

Seasonality of infection diseases in Germany compared to climate and its possible predictability on seasonal and climatic timescales

Peter Hoffmann (1), Frank Schwab (2), Tim Eckmanns (3), and Petra Gastmeier (3)

(1) Potsdam Institute for Climate Impact Research, Climate Impacts & Vulnerability, Potsdam, Germany

(peterh@pik-potsdam.de), (2) Institute of Hygiene and Environmental Medicine, Charité - University Medicine Berlin, Berlin, Germany, (3) Robert-Koch-Institut, Berlin, Germany

Existing similarities in the seasonality between infection diseases and monthly climate conditions in Germany has been systematically analyzed (1) on the seasonal and (2) on the climatic timescale. Both diarrheal infections caused by *Campylobacter*, *Legionella* and blood stream infections in intensive care units (ICU) caused by gram-negative (GN) bacteria show a recurrent peak around late summer and early autumn. However, this is somehow shifted by 1 or 2 months compared to the well-known seasonal cycle in temperature.

For the time period of common data 2001-2015 we first try to explain the time lag by using a statistical relation which estimates the interannual variability of the infectious peak in August-October by the monthly mean temperature in the previous months May-July. High predictability measures were found. This finding motivates advanced considerations on the climatic timescale.

First, the time-lag was removed by shifting the temperature time series one month forward and second, a pathogen-temperature relation was derived, respectively. Finally, this relationship was used to assess the climatic part of the past and future infective trajectories. Both, long temperature time series and data from regional climate models were used to estimate the climate change effect on infection diseases.