

Journal of Environmental Indicators, 9:5, 2015
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Human Health Risks: Environmental Indicators of Microbiological Quality

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Improvement in sanitation and protection of water quality has clearly been one of the most important developments in public health. Surface water of poor quality results in higher costs for municipal drinking water treatment, poses a risk for the quality of irrigated crops, and is a hazard for recreational use. The disparity in water quality between affluent areas of the developed world and many areas in the developing world is reflected in a wide gap in mortality and morbidity due to waterborne disease. Wastewater reuse for crop irrigation will become increasingly practiced as changes in weather patterns result in more widespread arid conditions. At the other extreme of climate variability, extreme precipitation events mobilize and transport contaminants across landscapes, representing a further challenge to managing water quality. Overall, ensuring the availability of water in adequate amounts and of adequate quality for societal needs and the maintenance of environmental quality represents a significant looming challenge for much of humanity.

Most of Canada is blessed in having access to an abundance of high quality water, although there are periodic instances of pollution problems reflected in beach closures, algal blooms, and outbreaks of waterborne disease. In this country water is potentially at risk of fecal contamination from our large and varied livestock industry, the use of fecal material as a valued source of fertilizer in crop production, effluents of human sewage and septage, and avian or terrestrial wildlife. The relative importance of these fecal sources varies with local land use and climate characteristics. Contamination of water resources with fecal microorganisms represents a significant risk to human and animal health. This presentation will give an overview of current practice with respect to microbiological indicators, and emphasize future developments with respect to detecting, quantifying and interpreting the significance of indicator, pathogenic, and antibiotic-resistant microorganisms.