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Effect of Sampling Frequency on Shoreline Microbiology Assessments

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ABSTRACT

More than 80,000 shoreline bacteriological samples are collected annually in southern California to protect beachgoer health, but sampling frequency varies from daily to monthly among sampling sites. To assess the effectiveness of various sampling frequencies, we used five years of data from 24 Los Angeles area sites that have been monitored daily to simulate five alternative sampling strategies: five weekdays, five days per week including a weekend day, three days per week, weekly, and monthly. For each of these sampling strategies, we included in the simulation the local custom of adaptive sampling, in which a site is resampled the following day if bacterial concentrations exceed the State of California's beach water quality standards. We found that sampling five times per week resulted in observing about 80% of the events in which State standards were exceeded. This frequency dropped to 55%, 25%, and 5% for three times per week, weekly, and monthly sampling, respectively. Adaptive sampling was ineffective because nearly 70% of the water quality exceedances were single-day events, even at the most frequently contaminated sites. This high frequency of single-day events is of concern because the public is typically notified about water quality conditions 24-48 h after samples are collected, meaning that most warnings are out-of-date when they are issued.

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