Seasonality of Respiratory Syncytial Virus Infection

To the Editor—Dr. Gavin Donaldson recently compared climate change and the pattern of epidemics of respiratory syncytial virus (RSV) infection in England and Wales for 1981–2004 [1]. His conclusion—that the warming of the temperature may be shortening the RSV infection season and, thus, decreasing the disease burden—is interesting, but it should be taken within the context of the global dynamics of RSV transmission. An equivalent analysis performed on the total annual number of hospitalizations for RSV infection, rather than on the timing of the end of the RSV infection season, would better test this hypothesis.

In contrast with Donaldson [1], we do not believe that within-school cross-infection has been ruled out. The combination of the short-lived immunity to RSV infection and the completion of the school year may explain the seasonal signal of RSV infection in many countries. Three studies provide evidence that younger children acquire infection from school-aged children within the household [2–4], indicating a significant contribution of within-school transmission to the overall transmission of RSV. A range of dynamic behaviors can result from the interplay between the time-scales of the acquisition and loss of immunity in a population and a seasonal signal for transmission [5, 6].

Therefore, temperature may be a part of but not the whole of the explanation for the seasonal dynamics in the United Kingdom, and it cannot be extended to a global explanation. In Finland, for example, RSV-related hospital admissions follow a 2-year cycle, beginning in the first winter, with a minor peak in the following spring (usually May) and a major peak in the second winter (usually December). The epidemiology of RSV infection in Finland has been described elsewhere [7] and has been described in comparison with that of England and Wales [6]. Similar cycling of early and late outbreaks has been observed elsewhere; recent data indicating similar outbreak patterns have been published from Germany, Switzerland, and Chile [8–10].

Because the number of diagnoses of RSV infection in the spring is increasing or decreasing in alternating years in several countries with different weather conditions, the end of the RSV infection season cannot be associated with the spring temperature. In addition, circulation of RSV is detected during most of the summers before major peaks but not after them. The decline of the infection rate after the minor peaks could be explained by several factors, including seasonal climate factors, such as higher temperature and more UV light. The most important factor is probably less indoor crowding of the transmitter population because of the summer vacation of school children and the reduced numbers of younger children in day care centers.

The vast majority of the children hospitalized with RSV infection are infants and toddlers, who catch their infections from older siblings or in day care centers. Assuming that the average virulence of the circulating virus strains remains the same, the size and density of the most susceptible child population are the main determinants of the RSV infection epidemic, or what we recognize as one. Regarding the length of the RSV infection season, nativity, urbanization, and travel are likely to be more important changes in the environment of the virus than the climate warming.

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References


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