

Middle East Respiratory Syndrome Coronavirus (MERS-CoV)

Preparedness and Response Plan



Ethiopian Public Health Institute (EPHI)

July 2014

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Introduction

Coronaviruses are found worldwide and causing a range of illnesses in humans, animals and rodents. In humans, coronaviruses can cause mild to severe illness like common cold as well as severe acute respiratory syndrome (SARS). The new strain of Coronavirus MERS-CoV (formerly called “novel coronavirus”) was first identified in September 2012 among individuals with severe acute respiratory illness in Kingdom of Saudi Arabia. The infected individuals developed severe acute respiratory illness with symptoms of fever, cough, and shortness of breath. A small number of the reported cases however also had a mild respiratory illness.

The MERS-CoV appears similar to coronaviruses found in bats however; genetic sequence analyses have shown that the new virus is different from other known human coronaviruses, including SARS. No vaccines and specific antivirals have been developed as yet and therefore, the supportive treatment remains the mainstay of case management.

The available evidence suggests that the virus is capable of limited human to human transmission. Besides spread among close family contacts and healthcare workers, MERS has also been transmitted to other countries through travelers infected in Arabian Peninsula and neighboring countries. The WHO however, neither recommends any travel restrictions to the affected countries nor any special screening at the airports. The current global efforts are accordingly aimed at strengthening Severe Acute Respiratory Infection (SARI) surveillance especially among people traveling to Arabian Peninsula. Considering the large number of travelers visiting the identified high risk countries and the large number of Umrah attendees during Ramadan and the subsequent Hajj, necessary preparations need to be undertaken by all stakeholders.

Rationale of the plan

Currently MERS-Coronavirus has been affecting sizable community in different countries especially middle east countries. Saudi Arabia is one of the most affected countries. Many Islamic religion followers will travel to Saudi Arabia from the corner of the world to attend Hajj and Umrah ceremony.

Gathering of the large population together is one of the possible favorable conditions for the virus to be transmitted to other new countries. Likewise approximately 10,000 people from different part of Ethiopia are expected to attend the coming (September - November 2014) Hajj and Umrah pilgrimage. Since Saudi Arabia is the most affected country, there is a possibility that the virus will be transmitted from the sick to the health individuals. Even though, the MERS-Coronavirus is not detected from human so far in Ethiopia, the travelers to Hajj and Umrah pilgrimage might be affected and then comeback with the virus.

Hence, sensitization of Hajj and Umrah travelers, health workers, airline crew members, community in general and strengthening the overall surveillance system is very crucial to early detect and respond to the disease.

General Objective

To strengthening the surveillance system and response capacity to early detect and respond to Middle East Respiratory Syndrome Coronavirus outbreak in Ethiopia.

Specific Objectives

- To sensitize the public at large, pilgrims, health workers and airline crew members on MERS coronavirus,
- To strengthen laboratory capacity and ensure the availability of essential lab supplies for the MERS diagnosis,
- To strengthen surveillance system against MERS-Corona Virus by providing guideline, reporting formats and sensitizing health workers
- To prevent and control the spread of the MERS-Coronavirus by prepositioning appropriate infection prevention supplies,
- To prevent avoidable morbidity and mortality associated with MERS-Cov.

Activities

- Set responsible coordination mechanisms (establish working groups)
- Prepare the Action plan to implement the prevention and control of the diseases
- Prepare guideline, leaflets, health education materials etc
- Advocate and sensitize the public, Hajj and Umra travelers,
- Establish new temporary sentinel sites for SARI surveillance
- Establish sample collection and reference system
- Ensure the availability of isolation sites
- Provide training for health workers on MERS coronavirus guideline.
- Provide orientation to airline crew members
- Ensure drugs and medical supplies for case management and infection prevention
- Stockpile laboratory equipment, reagents and consumable supplies
- Review of the overall activity with all the stakeholders

Strategies

- Preparation and distribution of health education materials for public, hajj and umra travelers
- Preparation and distribution of guideline, reporting and investigation formats to health facilities
- Training of trainer for participants from regional health bureaus, regional laboratories and SARI sentinel sites health workers
- Cascading the training for clinician, laboratory personnel and surveillance officers from hospitals.
- Drug and medical supplies procurement and distribution.

Details of the Activities

a. Sentinel Site

There were five previously SARI sentinel sites for the follow up of influenza and new viral infections as indicated in the table below. EPHI has a plan to add one more hospital in Addis Ababa, which is St Paul Hospital as permanent SARI site.

Taking into account the wide distribution of Hajj Umra within the country it is important that more temporary SARI be opened. Accordingly six more SARI sites will be considered by assuming that majority of Hajj and Umra travelers will be from Jimma, South Wollo, Bale zones, Dire Dawa Town and the surrounding and Harari town its surroundings.

The following Hospitals are selected as a temporary SARI sites in addition to five previous sites.

SARI Sites	Region	Zone
Temporary SARI Sites		
1. St. Paul Millennium Medical College Hospital	AA	AA
2. Jimma Teaching Hospital	Oromia	Jimma
3. Robe Hospital	Oromia	Bale
4. Desse Hospital,	Amhara	South Wollo
5. Hiwot Fana Hospital	Harari	Harari
6. Dil Chora Hospital	Dire Dawa	Dire Dawa
Previous SARI Sites		
7. Yekatit 12 Medical College Hospital	AA	AA
8. Adare Hospital	SNNP	Hawasa
9. Adama Teaching Hospital	Oromia	East Shewa
10. Felegehiwot Hospital	Amhara	Bahirdar
11. Mekele Hospital	Tigray	Mekele

b. Budget break down

The activities required a total of 6,202,570 birr. For the detail information see table 1 to 10 below.

Table 1: Advocacy and Community Sensitization

Communication Materials	Number of Copies	Unit	Cost per unit	Total Cost	Contingency	Total
Leaflet for Public	60,000	Piece	4	240,000	12,000	252,000
Leaflet for Hajj Umra Travelers	20,000	Piece	4	80,000	4,000	84,000
Leaflet for Crew Members	5000	Piece	4	20,000	1,000	21,000
Leaflet for Health Workers	20,000	Piece	4	80,000	4,000	84,000
Total				420,000	21,000	441,000

Table 2: Surveillance and Communication

Documents to be printed	# of Copies		Cost per unit	Total Cost	Contingency	Total
Guideline	10,000	Piece	40	400,000	20,000	420,000
Case Investigation form	865	Pad of 50	35	30,275	1,514	31,789
Contact Tracing	865	Pad of 50	35	30,275	1,514	31,789
Laboratory Report	865	Pad of 50	35	30,275	1,514	31,789
Format for Travelers	865	Pad of 50	35	30,275	1,514	31,789
Total				521,100	26,055	547,155

Table 3: Sample Collection and Transportation

Category of Sample transportation	# of shipment (estimated)	Cost Per shipment	Total
Local transportation	100	2450	245,000
To send to abroad	10	5000	50,000
Total			295,000

Table 4: Training of trainers

Region	Number of Participants	Transport Day	Training Day	Perdium	Transport Cost	Stationery	Refreshment	Lunch	Accommodation (bed)	Toata Cost
Addis Ababa	9	2	3	7920	18000	720	4050	6750	12150	49590
Dire Dawa	6	2	3	5280	12000	480	2700	4500	8100	33060
Harari	6	2	3	5280	12000	480	2700	4500	8100	33060
Oromia	12	2	3	10560	24000	960	5400	9000	16200	66120
SNNP	6	2	3	5280	12000	480	2700	4500	8100	33060
Afar	3	4	3	4380	6000	240	1350	2250	4050	18270

Benishangul Gumuz	3	4	3	4380	6000	240	1350	2250	4050	18270
Gambella	3	4	3	4380	6000	240	1350	2250	4050	18270
Somali	3	4	3	4380	6000	240	1350	2250	4050	18270
Tigray	6	4	3	8760	12000	480	2700	4500	8100	36540
Amhara	9	4	3	13140	18000	720	4050	6750	12150	54810
Airlines/ aviation / airports	3	4	3	4380	6000	240	1350	2250	4050	18270
FMHACA	2	4	3	2920	4000	160	900	1500	2700	12180
MOA	2	4	3	2920	4000	160	900	1500	2700	12180
Islamic Aff council	1	4	3	1460	2000	80	450	750	1350	6090
MOH	2	4	3	2920	4000	160	900	1500	2700	12180
EPHI	6	4	3	8760	12000	480	2700	4500	8100	36540
MOD	2	4	3	2920	4000	160	900	1500	2700	12180
St Peter Hospital	2	4	3	2920	4000	160	900	1500	2700	12180
Total	86			102940	172000	6880	38700	64500	116100	501120

Assumptions for training of trainers

- Participants: 86 (3 participants from each regions and SARI sites which includes Clinician, Laboratory personnel, PHEM officer, and 16 from line ministries and others)
- Required day: 6 Day (three days for training and three days for transport)
- Per diem rate: 290 birr per person per day on transport and 100birr per person per day on training
- Transport cost: approximately 2000 birr per participants
- Stationery: 80 birr per participants (55 birr for binder, 20 birr for Note book, 5 birr for pen)
- Refreshment cost: 150 birr per participants per day for three days
- Lunch: 250 birr per participant per day for three days
- Bed: 450 per participants per day for four nights

Table 5: Cascading Training

Region	Number of Participants	Day (Including Transport day)	Per diem	Transport Cost	Stationery	Refreshment	Total Cost
Addis Ababa	105	5	152250	10500	2625	25200	190575
Dire Dawa	12	5	17400	1200	300	2880	21780
Harari	15	5	21750	1500	375	3600	27225
Bale	18	5	26100	1800	450	4320	32670
Jimma	15	5	21750	1500	375	3600	27225
South Wollo	18	5	26100	1800	450	4320	32670
Airline crew members	100	5	145000	10000	2500	24000	181500
MOA	30	5	43500	3000	750	7200	54450
MOD	30	5	43500	3000	750	7200	54450
St Peter Hospital	30	5	43500	3000	750	7200	54450
Facilitators	30	5	43500	3000	750	7200	54450
Total	403	55	584350	40300	10075	96720	731445

Assumptions for cascading training

- Hospitals (Government and Private Hospitals)
- 3 participants from each hospitals (Clinician, Laboratory personnel, Surveillance officer)
- Other participants and 3 facilitators per training sites
- Day (three days for training and two days for transport)
- Per diem (290 birr per person for five days)
- Transport cost (approximately 100 birr for each participants)
- Stationery 25 birr per participants (Note book 20 birr, pen 5 birr)
- Refreshment 80 birr per participants per day for three days

Table 6: Drugs and supplies for Case management

Items	Unit	Amount Required	Unit Cost	Total Cost
IV fluid	Each	2500	30	75000
Cannula	Each	500	280.72	140360
Amoxiciline 500mg	Tin of 500 tablets	28	360	10080
ORS	Sachet	2500	3.5	8750
Paracetamol	Strip of 10 tablets	500	2	1000
Ceftioxone	Vial	7000	7.25	50750
Syringes 5ml	Box of 100	70	110	7700

Total	293,640
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Assumptions for drugs and medical supplies for case management

- Traveler: 10,000
- Exposed: 50,000 (10,000 x 5 family members)
- Affected: 5,000 (10% of exposed peoples)
- Severe Cases: 500 (10% of affected [eaople])
- Sample: 500 (All severe cases will be sampled)
- Paracetamol: 10 tablets per patient
- Ceftriaxone: 14 vial per patient, syringe is equal to ceftriaxone
- Amoxiciline: 28 tablets per patient
- IV Fluid and ORS: 5 bag per patient

Table 7: Infection prevention and control materials

Items	Unit	Amount Required	Unit Cost	Total Cost
Absolute Alcohol	Bottle lt	110	470	51700
Absolute ethanol	liter	4	3400	13600
Hypoclorite	Bottle lt	220	320	70400
Powderless gloves (small)	Box of 100 pairs	55	1900	104500
Powderless gloves (medium)	Box of 100 pairs	55	1900	104500
Powderless gloves (large)	Box of 100 pairs	55	1900	104500
Heavey duty Gloves	Each	110	45	4950
Autoclave gloves	Each	1	900	900
Cryogenic gloves	Each	1	3600	3600
Mask (N95)	Box of 20	150	2000	300000
Eye Goggle	Each	110	50	5500
Boots	Pair	200	200	40000
Cover all (PPE suit)	Carton	10	3000	30000
Apron Plastic	Each	550	100	55000
Apron Cloth	Each	550	100	55000
Total				944,150

Assumptions for infection prevention

- Absolute Alcohol: 10lt per SARI sites
- Hypochlorite: 20 lt per SARI sites
- Heavey duty Gloves: 10 for each SARI sites
- Gloves all size: 5 boxes per SARI sites
- Mask (N95): 3 boxes per SARI sites
- Eye Goggle: 10 per SARI Sites
- Apron all type: 50 per SARI sites

Table 8: Laboratory reagent and supplies (for 500 samples)

ITEMS	Unit	Requir ed	Unit Price	Total Cost
RNA extraction kit	kit of 250 reactions	5	5400	27000
RT_PCR kit	box	7	2400	16800
Safe-lock 1.5ml eppendorf tubes	500/pack	5	1480	7400
Cryogenic vials, internal thread, flat bottom 1.8ml	500/pack	5	3600	18000
Universal viral transport medium (VTM)	box of 50	30	2700	81000
Plastic specimen transportation bags	pack pf 1000	3	540	1620
Isothermal packaging, for category A infectious substances	number	30	1800	54000
Sterile dacron-tipped applicator swabs	case of 1000	2	3700	7400
Sterile wooden tongue depressors	case of 1000	4	2000	8000
Pre-packed aerosol, self-sealing, barrier filter pipette tips (ART 20P)	4 case per box	20	10800	216000
Pre-packed aeorosol, self-sealing, barrier filter pipette tips (ART 200P)	4 case per box	20	10800	216000
Pre-packed aerosol, self-sealing, barrier filter pipette tips (ART 1000P)	4 case per box	20	9200	184000
Fast PCR plates for AB 7500 machine	pack of 20	25	1360	34000
MicroAmp Optical adhesive film for fast plates	box of 100	5	1080	5400
Thin-walled 8-tube PCR strip tubes	pack	5	1900	9500

Prepare the Action plan to implement the prevention and control of the diseases								
Preparation of Guideline, reporting and investigation formats health education materials								
Ensure the availability of isolation sites								
Procurement order (lab supplies, reagents, equipments)								
Establish new temporary sentinel sites for SARI surveillance								
Printing and distribution of materials								
Advocate and sensitize the public, Hajj and Umra travelers								
Training of trainers								
Cascading the training								
Provide orientation to airline crew members								