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Human viruses and viral indicators in marine water at two recreational beaches in southern California, United States

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ABSTRACT

Waterborne enteric viruses may pose disease risks to bather health but occurrence of these viruses has been difficult to characterize at recreational beaches. The aim of this study was to evaluate water for human virus occurrence at two Southern California recreational beaches with a history of beach closures. Human enteric viruses (adenovirus and norovirus) and viral indicators (F+ and somatic coliphages) were measured over a four-month time period in water samples from Avalon Beach, Catalina Island, California (CA; n = 324) and Doheny Beach, Orange County, CA (n = 112). Human viruses were concentrated from 40 L samples and detected by nested-reverse transcriptase-PCR. Detection frequencies at Doheny Beach were 25.5% (adenovirus) and 22.3% (norovirus), and at Avalon Beach were 9.3% (adenovirus) and 0.7% (norovirus). Positive associations between adenoviruses and fecal coliforms were observed at Doheny ($p = 0.02$) and Avalon ($p = 0.01$) Beaches. Human viruses were present at both beaches at higher frequencies than previously detected in the region, suggesting that the virus detection methods presented here may better measure potential health risks to bathers. These virus recovery, concentration and molecular detection methods are advancing practices so that analysis of enteric viruses can become more effective and routine for recreational water quality monitoring.

Full Text

http://ftp.sccwrp.org/pub/download/DOCUMENTS/AnnualReports/2013AnnualReport/ar13_595_610.pdf