O152
2-hour Oral Session
Emerging viruses: what about "Tick", "Chik" and "Zik"?

Resurgence risk for measles, mumps and Rubella in France in 2016

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Background: France experienced a massive measles outbreak in 2010-2011, with more than half of the 30,000 cases reported in Europe, mostly attributed to suboptimal vaccination coverage. Large measles and mumps outbreaks occurred more recently in Europe (e.g., in the Netherlands and the UK). The currently used vaccine being a trivalent measles, mumps and rubella vaccine implies that a potential risk for measles resurgence due to incomplete coverage may be associated with a risk for mumps and rubella outbreaks. We aimed to estimate and map the resurgence risk for measles, mumps and rubella in France.

Material/methods: We used a multi-cohort model in which (1) measles, mumps and rubella serology is modelled in order to predict the susceptibility to these infections in the year of data collection (2009 or 2013); (2) age-dependent susceptibility by department (n=96) is derived for the year of interest (2016); (3) department-specific effective reproduction numbers and age-dependent relative incidences upon a potential outbreak are estimated relying on social contact data.

Results: The overall risk for a measles, mumps or rubella outbreak in France in 2016 is highest for mumps, moderate for measles and negligible for rubella. There was heterogeneity in the outbreak risk between departments, of which the most at risk for measles, mumps and rubella were respectively Haute-Marne, Cantal, and Puy-de-Dôme. Departments often share common risks for mumps (Figure 1: Centre) and rubella (Figure 1: Right) (the south-east/south-centre of France), while the risk distribution is more diverse for measles (Figure 1: Left) as shown in Figure 1.
Infants under 1 year of age would be seriously implicated in a future outbreak, but the highest overall contribution in the caseload would come from teenagers and young adults (10 to 25 years old). Holidays (as a proxy for school closures) would reduce the effective reproduction number on average by 37.2%, 29.5%, and 33.4% for measles, mumps and rubella respectively. For measles and rubella, susceptibility - thence, resurgence risk - differs according to gender, males being more frequently susceptible than females. This is not the case for mumps.

Conclusions: Using serological survey and vaccine coverage information, we were able to estimate the resurgence risk for measles, mumps and rubella in a highly vaccinated population. Despite the recent measles outbreak, the risk for a new outbreak persists in France, but predominates for mumps. The high risk for teenagers and young adults is concerning in view of these ages' vulnerability to more severe measles, mumps and rubella disease and complications. Gender-specific differences in susceptibility highlight the interest to consider gender-specific vaccination campaigns to lower future outbreak risk.