

Relationship between coliphage and *Enterococcus* at southern California beaches and implications for beach water quality management

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ABSTRACT

Coliphage have been suggested as an alternative to fecal indicator bacteria for assessing recreational beach water quality, but it is unclear how frequently and at what types of beaches coliphage produces a different management outcome. Here we conducted side-by-side sampling of male-specific and somatic coliphage by the new EPA dead-end hollow fiber ultrafiltration (D-HFUF-SAL) method and *Enterococcus* at southern California beaches over two years. When samples were combined for all beach sites, somatic and male-specific coliphage both correlated with *Enterococcus*. When examined categorically, *Enterococcus* would have resulted in approximately two times the number of health advisories as somatic coliphage and four times that of male-specific coliphage, using recently proposed thresholds of 60 PFU/100 mL for somatic and 30 PFU/100 mL for male-specific coliphage. Overall, only 12% of total exceedances would have been for coliphage alone. Somatic coliphage exceedances that occurred in the absence of an *Enterococcus* exceedance were limited to a single site during south swell events, when this beach is known to be affected by nearby minimally treated sewage. Thus, somatic coliphage provided additional valuable health protection information, but may be more appropriate as a supplement to FIB measurements rather than as replacement because: (a) EPA-approved PCR methods for *Enterococcus* allow a more rapid response, (b) coliphage is more challenging owing to its greater sampling volume and laboratory time requirements, and (c) *Enterococcus*' long data history has yielded predictive management models that would need to be recreated for coliphage.

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