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Presentation Abstract

Presentation: 039 - Modelling the transmission of Peste des Petits Ruminants in Ethiopia and optimal vaccination coverage

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Abstract: **Purpose:**
Peste des petits ruminants (PPR) is a highly contagious viral disease of small ruminants with a substantial economic impact on production systems. Eradicating PPR within the next 15 years is a joint objective of the FAO and the OIE. Although a vaccine is available, the transmission of the virus (PPRV) has never been quantified in any setting. This knowledge is essential in order to design and implement effective vaccination campaigns. Our aim was to estimate the level of PPRV transmission using data from a national serological survey conducted in Ethiopia (1999-2000) prior to the first vaccination campaign, including over 10,000 sheep and goats.
Methods:
We developed a stochastic spatially-explicit metapopulation model. The total Ethiopian small ruminant population was divided into 5100 populations, each defined by an area of 15km by 15km. PPRV spread was simulated within and between these populations. Sedentary and pastoralist populations, which prevailed in the highlands and lowlands, respectively, were further differentiated. Age and species (sheep or goats) were accounted for. The model was fitted to the serological survey results using Approximate Bayesian Computation.
Results:
Results showed that PPRV transmission was higher within pastoralist than sedentary populations. Moreover, transmission was high between pastoralist

populations, suggesting a high level of mixing. While PPRV could not become endemic within a single pastoralist population, it could remain endemic within the pastoralist system as a whole. Although viral spill-over from pastoralist to sedentary populations was frequent, the level of PPRV transmission among sedentary herds was low and unlikely to allow endemicity. The high turn-over in small ruminant populations meant that vaccinated animals are rapidly replaced by susceptible animals. Therefore, vaccination campaigns should be conducted annually in order to maintain the vaccination coverage above the herd immunity threshold.

Conclusions:

Vaccination campaigns should be conducted annually and target pastoralist populations.

Relevance:

This study provides the first ever estimation of PPRV transmission to guide vaccination policy.