Planning on drinking water safety: What are the benefits of reducing risks?

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Abstract:
Water Safety Plans (WSPs), recommended by the World Health Organization in 2004, seek to proactively identify potential risks to drinking water supplies and implement preventive barriers called “critical controls.” To evaluate the outcomes of WSP application in large drinking water systems in France and Spain, we undertook an observational retrospective cohort study of diarrheal disease incidence, in conjunction with analysis of water quality and performance indicators, before and after WSPs were implemented at five locations between 2003 and 2015. Measured water quality indicators included bacteria, disinfection by-products, residual chlorine, aluminum, pH, turbidity, and total organic carbon; performance indicators included exceedances of regulated, recommended, or operational water quality thresholds. We used Poisson regression to examine diarrheal rates in WSP-affected water service areas relative to a comparison site, and multiple, Poisson, or Tobit regression to evaluate water quality before and after the WSP intervention. Performance was assessed by comparing water quality to relevant internal guidelines and external regulatory thresholds, and informal audits were conducted to evaluate factors influencing WSP outcomes. The WSP implementation process did improve water quality, health, and compliance with relevant regulatory and operational water quality thresholds at some locations, although this effect was not universal. Findings suggest the WSP approach may translate to a wide range of potential water quality, health, and operational benefits across large chlorinated water systems in developed nations.