

sensed datasets. To account for the prolonged latency of CE and AE, we used covariates for different years (i.e. 2000, 2005 and 2010) and for an extended period of 30 years (i.e. monthly mean). We summarised the different covariates at the local community level and assessed correlations with the SIR of CE and AE using the Spearman's rank correlation test. We also computed the variance inflation factor (VIF) to assess multicollinearity between covariates. We then fitted three types of conditional autoregressive (CAR) models for each disease, namely an independent, a convolution, and a so-called Leroux model. We used covariates exhibiting significant correlation with the SIR of CE or AE and no multicollinearity as explanatory variables, and case counts as response variables. We selected the best CAR model and further refined the covariate selection using the Deviance Information Criterion (DIC).

Convolution models exhibited the best fit in terms of DIC for both diseases. None of the selected environmental variables exhibited significant effect on the number of CE cases, whilst there was a significant negative effect of mean annual temperature in 2005 on AE cases. These preliminary findings might inform targeted prevention and control in high-risk areas.

#### Key messages:

- We assessed environmental and climatic risk factors for cystic and alveolar echinococcosis in Kyrgyzstan.
- Our preliminary findings suggest that alveolar echinococcosis risk in Kyrgyzstan is associated with climatic factors such as 10-year lag mean annual temperature.

## Environmental and climatic risk factors for cystic and alveolar echinococcosis in Kyrgyzstan

Giulia Paternoster

G Paternoster<sup>1,2</sup>, G Boo<sup>3</sup>, R Flury<sup>4,2</sup>, KM Raimkulov<sup>5</sup>, G Minbaeva<sup>6</sup>, J Usualieva<sup>6</sup>, B Müllhaupt<sup>7</sup>, P Deplazes<sup>8</sup>, R Furrer<sup>4,9</sup>, PR Torgerson<sup>1</sup>

<sup>1</sup>Section of Epidemiology, Vetsuisse Faculty, University of Zurich, Zurich, Switzerland

<sup>2</sup>Life Science Zurich Graduate School, ETH Zurich and University of Zurich, Zurich, Switzerland

<sup>3</sup>WorldPop, Department of Geography and Environment, University of Southampton, Southampton, UK

<sup>4</sup>Department of Mathematics, University of Zurich, Zurich, Switzerland

<sup>5</sup>Department of Medical Biology, Genetics and Parasitology, I.K. Akhunbaev Kyrgyz State Medical Academy, Bishkek, Kyrgyzstan

<sup>6</sup>Government Sanito-Epidemiology Unit, Ministry of Health of the Kyrgyz Republic, Bishkek, Kyrgyzstan

<sup>7</sup>Division of Gastroenterology and Hepatology, University Hospital Zurich, University of Zurich, Zurich, Switzerland

<sup>8</sup>Institute of Parasitology, Vetsuisse Faculty, University of Zurich, Zurich, Switzerland

<sup>9</sup>Department of Computational Science, University of Zurich, Zurich, Switzerland

Contact: giulia.paternoster@uzh.ch

Cystic and alveolar echinococcosis-CE and AE-are parasitic zoonoses caused by tapeworms *Echinococcus granulosus* and *E. multilocularis*. Their lifecycle is associated with particular environmental and climatic conditions, which have been identified as risk factors for CE and AE transmission. In this study, we assessed potential environmental and climatic risk factors for CE and AE in Kyrgyzstan where both diseases are endemic.

We previously estimated CE and AE surgical incidence and standardised incidence ratio (SIR) at the local community level in Kyrgyzstan for the period 2014-2016. We obtained 190 geospatial covariates on potential environmental and climatic risk factors for the two diseases from remotely