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**Simulations of Middle East Respiratory Syndrome Corona Virus Spread and Control in Camels in the Emirate of Abu Dhabi, United Arab Emirates**

Yassir M. Eltahir1\*& Meera Saeed Mohamed 1

\*Lead presenter: [yassir. eltahir @adafsa.gov.ae](mailto:meera.ahmed@adafsa.gov.ae); Animals Extension and Health Services Division, Abu Dhabi Agriculture and Food Safety Authority (ADAFSA), Abu Dhabi P.O. Box 52150, United Arab Emirates.

**Abstract:**

**Background/Objective:** Middle East Respiratory Syndrome Coronavirus (MERS-CoV) is a zoonotic infection in which bats and dromedary camels played essential roles in its emergence and epidemiology. Since 2013, a total of 94 confirmed human cases and 12 deaths have been reported in the United Arab Emirates (UAE). In contrast a high seroprevalence (97.1%) & (1.6%) molecular prevalence of MERS-CoV in camels were reported in UAE. The UAE ranks third in proven human cases globally. Despite reporting of MERS-CoV in both humans and camels in the UAE, no simulation spread studies were conducted to explore suitable strategies to control MERS-COV.

**Methods:** Camels’ data used in the study in terms of number and age groups was harboured by the Animal Identification and registration System (AIRIS) which belong to the Abu Dhabi Agriculture and Food Safety Authority (ADAFSA). In order to choose the suitable MERS-CoV control strategy which can minimize the epidemic length and the number of affected camel farms, the North American Animal Disease Spread Model (NAADSM) framework was used to run a customized stochastic model for UAE to simulate MERS-CoV spread among camels population in the Abu Dhabi Emirate. Three different scenarios of MERS-CoV control strategies were simulated. These included implementing no control measure (scenario 1), restricted animal movement (scenario 2) & (scenario 3), which applies vaccination and animal movement control.

**Results:** Animals’ movement control was found to be the optimum strategy to control MERS-CoV spread. In such a scenario, the outbreak duration was reduced from 288 days in scenario 1 to only 36 and the number of infected farms were also reduced from 3141 to 6 farms. Scenario 3 was not considered as an optimum scenario because, despite the high cost of vaccination, the control measure did not include a significant reduction in the number of infected animals.

**Conclusion** Selecting the implementation of the optimum MERS-CoV control strategy in camels requires considering both the strategy’s effectiveness and its cost. Indeed, animal disease spread simulation can aid policymakers in formulating effective eradication policies and increasing biosecurity.

**Keywords:** *Middle East Respiratory Syndrome Coronavirus; simulation spread; Abu Dhabi Emirate*