Worldwide Reduction in MERS Cases and Deaths since 2016

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From 2012 through May 31, 2019, Middle East respiratory syndrome coronavirus (MERS-CoV) has infected 2,442 persons and killed 842 worldwide (1). MERS-CoV is currently circulating in dromedary camels in Africa, the Middle East, and southern Asia; however, most cases of human infection have been reported in the Arabian Peninsula (2). Large hospital outbreaks in 2014 and 2015 (3,4) (Appendix Figure 1, https://wwwnc.cdc.gov/EID/article/25/9/19-0143-F1.htm) motivated affected countries to substantially invest in prevention and control activities. To estimate the potential number of MERS cases and deaths that might have been averted since 2016 had the risk levels of 2014–2015 continued, we analyzed case-based data on laboratory-confirmed human cases of MERS-CoV infections reported to the World Health Organization (5). We categorized cases as either secondary (human-to-human transmission) or community-acquired (presumed camel-to-human transmission). In addition, we used case-based data on date of onset (for symptomatic infections) or report (for asymptomatic infections), outcome (died/recovered), and dates and sizes of reported clusters of human-to-human-transmission cases (3,4,6–8).

We compared incidence of camel-to-human-transmission cases (i.e., community-acquired cases, assuming all of those not positively attributed to human-to-human transmission were in this category) during 2016, 2017, and 2018 (through September only) with incidence during 2014–2015, assuming that case numbers were Poisson distributed...
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estimated that 154 secondary cases (95% CI 0–495) were
ber 2018, although we did find nonsignificant trends. We
cases from 2014–2015 to 2016, 2017, and through Septem
transmission cases, or both). The incidence of communi
community-acquired cases, human-to-human
World Health Organization from 2012 through October 1,
(averted cases were not statistically significant, we truncated
lower bound of the 95% CI to 0 cases averted.

465 (95% CI 895–2,165) cases averted and 293 (95% CI
179–433) expected deaths averted (under the assumption of
a 20% CFR) from 2016 through September 2018. Assuming
a 35.5% CFR, this estimate corresponds to 520 (95% CI
318–769) expected deaths averted.

We believe that affected countries are reducing the
global threat of MERS by addressing knowledge gaps
with regard to transmission, enhancing surveillance, and
strengthening the ability to detect cases early and con-
tain outbreaks through improved infection prevention and
control measures in hospitals. Critical for preventing in-
ternational spread and sustained transmission have been
improved prevention and control measures in hospitals,
restriction of camel movement in affected areas, stronger and
more comprehensive investigations of cases and clusters,
and improved communication.

Although global efforts seem to have prevented hun-
dreds of infections and deaths, vigilance must be main-
tained by all countries. More needs to be done to limit spill-
over infections from dromedaries, which requires stronger
surveillance of dromedary populations and persons in direct
contact with infected herds and accelerated development of
a vaccine for dromedaries (2). The international com-
unity and affected countries have a collective and shared
responsibility to curtail a major health security threat such as
MERS in the Middle East and beyond.

Table. Estimated Middle East respiratory syndrome cases and deaths averted because of reduced human-to-human transmission and camel-to-human transmission*

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases averted</th>
<th>2-sided p value</th>
<th>Deaths averted</th>
<th>Cases averted</th>
<th>2-sided p value</th>
<th>Deaths averted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Assuming 20% CFR†</td>
<td>Assuming 35.5% CFR†</td>
<td></td>
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</tr>
<tr>
<td>2016</td>
<td>154 (0–495)</td>
<td>0.2714</td>
<td>31 (0–99)</td>
<td>55 (0–176)</td>
<td>507 (189–967)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>2017</td>
<td>96 (0–419)</td>
<td>0.5810</td>
<td>19 (0–84)</td>
<td>34 (0–149)</td>
<td>507 (189–967)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>2018†</td>
<td>80 (0–338)</td>
<td>0.4316</td>
<td>16 (0–68)</td>
<td>29 (0–120)</td>
<td>451 (191–855)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>2016–2018</td>
<td>330 (0–819)</td>
<td>0.0896</td>
<td>66 (0–164)</td>
<td>117 (0–291)</td>
<td>1,465 (895–2165)</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

*Values are estimated no. (95% range) except as indicated. CFR, case-fatality ratio.
†Conditional on reported community-acquired cases.
‡The 95% intervals reported are the 2.5th and 97.5th percentiles of the simulations. When cases averted were not statistically significant, we truncated the lower bound of the 95% CI to 0 cases averted.
§Through September 2018.
Acknowledgments

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About the Author

Dr. Donnelly is a professor of applied statistics at the University of Oxford and a professor of statistical epidemiology at Imperial College London. As a statistician and epidemiologist, her research interest is the spread and control of infectious diseases, with a particular focus on outbreaks.

References


Limited Scope of Shorter Drug Regimen for MDR TB Caused by High Resistance to Fluoroquinolone

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Resistance to second-line tuberculosis drugs for patients with multidrug-resistant tuberculosis has emerged globally and is a potential risk factor for unfavorable outcomes of shorter duration drug regimens. We assessed the proportion of patients eligible for a shorter drug regimen in Uttar Pradesh, India, which had the highest rate of multidrug-resistant tuberculosis in India.

India has the largest burden of multidrug-resistant (MDR) tuberculosis (TB) worldwide (1). The success rate for MDR TB treatment is low (47%), largely caused by death, suboptimal adherence of patients to long treatment courses, and frequent drug-related adverse events (2). In 2016, the World Health Organization recommended a shorter drug regimen (9–12 months) for patients with MDR TB or rifampin-resistant TB who had not received second-line drugs (SLDs) and in whom resistance to fluoroquinolones and injectable SLDs is considered highly unlikely (3). A shorter regimen is a promising step toward high treatment success rates. Recently, this regimen was instituted in Uttar Pradesh, which has ≈20% of the total...