# Cross-sectional surveillance for Middle East Respiratory Syndrome Coronavirus in Camels and Associated Livestock in Ethiopia

Elias Walelign[1*], Nega Tewolde[1], Getachew Gari[1], Tadele Mirkena[1], Scott Newman, Getachew Abebe[1]; Tesfaye Rufael[2l], Mesfin Sahile[2], Solomon Gebre[2]; Yismashewa Wegayehu[3], Wondwossen Bekele[3]; Emma Gardner, Sophie VonDobschuetz[4]; Yilma Makonnen[5]

1Emergency Centre for Transboundary Animal Diseases (ECTAD-Ethiopia), Food and Agriculture Organization (FAO), Addis Ababa, Ethiopia; 2 National Animal Health Diagnostic and Investigation Centre, Sebeta, Ethiopia; 3Ministry of Livestock and Fisheries Addis Ababa, Ethiopia; 4 Food and Agriculture Organization (FAO), Rome, Italy; 5Regional ECTAD Office for Eastern Africa, FAO, Nairobi Kenya

## Background

As part of the epizonal approach to determine the presence or absence of MERS CoV RNA and its neutralizing antibodies in East and North Africa and the Middle East, a cross-sectional surveillance study was conducted in Ethiopia from March 2016 to September 2017. The study was jointly carried by the NAHDIC and **the Food and Agriculture Organization (FAO)** under the **United States Agency for International Development's Emerging Pandemic Threats programme (USAID EPT-2)**. A total of 1145 camel sera were tested using Anticamel IgG ELISA. Additionally, 1697 camel nasal swab samples and 515 nasal swab samples from other species of animals (Goats, Sheep, cattle and donkeys) were also analysed by real time RT-PCR at the National Animal Health Diagnostic and Investigation Centre (NAHDIC). The study showed high level of anti MERS CoV antibodies detection in dromedary camels. However, unlike some other previous studies in the country, none of the study animals including camels were positive for MERS CoV RNA using molecular techniques. This could be associated with the brief viral shedding window period and difference in season of sample collection with the other studies.

***Contact information***: FAO-ET@fao.org

## Objectives

- To detect serological and virological evidence of MERS Co-V in camels and other livestock species (ruminants and equids) at different nodes along the value chains including markets, holding ground, aggregation points near water or grazing lands; and
- To use preliminary MERS CoV surveillance results to better target future surveillance studies

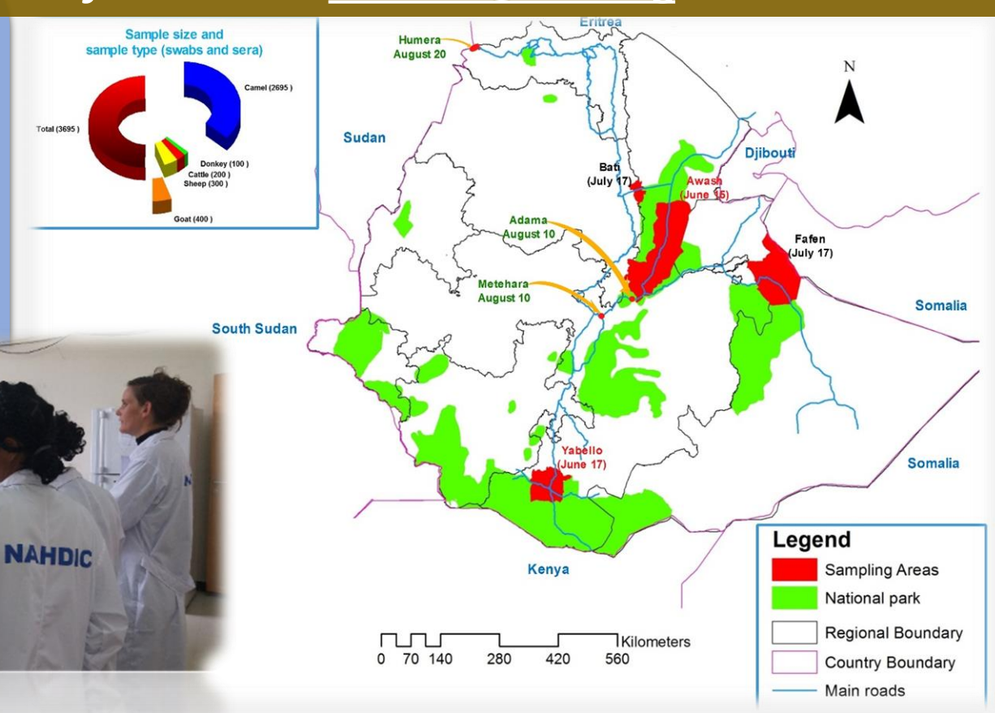


Figure 1. Map showing the locations of the sampling areas


## Methodology; *Cross-sectional surveillance study*

### *Study areas selection criteria*

- High camel populations;
- Contact between camels and d/r herds, people and other livestock species;
- Close proximity to national parks inhabited by potential bat reservoirs

### *Sample size considerations;*

- FAO epi guideline and its recommendation to use EPiTools

## Serological analysis

- Analysed using the anti-MERS-CoV ELISA Camel (IgG) manufactured by EUROIMMUN AG (country where the kit is from) to detect specific antibodies.
- Based on the S1 antigen of MERS-CoV

## Molecular analysis

- Analysed using the Real-time reverse transcription PCR (RT-PCR) targeting upstream of E gene of MERS CoV

## Result

Table 1. Summary of MERS CoV serology results by region in Ethiopia

| Region | Number of animals tested | Positive | %Positivity |
|---|---|---|---|
| Afar | 157 | 78 | **49.7** |
| Amhara | 275 | 189 | **68.7** |
| Oromia | 162 | 82 | **50.6** |
| Somali | 303 | 260 | **85.8** |
| Tigray | 187 | 159 | **85** |
| **Total** | **1084** | **768** | **70.8** |

## Conclusion

- MERS CoV sero-prevalence is very high in camels in Ethiopia, ~70.8% in the study areas;
- No MERS CoV RNA was detected in this study which considerably varies from other studies;
- In areas with predominant male camel population the sero-prevalence was higher (75.32% > 67.58%)
- Higher seropositivity was shown in adult camel populations, a finding which is in agreement with other studies

## Follow-up activities

Based on the results from this study and other up-to-date scientific information on MERS CoV epidemiology and risk factors analysis, upcoming studies in Ethiopia will focus on;

1. Longitudinal surveillance studies;
2. Comparative anthropological studies; and
3. Advanced genetic characterization

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