Researchers reveal Ebola virus spreads in social clusters

December 16 2014, by Ziba Kashef

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An analysis of the ongoing Ebola outbreak reveals that transmission of the virus occurs in social clusters, a finding that has ramifications for case reporting and the public health.

Prior studies of Ebola transmission were based on models that assumed

the spread of infection occurred between random pairs of individuals. However, because transmission of the virus happens most often in hospitals, households, and funeral settings, Yale researchers, and an international team of co-authors, investigated the possibility of clustered transmission, or spread between individuals in small social groups.

For their analysis, the researchers reviewed both genomic and epidemiological data from the current outbreak in Sierra Leone. They found evidence of significant social clustering. "Clustered transmission means that when you have an individual who has the disease and they transmit it to another individual, the next transmission is likely to be to someone who the first individual knew," said Jeffrey Townsend, principal investigator and associate professor of biostatistics and ecology & evolutionary biology at Yale. "It's all happening within little small social networks."

Researchers were also able to estimate that for every Ebola case reported, fewer than one went unreported. This estimate, that up to 70% of cases were not reported, is significantly lower than previous estimates. "For Sierra Leone, underreporting is lower than some more speculative estimates that ran as high as 250%," Townsend noted.

These findings underscore the importance of rapid contact tracing and quarantine of symptomatic individuals, which can be highly effective among these clustered groups. The analysis also points to the need for more public health resources, such as hospital beds, to make sure every infected individual in West Africa is quickly isolated and receives professional care.

Though more research is needed, the analysis has strong implications regarding the testing of newly developed Ebola vaccines, note the researchers. Individuals clustered in a household or hospital with Ebola patients are at greater risk for multiple exposures and could benefit most

from vaccination.

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The analysis was published early online in the journal *Clinical Infectious Diseases*.

Provided by Yale University