Reviewer’s report

Title: Recognition of aerosol transmission of infectious agents: a commentary

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Reviewer: Rachael M Jones

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The title of this paper poses a very interesting question, but the answer provided is rather a let down, concluding that eventually there is a weight-of-evidence the gives an "impression of the main transmission route" to the scientific community. This conclusion is probably true, but it is not insightful.

It is true, that eventually a number of epidemiologic, mechanistic and experimental studies are performed, and individuals in the scientific community make their assessments of these data and form opinions about the transmission routes(s) for a pathogen. But assessments are also made by public health organizations, as it is the decisions of these organizations that change clinical and occupational health practices so as to prevent disease transmission. Arguably, the decisions of organizations are more influential than the decisions of individuals, though individual decisions must precede that of organizations.

Based on the question in the title, I had anticipated that the authors would discuss what pieces of evidence the scientific community and public health organizations find persuasive, so that decisions are made (and impact infectious disease control). This type of analysis could help to direct us to the most persuasive types of research studies, and reduce the time until scientists can make assessments about transmission routes. Instead, the paper presents a not-quite systematic review of the evidence about disease transmission of selected diseases. This evidence is not placed in a historical timeline or discussed with respect to decision-making by scientists or public health or other scientific organizations.

In the U.S. the critical public health organizations would be the Centers for Disease Control and Prevention (CDC) and the Healthcare Infection Control Practices Advisory Committee (HICPAC); and there are others globally. These organizations, however, have shown themselves to be hesitant to identify inhalation as a transmission route for many agents. (This is also true of the World Health Organization.) In the 2007 isolation guidelines from CDC/HICPAC, the ill-defined concept of "small particle aerosol" was introduced to begin to acknowledge that aerosols may be important for influenza and norovirus, but the identification of this disease transmission route didn't really result in a change in infection prevention strategies. The discussion about this concept in the isolation guidelines suggested that epidemiologic studies were most persuasive, though these events were seen as atypical. This discussion and decision by CDC/HICPAC stands in contrast to the analysis of many others, including some of the authors of this paper. Similarly, the evidence presented in this paper about the infection site of MERS-CoV in the lower-respiratory tract is persuasive to this reader, but most public health
organizations do not recognize MERS-CoV as transmitted through inhalation (and do not recommend respiratory protection). Is would be more insightful to explore the decision-making process at the individual an organizational level; or how organizations consider different types of evidence. For example, is the difference in classification of MERS-CoV relative to the partial acknowledgement of transmission via "small particle aerosols" for norovirus and influenza result from the nature of the evidence (mechanistic vs. epidemiologic)?

It would be helpful to see the types of evidence that was used to make decisions about disease transmission routes compared across the diseases. Such a table would include only evidence before the aerosol transmission route was determined, and would help to identify evidence that is persuasive. Jones and Brosseau (Journal of Occupational and Environmental Medicine, 2015) described a weight-of-evidence scheme to help determine classification of infectious diseases with respect to the potential for aerosol transmission. Jones and Brosseau, however, do not take a historical perspective about the evidence that was used to support decisions.

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