

# Exposure and consequence assessment of the transmission of hepatitis E from animals to humans in Switzerland

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## Key words

Hepatitis E, risk assessment, foodborne zoonosis, pork, Switzerland

## Aim of the study

The objective of the study was i) to quantify the risk of hepatitis E in the Swiss population via the consumption of specified Swiss pork products and ii) to estimate the total burden of human hepatitis E in Switzerland.

## Material and methods

A quantitative risk assessment was carried out according to the Codex Alimentarius Framework. Fifty three meat products were included in the model. Different scenarios were modelled for the hazard and risk characterization due to the unavailability of a dose-response relationship for oral exposure to hepatitis E virus (HEV). The HEV prevalence in Swiss pig livers at slaughter was determined with a precision of 5% and a confidence interval of 95%.

The burden of hepatitis E was estimated in terms of Disability Adjusted Life Years (DALY) as recommended by the World Health Organization (WHO), and using detailed data about hepatitis E cases diagnosed at two major hospitals based in the *Ticino* canton, as well as additional laboratory data from three other cantons.

## Results and significance

The prevalence of HEV in 160 pig livers of 40 different Swiss fattening farms was estimated to be 1.25% (95% confidence interval 0.3%-4.4%). This estimate was used as input in the risk assessment model, together with data from other published studies. The risk of foodborne acute hepatitis E was considered negligible in products containing only pork meat. Pork products containing pork liver and if sold raw (i.e. plain pork liver and *Leberwurst*) were identified as the products with the highest risk for the consumer of products of Swiss origin.

Assuming insufficient cooking of these products, i.e. heat treatment allowing virus survival of 50% and in 1% of the servings, respectively, the most likely annual numbers of foodborne hepatitis E cases caused by these two products were estimated to be 11'394 [5<sup>th</sup> and 90<sup>th</sup> percentiles 6'615, 21'804] and 198 [122, 524], respectively.

The total burden of hepatitis E in Switzerland was not possible to calculate due to lack of data. Yet, for the *Ticino* canton, it was shown to have significantly increased since 2012 from <5 DALY in the period 2010-2012 per 100'000 inhabitants to >50 in 2015. This change could partly be due to an increased awareness among medical practitioners. Extrapolation to other cantons could be applied if information on differences in food consumption patterns were available. This should be possible in the near future using data from the MenuCH project. Notification of HEV cases should be considered to improve the basis for risk assessments.

## Publications, posters and presentations

Collineau, L.; Müller, A.; Müller, A.; Stephan, R.; Stärk, K.D.C.: "Assessment of the exposure of the Swiss population to Hepatitis E via the consumption of pork products". ECVPH Annual Scientific Conference and Annual Meeting, Belgrade, Serbia, 7 to 9<sup>th</sup> October 2015. (Oral communication + poster).

Müller, A.; Collineau, L.; Stephan, R.; Mueller, A.; Stärk, K. D.C.: Assessment of the risk of foodborne transmission and burden of hepatitis E in Switzerland. *Int. Journal of Food Microbiology*, in press.

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