

## RSV and HMPV seroprevalence in Tuscany (Italy) and North-Rhine Westfalia (Germany) in the winter season 2009/2010

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To the editor:

RSV and HMPV are the major contributors to mild to severe respiratory infections in all age groups. Most infections are recognized in children and frequent re-infections are observed for both viruses [reviewed in<sup>1,2</sup>]. The seroprevalence for both viruses was described to be age – dependent, and the rate of seropositive individuals was significantly higher in subjects older than 10 years. Surprisingly, in a recent large study concerning the HMPV seroprevalence in a German cohort of Bonn,<sup>3</sup> the neutralizing immune response was shown not to correspond to the overall seroprevalence described in previous studies.<sup>4,5</sup> Taking these data into account, we hypothesised that this discrepancy could be due to geographical differences, consequently, we prospectively analysed the seroprevalence in children against both viruses during the winter/spring season 2009/2010 in two different regions of Europe, Northrhine-Westfalia, Germany (85 serum samples), and Tuscany, Italy (86 serum samples). Unlike the study of Matsuzaki *et al.*,<sup>4</sup> who used a neutralization assay, and Liu *et al.*,<sup>5</sup> who used an in-house recombinant ELISA, the serum samples in the present study have been investigated for the presence of antibodies by indirect immunofluorescence, as previously described.<sup>6</sup> It appears that only marginal differences were observed in the seropositivity rates of the corresponding groups aged 1–5 years (mean age 2,5 for Italian children and 1,5 for German children) and 6–10 years (mean age 7,5 for all the children), respectively, of the different geographic provenances (Table 1). It is worthy to note that the sera were drawn from infants older than 6 months, in order to exclude the possibility of an overestimation of seropositives due to the presence of specific maternal antibodies. In the youngest group, the HMPV

seroprevalence in the two countries was indistinguishable (48·8%), whereas the RSV seropositivity rate was slightly higher in the German group, but without a significant difference ( $P > 0\cdot05$ ). In the oldest group, the seropositivity rate was similar for both the viruses ( $P > 0\cdot05$ ).

The data confirm that RSV infection occurs earlier in life, and show that HMPV seropositivity is significantly lower than the RSV seropositivity rate in the cohort of 1–5 year old children ( $P < 0\cdot05$ ). This difference is no more evident in the oldest group of children, indicating that HMPV infection may occur at a later time and most of the young population can be infected by hMPV after the 5th year of life.<sup>7,8</sup> However, the difference in the youngest group of subjects is somehow surprising as there is no significant epidemiological difference of both viruses in the areas considered.<sup>9,10</sup> Therefore, it appears that the circulation of these viruses in these two countries of Europe, which have different climates, is similar and that RSV spreads very efficiently among infants. Moreover, these data confirm that the patterns of RSV and hMPV infection in Italy are similar to those reported for other countries in the northern hemisphere ( $P < 0\cdot05$ ). Finally, the lower seroprevalence to hMPV observed in the youngest German group seems discordant with the analysis performed by Lüsebrink *et al.*<sup>3</sup> In the previous study, the hMPV seroprevalence, tested by XTT-based neutralization assay, was 93·1% in the group of children aged 0–2 years and 100% in the group of children aged 3–9 years. However, this result could be explained by the fact that in this study, we analysed the seroprevalence in young children by IFA, while, in the previous study, it was evaluated by the neutralization test. In this assay, the neutralizing activity against hMPV was evaluated in the presence of

**Table 1.** Seropositivity rates against HMPV and RSV in two age groups, 6 months–5 year old children and 6–10 year old children

	6 months–5 years of age		6 years–10 years of age	
	Germany (%)	Italy (%)	Germany (%)	Italy (%)
hRSV	72 +	68.8 +	100 +	97.5+
hMPV	48.8 +	48.8 +	97.7+	95+

complement, which is an important factor to enhance the neutralizing effect of the serum, thus it is likely that the percentage of seropositives was overestimated by using the XTT-based neutralization test. Furthermore, the age groups considered in the previous study were different from those analysed here (i.e. 0–2 years versus 6 months–5 years), making the comparison more difficult. In fact, the highest seroprevalence value previously observed in the youngest group could have been influenced by the presence of maternal antibodies in infants under 6 months of age included in the study.

Nevertheless, taking into account the observation that the neutralizing activity of sera may provide results which do not completely correspond to the seropositivity rate, it is still unclear which mechanisms lead to a protective immune response against RSV and HMPV and how long these responses induce a long-lasting protective effect. In conclusion, we did not observe a substantial difference in the RSV and hMPV seroprevalence rates among Italian and German children, during the winter/spring season 2009/2010, indicating that these viruses have a similar pattern of infection and profile of spreading in the population in regions characterized by mild cloudy winters.

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## Ethical statement

This work was performed under votes from the local Ethical Committee from the University of Bonn and University of Siena, respectively.

## Conflicts of interest statement

Nothing to declare.

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