

A new model calculates infection risks from water

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Many infectious viruses are transferred to humans from water or other liquids. A microbiologist at Eawag has now investigated how high the risk of infection is when someone comes into contact with polluted water.

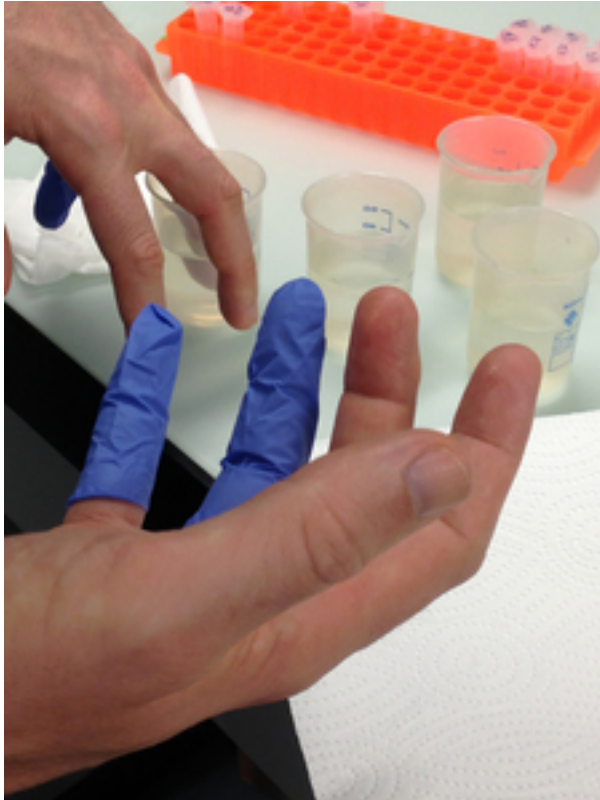
Again and again it happens that humans fall ill with diarrhoea or have to vomit because they have come into contact with virus-contaminated liquids. This happens, for example, in swimming pools, hospitals, during floods or when collecting faeces and urine in dry toilets. Many infectious diseases are transmitted to humans by means of an intermediate reservoir such as water, blood or urine. Even today, several million children die every year from digestive-system diseases and respiratory infections – above all in countries with a weak infrastructure.

But the exact method and in what quantity viruses living in water are absorbed through human skin have until now scarcely been investigated. “In order to model the spread of virus diseases, one must know the probability of infection after one has come into contact with a polluted liquid,” explains Ana Karina Pitol, who is working on her doctorate at Eawag on just this topic.

Risk models identify infection hotspots

Microbiologist Pitol has developed a model based on laboratory experiments that describes exactly this process – how viruses are transmitted to human skin from liquids. The result is partially dependent on the virus concentration in the liquid and how much liquid remains on the skin. In order to get numbers as realistic as possible, Pitol worked with human cadaver skin as well as genuine, infectious viruses. “Normally, one carries out such experiments with model viruses that are not dangerous for humans as

well as with synthetic skin,” explains Pitol. But: with this method one gets results that are too inexact, she found in comparative experiments.



*A volunteer test subject dips his finger in a fluid with the harmless model virus.
(Photo: Ana Karina Pitol)*

Her findings now give one a basis for calculating, in order to generate infection models. These should show where and during what activity the danger of infection is especially high. “Then,” Pitol is certain, “it will be possible to take purposeful protective measures.”

Original publication

Pitol et al., Transfer of enteric viruses (adenovirus and coxsackievirus) 1 and bacteriophage (MS2) from liquid to human skin; Applied and Environmental Microbiology (2018); [doi:10.1128/AEM.01809-18](https://doi.org/10.1128/AEM.01809-18)

Contact



Tim Julian

Group Leader of Pathogens and Human Health

Tel. +41 58 765 5632

tim.julian@eawag.ch

<https://www.eawag.ch/en/info/portal/news/news-archive/archive-detail/a-new-model-calculates-infection-risks-from-water>