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EDITORIAL

Recurrent MERS-CoV Transmission in Saudi Arabia– Renewed Lessons in Healthcare Preparedness and Surveillance

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The World Health Organization (WHO) had recently announced on May 12, 2025, the reporting of nine new laboratory-confirmed cases of Middle East Respiratory Syndrome Coronavirus (MERS-CoV) in Saudi Arabia [1]. This announcement is a sobering reminder that while the global community remains focused on emergent threats like avian influenza or post-pandemic resilience, endemic zoonotic diseases like MERS-CoV may continue to circulate, evolve, and exploit gaps in infection prevention.

MERS-CoV, first reported in 2012 [2], is a betacoronavirus endemic to the Arabian Peninsula. Dromedary camels remain the primary animal reservoir. Though zoonotic transmission dominates most spillover events, human-to-human transmission—particularly in healthcare settings—has triggered multiple nosocomial clusters, sometimes involving a large number of cases. Notably, outbreaks in 2014 (Saudi Arabia) and 2015 (South Korea) underscored MERS-CoV's epidemic potential when detection, triage, and infection control measures faltered or other patients characteristics predominate [3]. The number of cases had decreased significantly in the last few years (Fig. 1), with the highest number of cases in 2014.

Between February and April 2025, nine laboratory-confirmed MERS-CoV cases were reported in Saudi Arabia, primarily from Riyadh. Two elderly, non-healthcare individuals died following symptomatic illness, while a third recovered. The remaining six cases, all healthcare workers aged 18–65, were linked to secondary exposure from one index case. Five of them were asymptomatic and not hospitalized, highlighting the risk of silent transmission (Table 1) [1]. This cluster underscores the critical need for early detection, contact tracing, and strict infection control measures, especially in healthcare settings. The first multi-hospital MERS-CoV outbreak was controlled with basic infection control measures [4].

A notable feature in recent outbreaks is the proportion of asymptomatic or mildly symptomatic cases. These individuals, often detected through contact tracing or routine screening of healthcare workers (HCWs), pose a silent risk to IPC programs. In this cluster, asymptomatic patients were identified during active surveillance, reinforcing the value of proactive case finding. Studies suggest that asymptomatic individuals can shed virus for days, even if not contributing significantly to broader community transmission [5]. Nonetheless, in enclosed environments such as hospitals, their undetected presence is a potential threat.

Healthcare-associated transmission has consistently posed a major challenge in controlling the spread of MERS-CoV. The 2015 outbreak in South Korea originated from a single index patient and rapidly spread across multiple facilities, leading to 186 infections and 38 deaths [6]. Generally, past outbreaks often stemmed from delayed diagnosis, inadequate PPE use, and lapses in triage protocols—failures exacerbated by poor infrastructure in emergency departments and ICUs [3].

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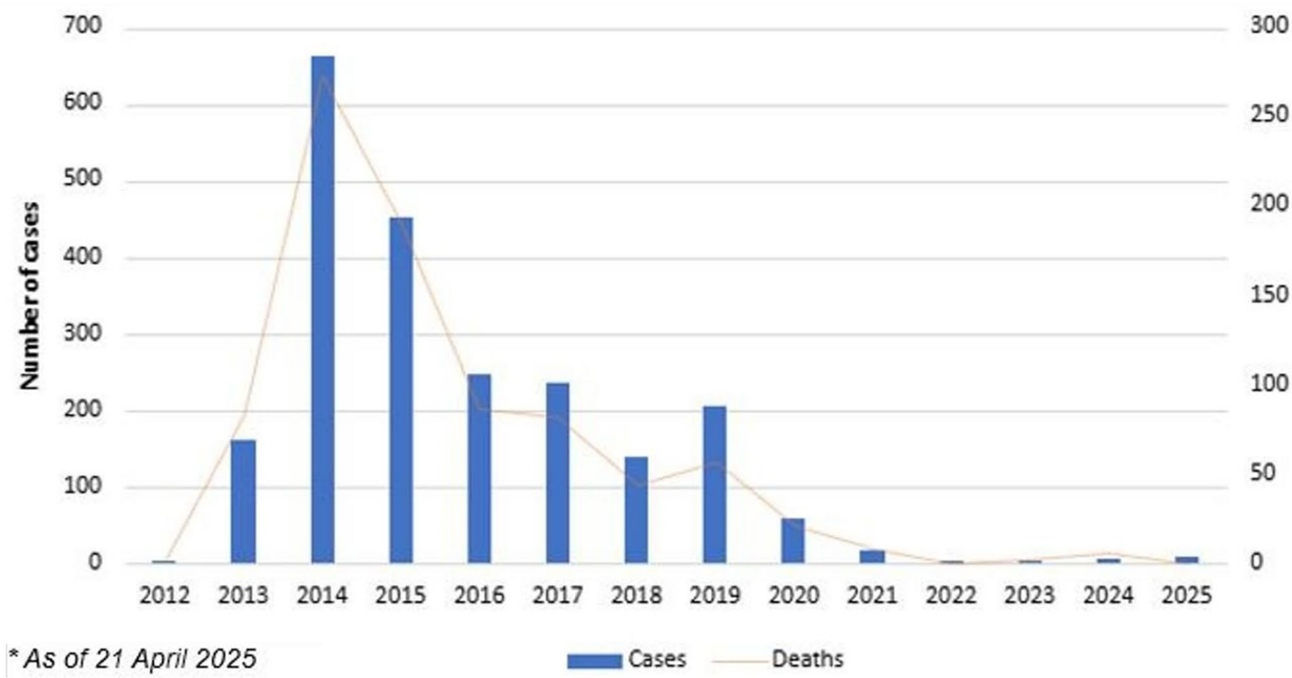

Fig. 1 Epidemic curve of MERS-CoV infections (n=2218) and deaths (n=865) reported in KSA between 2012–2025* (from WHO [1])

Table 1 Summary of MERS-CoV Cases– Saudi Arabia, March–April 2025 (From World Health Organization) [1]

Case	Region	Age Group	Healthcare Worker	Exposure History	Symptom Onset	Hospitalization	Lab Confirmation	Health Status
1	Hail	>65	No	Indirect contact with camels	20-Feb-2025	23-Feb-2025	01-Mar-2025	Died
2	Riyadh	18–65	No	No known contact with camels/products	31-Mar-2025	31-Mar-2025	03-Apr-2025	Died
3	Riyadh	>65	No	No known contact with camels/products	03-Apr-2025	06-Apr-2025	06-Apr-2025	Recovered
4	Riyadh	18–65	Yes	Contact with Case 2	Asymptomatic	Not Applicable	07-Apr-2025	Recovered
5	Riyadh	18–65	Yes	Contact with Case 2	11-Apr-2025	Not Applicable	12-Apr-2025	Recovered
6	Riyadh	18–65	Yes	Contact with Case 2	Asymptomatic	Not Applicable	13-Apr-2025	Recovered
7	Riyadh	18–65	Yes	Contact with Case 2	Asymptomatic	Not Applicable	13-Apr-2025	Recovered
8	Riyadh	18–65	Yes	Contact with Case 2	Asymptomatic	Not Applicable	14-Apr-2025	Recovered
9	Riyadh	18–65	Yes	Contact with Case 2	16-Apr-2025	16-Apr-2025	16-Apr-2025	Recovered

The latest WHO report confirms that two cases were part of a familial and healthcare exposure cluster—highlighting that the patterns of spread remain unchanged when core precautions are bypassed [7]. Healthcare workers (HCWs) remain disproportionately exposed during the surge of cases of MERS-CoV infection. In previous outbreaks, HCWs accounted for up to 25% of secondary cases [8], with a case fatality rate of 16% among HCWs compared with 34% among other patients (P=.001) [9]. The involvement of HCWs in the 2025 Saudi Arabia cluster is consistent with this pattern. Even with appropriate Personal Protective Equipment (PPE), prolonged exposure, improper donning/doffing, and fatigue-related lapses increase vulnerability. The occurrence of infection among HCWs has dual consequences: direct workforce depletion and psychological impact, undermining hospital resilience. Structured IPC training, regular drills, and robust post-exposure support systems are non-negotiable in endemic regions [10].

Currently, there is no approved vaccine for MERS-CoV, though several promising candidates are in development and have advanced to human clinical trials. Recent research has focused on vaccines that provide broad protection against multiple coronaviruses. For example, a multi-antigen vaccinia vaccine has demonstrated protection in mice against SARS-CoV-2, influenza A, SARS-CoV-1, and MERS-CoV, suggesting the potential for a universal, or pan-coronavirus, vaccine [11]. Individuals who recovered from MERS-CoV infection can develop long-lasting cellular and humoral immunity-lasting up to ten years-with cross-reactivity to SARS-CoV-2 and its variants. This cross-reactive immunity indicates that MERS-CoV-specific immune responses may contribute to broader coronavirus protection, supporting the rationale for developing vaccines targeting conserved antigens across these viruses [12]. One study found that individuals with a history of both MERS-CoV and SARS-CoV-2 infections exhibited significantly higher levels of MERS-CoV IgG antibodies compared to those who had only MERS-CoV or to control subjects. This suggests the presence of cross-adaptive immunity between MERS-CoV and SARS-CoV, indicating that prior infection with both viruses may enhance the immune response to MERS-CoV [13]. These advances highlight the potential for future vaccines not only to control MERS-CoV outbreaks but also to offer cross-protection against emerging coronavirus threats, paving the way for a pan-coronavirus vaccine strategy.

While vaccines for MERS-CoV remain in development, current defenses hinge on time-tested public health fundamentals: risk communication, animal reservoir surveillance, and hospital preparedness. Lessons from SARS-CoV-2 must now translate into practical investments in endemic countries: from real-time genome sequencing of MERS-CoV isolates to cross-border surveillance collaboration, with the adaptation of the one health concept. The adoption of specialized risk mapping methods, such as ecological niche modeling (ENM), is increasingly recommended for environmental monitoring of emerging infectious diseases (EIDs) within integrated risk analysis (IRA) processes. ENM enables the identification and mapping of environmental drivers and potential transmission pathways of EIDs, supporting a more comprehensive understanding of the factors that contribute to disease emergence and spread [14].

MERS-CoV's case-fatality rate remains disturbingly high—approximately 35%—making every missed opportunity for containment a gamble with lives. The clustering of cases in early 2025, involving asymptomatic transmission, healthcare settings, and camel contact, is not new—but that's precisely the concern. We've been here before.

MERS-CoV persists due to multiple factors and the complex human-animal interactions and at times due to wanes in the absence of crisis headlines. The continues zoonotic risks should be further explored from various aspects to prevent the spillover and to reawaken global stakeholders to the realities of persistent zoonoses. Surveillance must be strengthened, IPC rigorously enforced, and frontline workers empowered with knowledge and protection.

Abbreviations

WHO	The World Health Organization
MERS-CoV	Middle East Respiratory Syndrome Coronavirus
HCWs	Healthcare workers
PPE	Personal Protective Equipment
ENM	Ecological niche modeling
EIDs	Emerging infectious diseases
IRA	Integrated risk analysis

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Declarations

Conflict of Interest ZAM EIC of JEGH and JAT Associate Editor. Otherwise no other COI to declare.

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