

# BIKE

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BIKE is a Bayesian dietary exposure assessment model for microbiological and chemical hazards. Only a few Bayesian models have been applied for dietary exposure assessments and the specialized codes are seldom widely accessible for other users. Therefore, a graphical user interface was developed utilizing OpenBUGS and R in tandem, as a shiny app. The application connects Bayesian hierarchical models for both occurrence data and consumption data, to build a Bayesian exposure estimation. Occurrence data provides information on hazard concentrations and prevalence in food types. In turn, consumption data provides information on consumption amounts and frequencies for the same foods. Concentrations are often left-censored measurements (below reporting limits) which can be interpreted either as small but non-zero values, or possibly including true zeros and analyzed with zero-inflated models. Dietary reporting days may be independent occasions or consecutive days as a Markov chain. Consumptions of various foods can be correlated as with multivariate normal distribution. For these options, a user can select the appropriate models, which exploit properties of log-normal models. Based on data entries, the R-code builds the needed likelihood structures accordingly for the Bayesian model to be simulated. The model provides an assessment of long term mean exposure for chemical hazards, and acute exposure for microbiological hazards. In quantitative risk assessments, the separation of uncertainty and variability is often emphasized. Therefore, the results aim to visualize both by using "2D-simulation" where the uncertainty of parameters is given by the posterior distribution, and the variability of the predicted quantity is given by the conditional probability distribution, given the parameters. BIKE is to be available from github and an extensive manuscript is to be finalized. This presentation briefly shows the functionality of the user interface.