QUANTITATIVE RISK ASSESSMENT OF *CRYPTOSPORIDIUM PAVUM, GIARDIA LAMBLIA AND ENTAMOEBA HISTOLYTICA* IN SURFACE WATER AS A SOURCE OF TAP WATER

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Objective - To determine the adverse health effect caused by *Cryptosporidium parvum, Giardia lamblia,* and *Entamoeba histolytica* in surface water by simulation technique.

Methods - Exposure assessment. The surface water as a source of tap water in Bangkok was accommodated from Mae Klong and Chao Phraya rivers. The sampling volume was 20 liters. Water samples were filtered to concentrate and separate (oo)cysts from debris. After extracted and purified, the PCR assay was employed to detect *C. parvum, G. lamblia,* and *E. histolytica*. The concentration of (oo)cyst follows the Poisson distribution. The water consumption follows the lognormal distribution (Mu = -1.6 L^{-1}person·day). The probability of exposure is a function of protozoa concentration and water consumption.

- Hazard characterization. The dose-response model to estimate probability of infection for *C. parvum and G. lamblia* is exponential (r = 0.0572 and 0.0199) and that for *E. histolytica* is Beta-Poisson (alpha = 0.101 and Beta = 0.357).

- Risk characterization. The risk (probability of infection) is the conditional probability of infection given the probability of exposure. The models with variables described by probability distribution were analyzed by simulation software.

Result - The mean risk estimates of *C. parvum, G. lamblia,* and *E. histolytica* on western surface water were -12.25, -12.71, and -11.56 log person^{-1}day^{-1}, respectively. While the mean risk estimates of those on eastern surface water were between -12.25 and -7.76, -12.71 and -4.50, and -11.56 log person^{-1}day^{-1}, respectively. All risk estimates were considered negligible except that of *G.lamblia* was extremely low.

Keywords : risk assessment, *Cryptosporidium, Giardia, Entamoeba ,* surface water