1] http://www.who.int/csr/bioriskreduction/interim_recommendations_filovirus.pdf (accessed on03 June 2012)

These preliminary literature reviews provided information on some available scientific evidence that is credible, driven from a methodologically acceptable study process and is of high quality. As such, this evidence can support appropriate recommendations on a host of issues and interventions which would be the focus of the guidance document. Yet, there were areas which require further systematic review to synthesize evidence that can guide the development of best recommendations on the effect of interventions which will be considered in the guidance document. This will also follow the WHO guideline development process, as the summary of this research evidence drawn for developing recommendations will be done in the form of systematic reviews applying the rigorous scientific approach to the selection, appraisal and synthesis of relevant studies.

3.1 Scope of the guidance document

The participants discussed the scope and contents of the guidance document and in doing so agreed on a list of topics that would be included in the document and for which evidence-based recommendations would be provided. These lists of topics are presented below.

- Mode of transmission: health care associated, e.g. contact with body fluids/bloodborne (due to needle-stick injuries)/airborne/opportunistic airborne/aerosol-generating/sexual contact/or any other artificial mode of transmission.
- Early recognition and source control:
  - The importance of precautionary measures for early recognition and source control
  - Early suspicion: case definition/epidemiological linkage/clinical clues/ suspected/probable/confirmed cases through laboratory diagnosis, etc
- Administrative control strategies:
  - infection prevention and control programme and infrastructure;
  - Pre-hospital care;
  - Isolation and patient transportation outside the health care facilities.
- Isolation precautions in hospitals/health care facilities:
  - Purpose and rationale;
  - Definition of isolation in patient care;
  - Organization of patient care;
  - Patient placement in health facilities;
  - Type of isolation: Single isolation versus cohorting of patients;
  - Cohorting of patients and other special measures;
  - Transportation of patients within health care facilities;
  - Patient care when co-infected with other pathogens;
  - Need for dedicated staff for patient management;
  - Type of infection prevention and control precautions – standard precautions versus other type of infection prevention and control precautions;
  - Conditions and situations determining types of infection control precautions;
  - Sterilization, cleaning and disinfection of medical equipment;

  - Patient care during invasive procedures such as blood transfusion services, surgical care services, maternity care services, pregnancy care and renal dialysis;
  - Procedures for routine laboratories in hospitals.
- Exposure management:
  - Definition of exposure and contacts within health care facilities;
  - Post-exposure prophylaxis including pharmaceutical measures;
  - Definition of occupational exposures when dealing with patients confirmed or suspected to be infected with CCHF;
  - Follow-up measures for exposed and contacts;
  - Contact tracing and active case finding;
  - Triage and risk categorization based on triage results.
- Duration of infection prevention and control precautions and patient discharge:
  - Duration of shedding of virus (infectivity and communicability);
  - Duration of infection prevention and control precaution in health facilities and in home settings;
  - Evidence for repeated infections and immunity;
  - Advise to patients infected with CCHF on discharge;
  - Advise to the family members and visitors;
  - Advice to close contacts of patients.
- Environmental and engineering controls:
  - Role of natural ventilation;
  - Triage and waiting areas;
  - Waste management.
- Personal protective equipment:
  - Use of gowns versus all types of personal protective equipment, especially the use of double gloves while handling patients;
  - Use of head covers, face protection (masks and goggles and or/versus face shields);
  - Use of medical masks versus particulate respirators;
  - Disinfection of personal protective equipment, including disinfection of gloves with bleach powder, etc;
  - Procedure for taking off personal protective equipment.
- Non-patient care activities: role of community triage (contact tracing, case finding etc).
- Laboratory activities:
  - Specimen collection/handling/transportation;
  - Bio-safety issues in advanced laboratories.
- Care of the deceased:
  - Removal of the body from the isolation room/area;
  - Measures for handling human remains and burial precautions;
  - Mortuary care;
  - Social behaviour for funerals;
  - Measures during post-mortem examination.

The target audience of this proposed guidance document was identified to be the ministries of health in Member States of WHO Eastern Mediterranean Region, including the

health care managers and health care workers involved in providing care to suspected or confirmed patients infected with CCHF.

3.2 Formulation of research questions

Once the scope of the guidance document was defined, the following research questions were identified by the meeting participants to be considered for systematic reviews in order to gather scientific evidence on the effect interventions on which the recommendations need to be based.

- What would be the best recommendations for post-exposure prophylaxis of health care workers and possibly others (including patients and visitors) when exposed to the risk of infection with a confirmed or suspected CCHF patient?
- When providing care to CCHF patients in health care, what types of patient isolation measure-single isolation or cohorting of patients or any other specific isolation measure, are associated with reduced risk of transmission?
- What type of infection control precautions (standard precaution alone or any other types or a combination of different types of precautions) should be recommended for health care workers when providing care to CCHF patients in health care settings?
- Does the use of double gloves, compared to single gloves, provide better protection to health care workers when treating a patient with CCHF infection?
- What is the best procedure for putting off personal protective equipment that are associated with reduced risk of contamination of self, others and environment when providing care to CCHF patients in health care settings?
- What special measures need to be taken for protection of health care workers when considering invasive procedures for CCHF patients like renal dialysis, surgical care, intravenous blood transfusion, pregnancy related maternity care, neonatal care, etc?
- What is the duration of shedding of CCHF virus in human bodies (that entails period of infectious stage) that may have policy implications on the duration of infection control precautions and timing of patient discharge from hospitals?
- What specific infection control measures are necessary for conducting an autopsy and handling of human remains and burial for confirmed CCHF patients if there are risks of exposure to infection associated with these measures?

The above research questions would be converted into answerable questions using the WHO's PICOT framework for finding the research evidence on the effect of interventions being considered, systematic assessment and later on synthesizing these evidence into a set of recommendations for the guidance document. Where appropriate, any other relevant PICO questions which are identified later would be considered for systematic reviews for inclusion in the scope of the guidance document.

3.3 General outline of the guidance document

The meeting participants discussed to include the following subject matter in the guidance document for better clarity and to avoid ambiguity.

- Definition of health care workers
- Explanation of health care settings, health care, ambulatory care, etc.
- Provision of care at home settings
- Importance of infection prevention and control programme at national and health facilities level and how the guidance would promote best standards for infection prevention and control
- Early clinical signs and symptoms of CCHF and some information on the survival of virus on the environment
- Actions to be undertaken by the hospital authority when dealing with a suspected or confirmed case of CCHF in the hospital
- Transmission patterns of different types of VHF and the difference in disease manifestation of different types of VHF
- Operational note when personal protective equipment is stored in a different place and not easily accessible
- Health care facility preparedness plan for CCHF (stockpiling and other issues)
- Need for regular staff update (continued professional training, education etc.)
- Ways to address stigmatization against patients when isolations precautions are recommended for the contacts
- Use of algorithm as a decision tree for triage and risk assessment, etc.
- Methods and ways to conduct risk assessment
- Links to other public health programmes
  - Recommendations for a) for primary health care centres; b) secondary or tertiary health care facilities; c) high dependency unit; d) transportation of patients; d) public health authorities;
  - Recommendations for countries with more frequent episodes of CCHF
  - Recommendations for countries with imported case of CCHF
- Links to case management protocol
- Current research gaps
- Disclaimer: the scope of the guidance document is CCHF but can be expanded to develop more comprehensive infection prevention and control guidelines for all types of VHF
- Available evidence and quality of evidence for recommendations, presented in the form of a table in the annexes

3.4 Other recommendations

As a spinoff effect, the meeting agreed on developing the following products as part of the guidance development process.

- database on published and other unpublished information on VHFs and CCHF reported in the Region through establishing a secure web portal
- tools for implementation of guideline: technical module on the guideline for training purposes as well as information, education and communication messages to influence the behaviour of health care workers

- generic study protocol (data collection tools), ready to use, during outbreaks for detecting the risk factors for transmission
- policy briefs for developing curriculum at undergraduate level on infection prevention and control in health care, specially targeted at VHFs
- training package for health care workers as part of continuing professional education

4. CONCLUSIONS AND NEXT STEPS

The meeting was the first step towards developing an evidence-based guidance document on infection prevention and control in health care for VHFs, especially those caused by arthropod-borne viruses such as CCHF, using the WHO guideline development process. Although this guidance document will principally address the needs of countries in the Region, it can also meet the global need as currently no such guidance on CCHF exists at the global level.

A guideline development group will be established by the Regional Office to guide the development of the guidance document as well as oversee the systematic review of the selected research questions and formulate recommendations, taking into account diverse values and preferences according to GRADE.

Upon finalization of the meeting report and scope of the guidance document, the research questions will be converted into answerable questions using the PICOT framework. The Regional Office would then commission a systematic review process to look for the missing evidence using an acceptable study protocol.

Once the necessary scientific and research evidences are assessed, retrieved and synthesized following the systematic reviews, the Regional Office will commission a group of experts with the task of developing the guidance document on infection prevention and control in health care for CCHF following the WHO guideline development process.

An external review group will also be constituted for peer review of the developed document before it is submitted to the Guidelines Review Committee of WHO for final approval.

By early 2013, another technical consultative meeting will be convened to review the guidance document before submission to the Guidelines Review Committee for final approval.

Annex 1

PROGRAMME

Wednesday, 20 June 2012

08:30 – 09:00	Registration	
09:00 – 09:30	Opening session Opening remarks Message from the Regional Director, WHO/EMRO Presentation of the objectives and agenda Introduction of participants	
09:30 – 10:15	Why do we need the guideline? Overview of the epidemiological situation of VHF	*Dr H. El-Bushra, WHO/EMRO*
10:30 – 11:15	WHO guideline development process: an overview	*Dr Sergey Eremin, WHO/HQ*
11:15 – 12:30	Current knowledge of infection prevention and control for VHF: review of the literature	*Dr Gail Carson, HPA, UK*
12:30 – 13:00	General discussion	
14:00 – 14:30	Experience from outbreaks of CCHF in the Region: lessons learnt, questions remaining	*Dr Tamer Saeed, NAMRU-3, Egypt*
14:30 – 15:30	Sharing experience from outbreaks of CCHF and other VHF in the Region and other regions	*Short presentations from the participants*
15:30 – 16:00	Knowledge gaps and controversies: general discussion	
16:00	End of Day 1	

Thursday, 21 June 2012

09:00 – 09:30	Presentation of the draft scope of the guideline by the WHO Steering Group	*Mamunur Malik, WHO/EMRO*
09:30 – 10:30	What the guideline should – and should not – cover? General discussion of the scope	
10:45 – 11:30	Refining the scope: general discussion	
11:30 – 13:00	Defining questions to address: general discussion	
14:00 – 14:45	Determining questions for systematic reviews: general discussion	
14:45 – 15:30	Formulating PICO(T) questions	
15:30 – 16:00	Draft GDG workplan and next steps	*Mamunur Malik, WHO/EMRO*

Annex 2

LIST OF TEMPORARY ADVISERS

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Dr Sergey Eremin, Medical Officer, Infection Prevention and Control in Health Care, WHO/HQ
Ana Paula Coutinho, Technical Officer, Infection Prevention and Control, Regional Office for Europe
Professor Natalia Pshenichnaya, Project Officer, Climate Change and Health, WHO Office in the Russian Federation, Moscow
Dr Mamunur Malik, Medical Officer, Communicable Disease Surveillance, Forecasting and Response, WHO/EMRO
Mrs Weaam El Metenawy, Senior Secretary, Division of Communicable Disease Control, WHO/EMRO

Annex 3

DOCUMENTS CONSULTED BY THE PARTICIPANTS

WHO documents

Core components for infection prevention and control programmes. Geneva, World Health Organization, 2009(WHO/HSE/EPR/2009.1) http://www.who.int/csr/resources/publications/WHO_HSE_EPR_2009_1/en/index.html accessed 4 June 2012

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