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Cantonal Engagement in the Prevention and Control of Vector-Borne Diseases in Switzerland and Liechtenstein

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1 Introduction

This survey is part of the health project within the research program “Decision Support for Dealing with Climate Change in Switzerland: a cross-sectoral approach” (NCCS-Impacts). The goal of NCCS-Impacts is to develop practical climate-related services for the environment, the economy, and society. The associated health project, jointly led by the Federal Office of Public Health (FOPH) and the Federal Food Safety and Veterinary Office (FSVO), focuses on the impacts of heat, mycotoxins, and vector-borne diseases on both animal and human health.

Regarding vector-borne diseases, a comprehensive risk assessment of current and future threats to humans and animals in Switzerland is being carried out. As part of this risk assessment, the project documents (1) the implementation of measures at the cantonal level in Switzerland and in Liechtenstein and (2) the state of knowledge about vector-borne diseases among the Bernese population. The national survey of departments of health, veterinary services, and the environment aims to gather information on engagement, specific measures, and collaboration with other stakeholders.

2 Methods

To assess the engagement of cantonal and Liechtenstein authorities with regard to vector-borne diseases, a cross-sectional survey was conducted among stakeholders in departments responsible for health, veterinary services, and environmental protection.

The survey was implemented using the REDCap electronic data capture platform (Research Electronic Data Capture, hosted by Unisanté) and administered via an online questionnaire. The questionnaire was distributed by email to targeted respondents within relevant cantonal and Liechtenstein services, based on

their role and responsibilities in managing public health or environmental risks. Participation was voluntary. Participants were able to save their answers and come back to it later.

The online survey was open from April 25 to June 6, 2025. A reminder was sent on May 16. The questionnaire included structured multiple-choice and checkbox items, as well as a small number of open-ended questions, covering topics such as awareness of vector-borne diseases, existing preventive measures, interdepartmental collaboration, and perceived needs or challenges. Respondents were ensured not to be identified.

The full questionnaire is available online: <https://redcap.unisante.ch/surveys/?s=YKERXDNR4KAMWYP9> (<https://redcap.unisante.ch/surveys/?s=YKERXDNR4KAMWYP9>). Data were anonymised, exported securely from REDCap and described using R (version 4.4.2). Open-text answers in multiple languages were summarized using GPT-4-turbo (June 2025 version). More details are available in the supplementary file.

3 Results

3.1 Participants

Requests for participation were sent to X persons. A total of 55 complete responses were collected during the study period, covering all 26 Swiss cantons and Liechtenstein. The number of answers per canton varied between 1 and 3. Participants primarily belonged to human health cantonal departments (n= 22), followed by the animal health departments (n= 17) and the environment departments (n= 16).

3.2 Involvement and resources

Most participants (77%) reported that their authority is currently involved in the implementation of measures or activities related to diseases transmitted by ticks and mosquitoes, such as public relations, monitoring, or control (Supplementary table 1). This was especially true in animal health departments (94%). Among 12 of 55 respondents who indicated no current involvement, the most frequently cited reasons included a lack of financial or human resources (50%) and a perception that such diseases are outside the authority's responsibilities (42%). Regarding the existence of cantonal strategies or action plans, 49% of respondents were aware of a plan for mosquito-borne diseases and 11% for tick-borne diseases, while 33% reported that no strategy exists in their canton. Around half of the respondents reported lack of human (49%) and financial (55%) resources

3.3 Concrete measures and activities

Reported concrete measures and activities in the field of vector-borne diseases varied markedly between tick- and mosquito-borne diseases (Supplementary table 2). The most common actions cited for ticks included public information campaigns (22%) and targeted awareness of professionals (13%), with rare reports of monitoring (4% passive; 0% active) and vaccination advice (6%). In contrast, involvement in mosquito-related activities was broader and more diverse: 40% of respondents reported engaging in public relations and professional awareness efforts, while active and passive mosquito monitoring were cited by 36% and 33% of respondents, respectively. Nearly one-third (29%) mentioned verifying sightings at new locations, and around 15–18% reported involvement in mosquito control on public or private land. Information and training activities were mentioned by 20% of respondents. If the authority develops

information, topics covered included vaccination (65%), protection against bites (53%), and elimination of breeding sites (47%). Open-text responses further highlighted involvement in national vaccination campaigns (e.g., against tick-borne encephalitis for humans or bluetongue disease for ruminants and camelids), interdepartmental coordination, media engagement, and surveillance of animal diseases transmitted by ticks and mosquitoes as defined in the Animal Disease Ordinance. Participants reported using a wide range of channels to disseminate information, most commonly official websites, emails, flyers, and direct communication with veterinarians or animal owners. Additional methods included newsletters, social media, articles in agricultural media, information sessions, and training courses, often in collaboration with municipalities or other local actors.

Respondents reported using a wide variety of guidelines, support materials, and reference documents to inform the development and implementation of measures against vector-borne diseases. The most frequently cited sources included technical instructions and documents from the Federal Food Safety and Veterinary Office (OSAV/BLV), the Federal Office for the Environment (OFE/BAFU), and the Federal Office of Public Health (OFSP/BAG). Several participants also referred to cantonal materials (particularly from Ticino) as well as international resources such as those from the WHO, WOA, or cross-border exchanges with France and Germany. Additionally, documents from academic or technical partners like SUPSI and Swiss TPH were mentioned. A few respondents reported using self-developed materials or relying on exchanges of expert knowledge, while others indicated they did not use any specific documents.

Respondents identified a range of knowledge gaps within their authorities concerning both tick- and mosquito-borne diseases (Supplementary table 3). For tick-borne diseases, the most commonly cited areas of limited knowledge included disease management (20%), followed by detection and prevention (both 18%). Open-text responses often emphasized limited relevance or jurisdictional responsibility, while some highlighted a lack of resources or the need for clearer coordination and federally supported monitoring. For mosquito-borne diseases, the main knowledge gaps were in disease and vector management and control (36%), as well as prevention (22%) and detection (20%). Several respondents pointed to uncertainties around the appropriate use of adulticides, sharing of responsibilities among stakeholders, and long-term control strategies. Regarding actual control measures against mosquitoes, over half of participants (53%) reported that no active mosquito control measures are in place. Among those that did report activities, biological larvicides (25%) and elimination of breeding sites (20%) were the most common, while use of adulticides (11%) and non-chemical larvicides (7%) was less frequent. Open-text answers revealed a mix of pilot studies, public awareness campaigns, and experimental approaches like sterile insect techniques (SIT), often in collaboration with academic or federal partners. Some respondents indicated that control responsibilities lie with other agencies, such as municipalities or environmental offices.

3.4 Collaboration and coordination

Collaboration and coordination emerged as important themes in participants' responses regarding vector-borne disease control (Supplementary table 4). While 60% of respondents reported active networks or exchanges with researchers and specialists for mosquito-borne diseases, only 20% indicated such collaborations for tick-borne diseases, and over a quarter (27%) reported no active exchange at all. Open-text responses highlighted needs for stronger inter-cantonal coordination, improved knowledge transfer, and harmonized federal guidelines, particularly for outbreak preparedness, surveillance, and the responsible use of control tools like biocides or adulticides. Several participants emphasized the importance of financial and human resource support, centralized information platforms, and a coordinated

national monitoring strategy. Others cited challenges related to fragmented responsibilities across levels of government or lack of expertise and capacity. When asked about the integration of tick- and mosquito-borne disease issues into national and cantonal climate adaptation strategies, most respondents indicated limited awareness or engagement: 65% were unsure about national-level integration, and 53% did not know whether these issues were addressed in their own canton's strategy.

4 Conclusion

This national survey provides a first detailed overview of how cantonal authorities in Switzerland and Liechtenstein are engaged in the monitoring, prevention, and control of diseases transmitted by ticks and mosquitoes. While most respondents (77%) reported some level of involvement in related activities, findings reveal notable disparities in resources, actions, and strategic alignment across cantons and sectors.

Efforts appear more advanced for mosquito-borne diseases, with a broader range of implemented activities such as public awareness campaigns, professional training, and both active and passive monitoring. In contrast, tick-related activities were reported far less frequently, with more than half of respondents stating that their authority does not currently engage in any tick-related measures. Access to dedicated human or financial resources remains limited overall, particularly for tick-borne disease interventions.

The survey highlights important knowledge gaps reported by cantonal authorities, particularly in the areas of disease management and pathogen detection. These gaps were reported more frequently for mosquito-borne than tick-borne diseases, reflecting the growing public health importance of invasive mosquito species. Despite these challenges, several authorities reported innovative or pilot measures, such as the use of biological larvicides and participation in sterile insect technique studies.

Collaborative networks are more commonly established around mosquito-related issues, with 60% of respondents indicating active exchanges with researchers and specialists in that domain, compared to only 20% for tick-related issues. Many participants called for stronger coordination across cantons, improved knowledge transfer, and clearer federal leadership, especially regarding outbreak preparedness, standardized intervention strategies, and resource sharing.

Finally, the survey underscores a general lack of integration of vector-borne diseases into climate adaptation strategies, both at the national and cantonal levels. Most respondents were unaware of whether these health issues are considered in existing climate strategies, suggesting a need to strengthen the connection between climate and vector-borne disease planning. Together, these findings point to the importance of reinforcing institutional capacity, inter-cantonal collaboration, and federal support in order to build a more coherent and effective response to the rising threat of vector-borne diseases under changing climatic conditions.