

### Seroepidemiological study to identify Middle East Respiratory Syndrome-Corona Virus (MERS-coV) transmission in Jordan, Israel and Palestinian Authority

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# Background

- MERS-CoV was first isolated in 2012 in Saudi Arabia from a patient with pneumonia and has spread mostly in SA and the Middle East.
- Cases detected outside the Arabian Peninnsula were associated with:
  - Travel to an endemic Middle East country
  - Contact with infected persons (secondary transmission).

#### **Clinical picture**

- Incubation period 2-14 days (usually 5-6 days)
- Fever (>38°C) 98%, cough, shortness of breath
- Abnormal chest radiograph -100%

Zaki MA et al. NEJM 2012

#### **CONFIRMED GLOBAL CASES OF MERS-COV 2012 - 2017**



Map Scale (A3): 1:1,109,175,783 1 cm = 11,092 km coordinate System: GCS WGS 1984 Latum: WGS 1984

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement. Data Source: World Health Organization © WHO 2017. All rights reserved. Map date:17/11/2017



The Middle East Consortium for Infectious Disease Surveillance (MECIDS) was established in 2003 by health professionals from the Ministries of Health and academia of Jordan, Palestinian Authority and Israel to fulfill the goal of facilitating trans-border cooperation in response to disease outbreaks.

A platform of collaboration that proved to be instrumental when addressing **regional emerging infectious diseases** such the case of H5N1 avian flu (2005), the H1N1 pandemic influenza (2009) and transmission of foodborne diseases (e.g. salmonellosis)

Cohen D, Gargouri N, Ramlawi A, Abdeen Z, Belbesi A, Al Hijawi B, Haddadin A, Sheikh Ali S, Al Shuaibi N, Bassal R, Yishai R, Green MS, Leventhal A. A Middle East subregional laboratory-based surveillance network on foodborne diseases established by Jordan, Israel, and the Palestinian Authority. **Epidemiol Infect. 2010;138(10):1443-8.** 

Leventhal A, Ramlawi A, Belbiesi A, Sheikh S, Haddadin A, Husseini S, Abdeen Z, Cohen D. Enhanced surveillance for detection and management of infectious diseases: regional collaboration in the middle East. **Emerg Health Threats J. 2013;6**.

Leventhal A, Ramlawi A, Belbiesi A, Balicer D. R. Regional collaboration in the Middle East to deal with H5N1 avian flu. **BMJ. 2006;333:8568.** 

### Aims

• Detection of potential transmission of MERS-CoV in the 3 countries with special emphasis on high risk groups.

#### Pilgrims (Hajj and Umra)

- Potential contact with MERS-CoV patients
- Crowded living conditions

#### People working with camels

- There were preliminary studies showing seropositivity among camels in southern Israel (Dr. Evgeny Khinich, Dr. Dan David the Veterinary Services)
- What is the extent of subclinical infection with MERS-coV ?

## Methods (1)

- Development of a joint protocol; IRBs approvals
- Healthy pilgrims to Mecca 2015
  - interviewed
  - screened for antibodies to MERS-CoV
    - before they departed for Mecca
      (n= 478)
    - 1-3 months after their return (n= 522)
- Visitors to Mecca in 2013 and 2014 (n= 287)
- Inhabitants of settlements where MERS-CoV detected in camels (Israel) (n= 265)
- Camel owners or handlers (n= 58)
- Subjects from general population (n= 614)

The study was statistically powered (80%) for detection of 2% seropositivity with a 95% CI of 1-3% at an alpha of 0.05.

### Methods (2)

- Initially
  - Sera were tested for MERS-CoV IgG by ELISA (Euroimmun, Germany)
- Further
  - Sera with positive results sent for confirmation by the plaque reduction neutralization test (PRNT) at the Department of Viroscience, Erasmus MC, Rotterdam, Netherlands.

# Results

- Seropositive MERS-CoV IgG samples were detected by ELISA in :
  - Two healthy asymptomatic female volunteers from the general population in Jordan
    - age 38, 50 respectively
  - A pilgrim female patient Israel (age 53) who had influenza-like illness while being in Saudi Arabia.

#### All the 3 positive results by ELISA were negative by the PRNT

 Around 30% of pilgrims experienced respiratory morbidity during their stay in Saudi Arabia but all were seronegative for MERS-CoV lgG.

Additional studies are still underway at the Erasmus MC Laboratory Rotterdam, Netherlands to re-examine selected sera with borderline results by ELISA

### **Conclusions & Lessons Learned (1)**

- Despite the mass gathering and extremely intensive population "mixing", pilgrimage to Mecca was not associated with an increased risk of MERS-CoV acquisition.
- No subclinical infection detected in samples from the general population
- No camel to human transmission was identified by screening with Euroimmun ELISA. Studies are still underway with more sensitive and specific assays at the Erasmus MC Laboratory Rotterdam, Netherlands.
- More studies needed to further examine transmission of MERScoV in the region (more than a one-year study).

### **Conclusions & Lessons Learned (2)**

- The high risk populations (pilgrims and camel shepherds) should be aware of MERS-CoV modes of transmission and maintain hygiene-related preventive measures.
- MECIDS platform was instrumental in obtaining important public health information on the risk of regional transmission of the virus.
- The same platform and approach could be expanded to study transmission of other respiratory pathogens in the region (e.g. influenza/ILI etc.)

### **Acknowledgments**



# Thanks are due to the study groups in Israel, Jordan and Palestinian Authority

Special thanks to Dr. Bart Haagmans and his group at the Department of Viroscience, Erasmus MC, Rotterdam, Netherlands.

**Financial support**: A grant from Skoll Global Threats Fund and the Rockefeller Foundation through Connecting Organizations for Regional Disease Surveillance (CORDS) conferred to the Middle East Consortium for Infectious Diseases Surveillance





rganization

Other countries: Algeria, Austria, Bahrain, China, Egypt, France, Germany, Greece, Iran, Italy, Jordan, Kuwait, Lebanon, Malaysia, Netherlands, Oman, Philippines, Qatar, Thailand, Tunisia, Turkey, United Arab Emirates, United Kingdom, United States of America, Yemen

Please note that the underlying data is subject to change as the investigations around cases are ongoing. Onset date estimated if not available.