One Health: Connecting Humans, Animals and the Environment
Video Transcript

Where would you invest?

[Jakob Zinsstag]: Do you remember the rabies example of the beginning of this course? Let me now elaborate on this. To be frank, I never wanted to work on rabies. But when our colleagues in Chad asked us if we could assist them as they wanted to establish standard rabies diagnosis for animals at the veterinary laboratory in N'Djamena, we agreed. As we were establishing rabies diagnoses, we engaged also in small-scale vaccination trials of dogs. We verified that it was possible to reach 70% percent of the dogs and vaccinate them. In addition, only an estimated part of 10% were inaccessible when it came to vaccination.

We talked to the minister of health, asking him for assistance with dog vaccination to prevent human rabies. He answered that he was in charge of humans and not responsible for dogs. When we addressed the issue to the minister of agriculture and asked support for the mass vaccination of dogs, he said that he was in charge of cattle and not of dogs. This is clearly an example of lacking cooperation between human and animal health systems, and it shows the need for One Health. Obviously, we were frustrated.

I asked myself then what would be less costly: Was it cheaper to treat all humans that were exposed to rabies with post-exposure prophylaxis, or was it more economical to mass vaccinate all the dogs to prevent human exposure in the first place? What do you think?

To answer this question, we had six years of data to parametrise the first dog-human rabies transmission model. This model allowed us to simulate rabies transmission. We assumed that all exposed humans would receive post-exposure prophylaxis. Then we estimated the cost. We then simulated the mass vaccination of 70% of the dogs. We estimated the cost of this vaccination and added the expenditure for human post-exposure prophylaxis. In this figure, you can see that if we provide post-exposure prophylaxis to all exposed humans, we have costs of about $7,000 every year. If we mass vaccinate 70% of the dogs, we have a high initial cost of about $45,000 US but little incremental cost. The cumulative cost of both scenarios reach break-even after about six years.

After this time, it is less costly to invest in dog mass vaccination in order to eliminate rabies. This is an important example of the added value of a One Health approach. If we would study human or dog rabies separately, the break-even point could never be found.

This example shows how the principle of One Health comparative intervention assessment is applied to human and veterinary medicine. It has far-reaching consequences, because it can be applied in principle to any comparable question of alternative intervention options in human and animal health. We did actually not content ourselves in predicting the break-even of the cost of different rabies interventions. In 2012 and 2013, we vaccinated two times 70% of the dogs in N'Djamena, Chad. Incidentally, if you look at it empirically, the break-even point between dog mass vaccination and human post-exposure prophylaxis is more likely to occur at 10 years. We thus come closer to an earlier prediction by Bögel and Meslin in 1992.