

Assessing food-borne risks of *Toxocara* infection in support of public health and food quality assurance

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Project Description: The neglected parasitic disease toxocariasis, caused by infection with the roundworm *Toxocara*, is an increasing public health concern. There is growing evidence for clinical and subclinical impacts of toxocariasis, for example through neurological and respiratory disease and impaired cognitive development. Seroprevalence studies suggest a significant burden of human infection worldwide and it is likely that many cases go unreported. Human infection has traditionally been thought to arise primarily from contact with soil contaminated by *Toxocara* eggs shed in the faeces of infected dogs, cat and foxes. Intriguingly, a wide range of animal species can also act as transport hosts for *Toxocara*, and this includes livestock. For example, up to 47% of sheep in the UK, have tested positive for specific anti-*Toxocara* antibodies. This raises the possibility of meat-borne transmission. Beyond some case reports linked to consumption of undercooked bird liver, however, this route has largely been ignored in public health risk assessments. Furthermore, contamination of vegetables with *Toxocara* eggs but as yet the level of hazard has not been investigated.

The aim of this project is to examine the risks of meat-borne, vegetable and soil transmission of *Toxocara*, and apply surveillance data and epidemiological modelling to evaluate appropriate intervention strategies. The project will involve a serological survey of UK livestock at slaughter for anti-*Toxocara* antibodies, testing of meat for presence of *Toxocara* DNA and viable larvae, tracing of sources of infections to farms of origin and testing environmental samples for presence of *Toxocara*, as well as assessing level of contamination of vegetables on sale in the UK. The data collected will be integrated into a mathematical model of *Toxocara* spread and this will be used to evaluate different approaches to control *Toxocara* transmission and protect public health. The project findings will be shared with key stake-holders so they can be used to inform food safety policies and practice.

As the level of risk posed by consuming food products contaminated with *Toxocara* is currently unknown, this project will provide important information on which to base recommendations for food safety and public health. The suggestion that food might act as a source of infection with *Toxocara* might explain the high seroprevalence globally. Moreover, higher levels of infection in poorer countries, which have been attributed to poorer hygiene and contact of people with environments contaminated with eggs could also be explained by close contact between dogs and cats and agricultural land in less developed agricultural systems. Scientifically, the project addresses a significant gap in knowledge and will develop practical tools for measuring, tracking and altering infection risk, that could be applied by researchers elsewhere.

References:

<https://doi.org/10.1016/j.puhe.2018.06.017>

<https://doi.org/10.1016/j.vetpar.2012.12.034>