

## Middle East Respiratory Syndrome-Coronavirus in an Extended Family: Risk Factors for Household Transmission – Saudi Arabia, 2014

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**Summary:** In spring 2014, CDC disease detectives worked alongside Saudi Arabia Ministry of Health colleagues to investigate an outbreak of MERS in a Saudi extended family and were able to assess household interactions that may be important for spread of MERS. Since then, MERS cases have continued to be identified in the Middle East.

### Abstract:

**Background:** Risk factors for human-to-human transmission of Middle East respiratory syndrome–coronavirus (MERS–CoV) are unknown. When MERS–CoV infections occurred in 4 households of one Saudi extended family within 1 week, we aimed to identify undiagnosed cases and determine transmission risk factors.

**Methods:** We tested relatives who lived in or visited affected households for MERS–CoV by using reverse-transcriptase–polymerase chain reaction (RT–PCR) for viral RNA and serologic tests for MERS–CoV antibodies. We assessed demographic characteristics and exposures to each household’s index patient and compared these exposures in the MERS–CoV-positive and –negative adults by calculating risk ratios.

**Results:** Among 79 relatives, 19 (24%) were MERS–CoV-positive (11 by RT–PCR, 8 by serology). The attack rate among adults living in the 4 affected households ranged from 14% to 64%; no visiting relatives acquired MERS–CoV. Sixteen (84%) of the MERS–CoV-positive family members, including all 4 index patients, were male; 8 (42%) had comorbidities; 11 (58%) were hospitalized; and 2 (11%) died. Risk factors for household transmission included sleeping in an index patient’s room (risk ratio [RR]: 4.1; 95% confidence interval [CI]: 1.5–11.2), changing patient’s clothes or sheets (RR: 2.9; CI: 1.0–8.4), and removing patient’s waste (RR: 3.2; CI: 1.2–8.4). Casual contact (e.g., shaking hands) and simple proximity (e.g., being within 1 m of the patient) were not significant risk factors for transmission.

**Conclusions:** In this MERS–CoV family cluster, the largest identified, the highest risk for household transmission was among those who provided direct care to ill relatives. The finding that casual contact did not increase transmission risk can guide resource allocation in future MERS–CoV investigations.