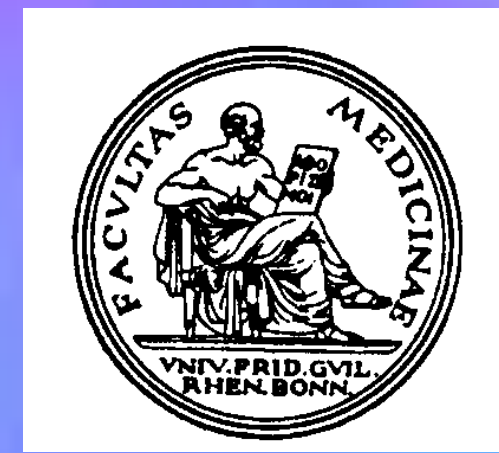


The Occurrence of Pathogens in Surface Water with regard to the Catchment Area



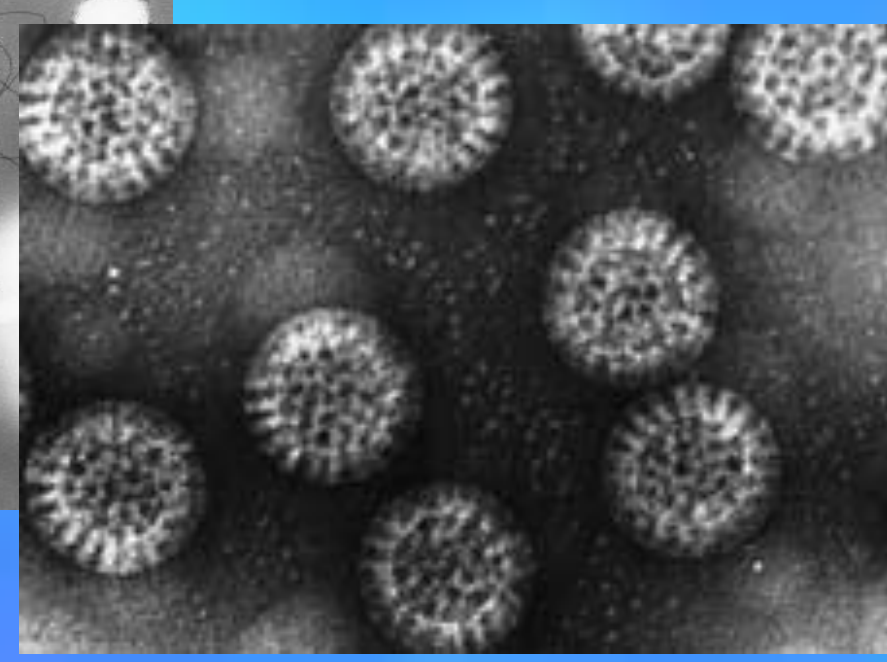
Friederike Dangendorf, Angela Queste, Ina Stalleicken, Thomas Kistemann, Martin Exner
Institute for Hygiene and Public Health, University of Bonn, Germany
WHO CC for Health Promoting Water Management and Risk Communication

Introduction

The occurrence of pathogenic micro-organisms in surface water is of significant hygienic interest, especially if they are intended for drinking water supply. Natural conditions as well as human activities in catchment areas highly affect the quality and safety of sea water, rivers, creeks, lakes, ponds and reservoirs. There is still a lack of knowledge concerning possible ways of contamination of surface water with pathogens and their persistence in watercourses. Our poster presents some results of a review in which different studies were analysed for the geocological aspects of the different catchment areas and their implication on microbial contamination of surface water.



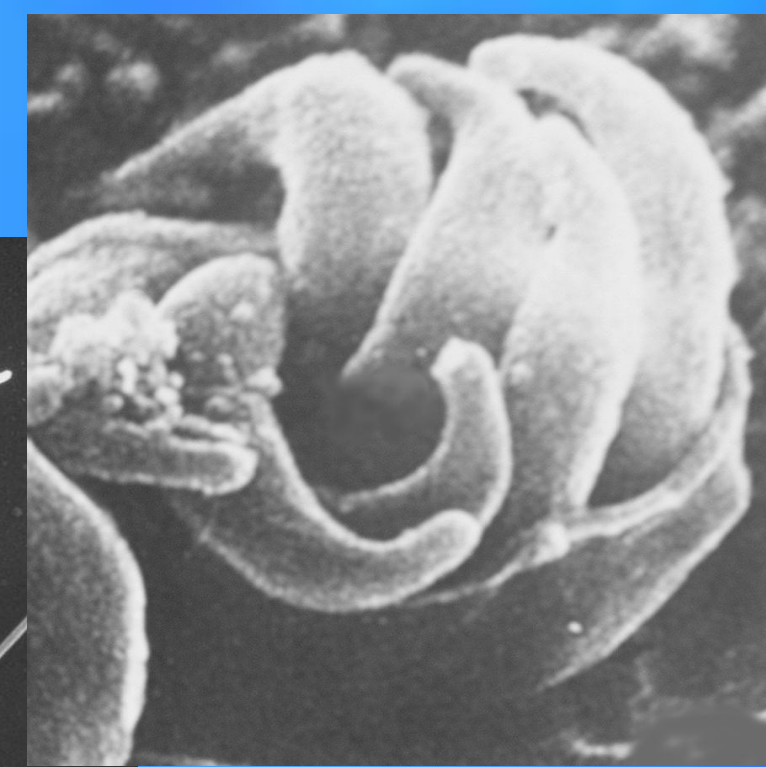
E. coli O157:H7



Rotavirus



Giardia cyst



Cryptosporidium oocyst

Methods

Data were collected by reviewing studies including information about the occurrence and measured concentrations of bacteria, viruses, fungi and protozoa and their relationship to the different types of catchment areas as well as indicator parameters. The study results were managed in an electronic data base. Figure 1 and 2 show the database information.

Figure 1: Template for data entry of the different study results

Figure 2: Template of data entry for reviewed references

Summary of study results: bacteria

Only few studies provided information about associations between the type of catchment area and the occurrence of bacteria. The highest concentrations of *Campylobacter* spp. were found in catchment areas with agricultural land use; but there was also an increasing health risk in periurban catchments (Ashbolt et al. 2002). For *Aeromonas*, *Salmonella* spp. and *E. coli* O157:H7, it was not possible to draw a general conclusion concerning the detection of these pathogens in typical catchment areas; e. g. *Salmonella* were found at bathing sites contaminated by bathers, waste water, sea birds or agricultural run off (Marino et al. 1995, Tobias & Heinemeyer 1994, Till 2000)

Summary of study results: parasites

The most frequent association for *Cryptosporidium* and *Giardia* had been detected between surface water sources and a high density of domestic and wild animals, whereas on one hand *Cryptosporidium* occurred almost ubiquitously at concentrations that correlate with dairy farming and density of fallow deer in the catchment area and on the other hand *Giardia* cysts were principally associated with the presence of sewage and beavers (Atherholt et al. 1998, Hansen & Ongerth 1991, Hsu et al. 1999, Kistemann et al. 2002, LeChevallier et al. 1991, Payment et al. 2000, Robertson & Gjerde 2001).

Summary of study results: viruses

The occurrence of enteric viruses in surface water bodies indicate faecal contamination from the human environment. Rotaviruses and enteroviruses are predominantly found in river or sea water polluted by discharges from densely populated and industrial areas. Adenoviruses and enteroviruses were also frequently found in lakes and rivers whose catchment areas are influenced by birds and sheep farming (Johl et al., 1991, Payment & Franco, 1993, Queiroz et al., 2001, Van Olphen et al., 1991, Till et al., 2000). The occurrence of viruses in surface water may still be underestimated due to insufficient detection methods.

Different types of waterbodies and catchment areas



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Contact:

Dr. Friederike Dangendorf
Institute for Hygiene and Public Health
University of Bonn
Sigmund-Freud-Str. 25
D-53105 Bonn
Tel: (0228) 287 9517; Fax: ~ 9516
email: friederike.dangendorf@ukb.uni-bonn.de
homepage: <http://www.meb.uni-bonn.de/hygiene>