

Effectiveness of Disease Control Measures in Military Operations

Outbreaks of contagious disease in a military theater can pose significant challenges to commanders, who seek to balance the need to achieve military objectives with the need to protect the health of the force. Yet commanders and their medical advisors lack analytically based guidance for planning and executing measures to control outbreaks when baseline capabilities prove inadequate. To meet this need, IDA evaluated medical countermeasures, isolation, quarantine, and restriction of personnel movement as outbreak control measures within an operational theater.

IDA defined parameters that determined the effectiveness of each type of response and calculated the required values for those parameters for four contagious diseases: smallpox, plague, severe acute respiratory syndrome (SARS), and influenza. Outbreak control measures were considered effective if they successfully reduced the mean number of infections caused by an infected individual to less than one.

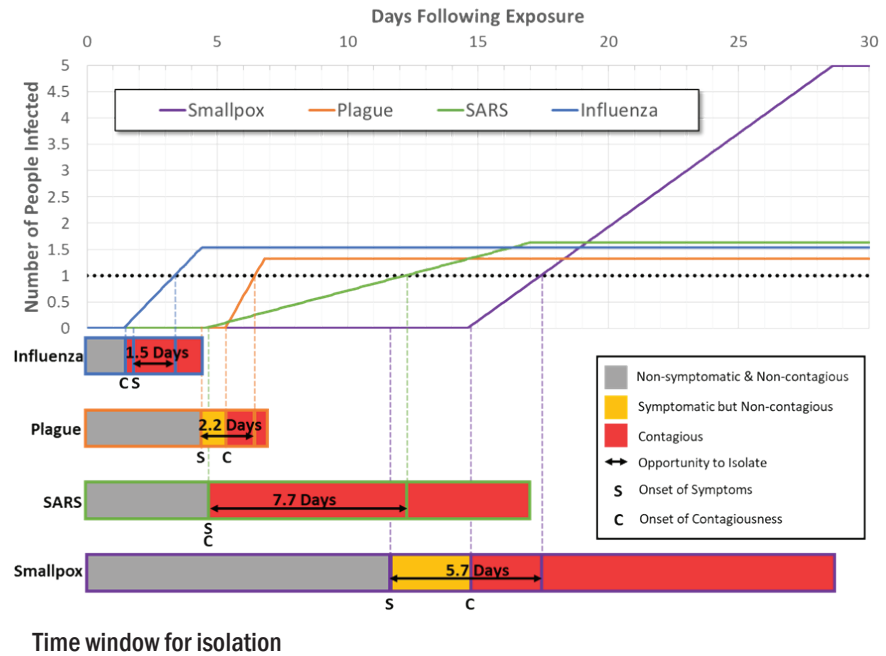
IDA found that the realities of military operating environments often made it difficult to meet requirements for successful outbreak control, which were driven primarily by disease characteristics.

For example, the time window for effective isolation is shortest for diseases that are highly transmissible, have short contagious periods, are contagious prior to the onset of symptoms, and are not readily differentiable from common diseases in their early stages. Yet meeting the required timelines for isolation may be difficult in military operations with degraded transportation networks, nonpermissive environments, and widely dispersed forces.

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The outputs of the IDA analysis are broad guidelines that identify factors that should be considered when selecting and implementing response measures. These guidelines are divided into three categories:

- General guidelines that should be followed when planning or implementing outbreak response in any operational environment,
- Guidelines related to specific diseases and disease characteristics, and
- Guidelines that account for the challenges to effective outbreak control in operations of different types.



While this effort focused on outbreak control measures, the affected individuals are patients in need of complex and sophisticated medical care that may not be readily available. Providing enough care for these individuals will be a significant and separate challenge but one that can be mitigated if outbreak response measures are effective.

This work is part of a larger, ongoing IDA effort that takes advantage of our contagious disease modeling capabilities and the broad experience of our multidisciplinary chemical, biological, radiological, and nuclear (CBRN) analysis group to provide decision support to military planners, commanders, and medical staff.



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