

The economic burden of bluetongue disease for the Italian sheep industry and the national health service

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Introduction and objectives: Bluetongue (BT) is a viral disease transmitted by biting midges (*Culicoides* spp.) and affecting wild and domestic ruminants. Severe disease is mostly limited to some breeds of sheep and species of deer. In Italy, the first outbreak, caused by BT virus serotype 2 (BTV-2), was detected in summer 2000. Since then, there have been at least 12 incursions and more than 50.000 outbreaks involving different BTV strains and serotypes. Being regarded as a disease with potential economic consequences, BT is qualified as “notifiable disease” by the World Organisation for Animal Health (OIE) and listed in categories C+D+E of the new European Animal Health Law. BTV infection may cause losses in production (e.g. deaths, weight losses, reduced milk yields, infertility, and abortions), increased expenditures by farmers and/or health authorities (cost of treatments, vaccines, surveillance and control plans), and lost revenues due to restrictions of movement and trade (involving also other species, e.g. cattle). This study aims to quantify the BT impact on the Italian sheep industry and the national health service (NHS). The analysis considers the economic burden of recent outbreaks caused by BTV-4 in two areas of Central Italy: Tuscany and Latium (years 2016-2017) and Sardinia (2017-2018), where flock density is very high.



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Materials and methods: The project is developing a deterministic farm model that incorporates epidemiologic, zootechnical and economic variables. This process relies on data from the national veterinary database (livestock identification and animal disease data) and a questionnaire survey to farmers, as well as interviews to experts. Possible economic impacts on the downstream industries (sheep cheese production and slaughtering industry) are also being investigated. A sequence of equations will describe the costs in the different livestock categories according to the clinical courses of the disease (acute, sub-acute and asymptomatic), by allowing a comprehensive assessment at the farm level (Fig. 1 and 3). NHS costs are evaluated by analysing the activities needed to implement BT surveillance and intervention programmes (Fig. 2 and 3). Subventions to affected farms are included in the estimation. Data on resource consumption are collected through a questionnaire submitted to the public institutions institutions involved: the regional and local health authorities (ASL), and Istituti Zooprofilattici Sperimentali (IZS). The corresponding monetary values are calculated through the attribution of standard costs to the operational protocols.

Discussion: The scientific literature provides limited information about the specific economic consequences of BT in Italy, although its geographical position and epidemiological situation make this country constantly exposed to the incursions of new BTV strains and the risk of new epidemics. This study proposes a wide analysis of losses and resource consumption caused by BT at different levels (private and public sectors) for a comprehensive assessment of the disease economic outcomes in the Italian situation. The resulting epidemiological-economic model could provide important information to evaluate the cost-effectiveness of new possible intervention strategies against BT, also in the context of other middle-and-high income countries and regions affected.



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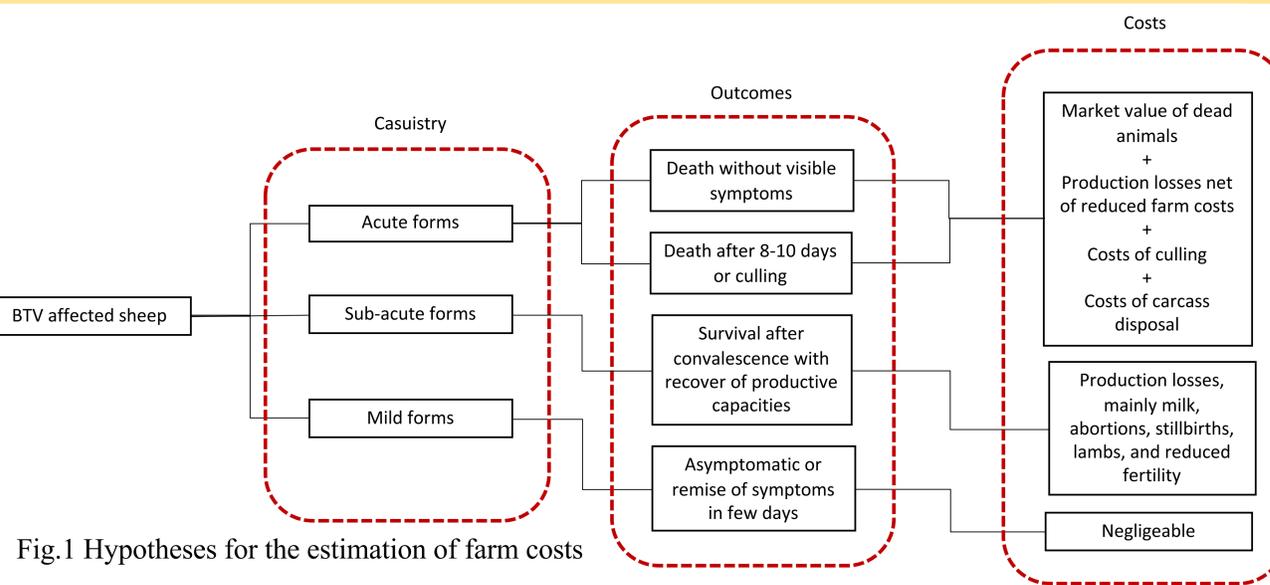


Fig.1 Hypotheses for the estimation of farm costs

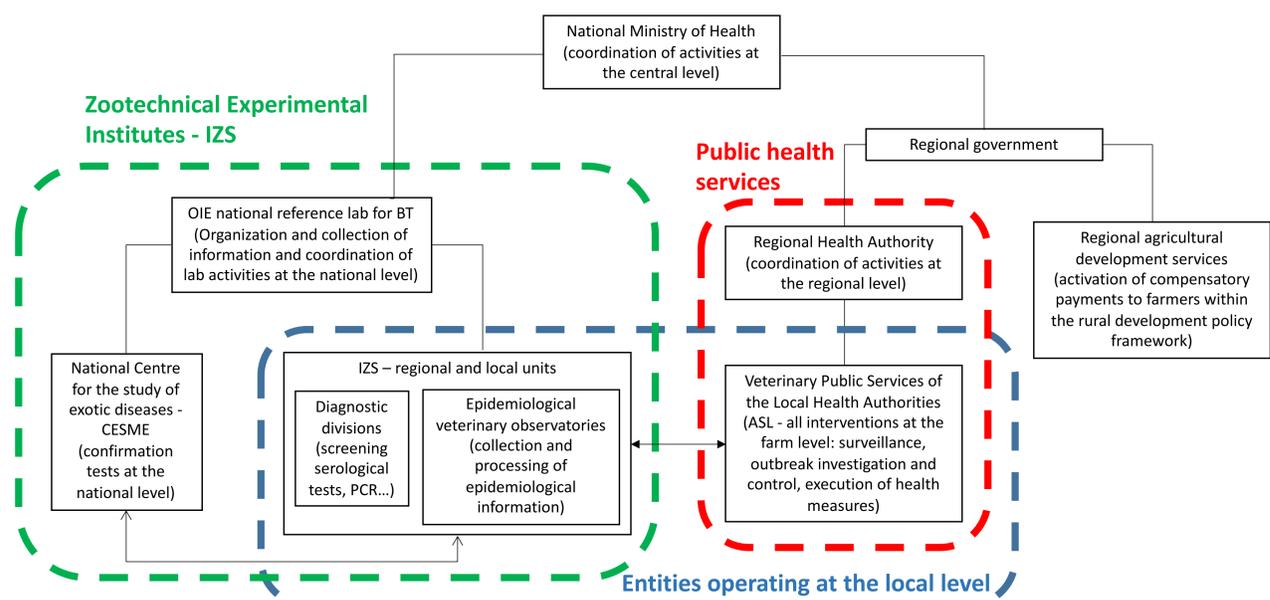


Fig. 2 - Cost spreading throughout the public institutions involved

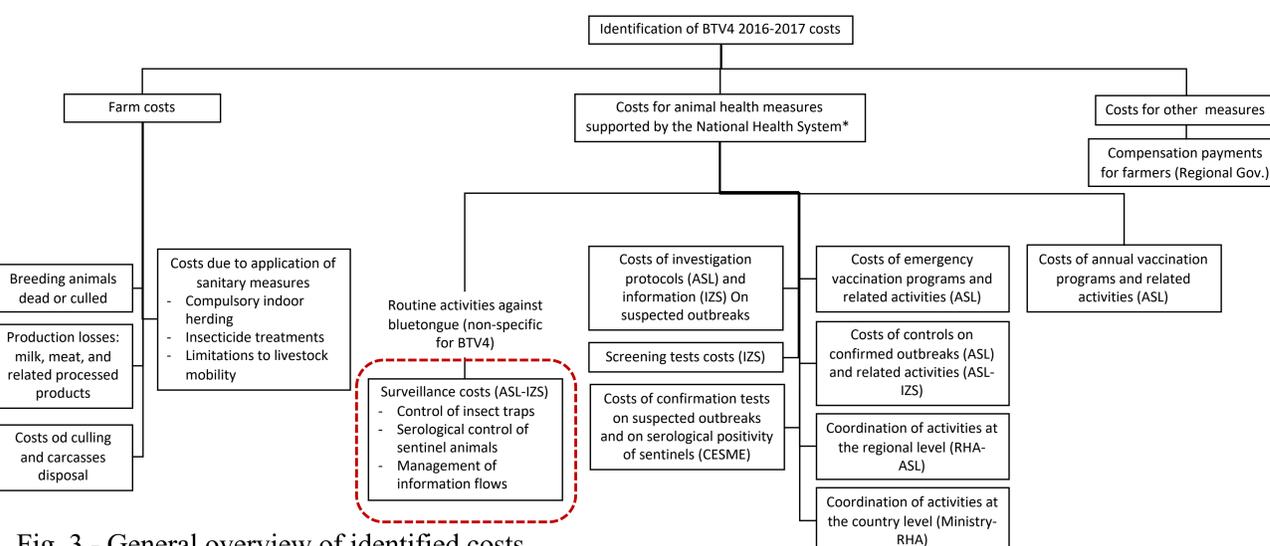


Fig. 3 - General overview of identified costs