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Editorial

Editorial for *Health Risk of Bathing in Southern California Coastal Waters* by Brinks et al

In "Health Risk of Bathing in Southern California Coastal Waters," Brinks et al use a simulation model to estimate rates of illness in bathers at southern California beaches. Models that incorporate quantitative data, such as bacterial indicator densities in beach water, beach visitation numbers, and the like, can be useful in approximating real-world outcomes associated with that data. However, the variables and assumptions used in the model must be applicable to the data in order for the outcomes to be accurate. There are a number of unknown variables regarding the science of monitoring beach water quality and health risks for bathers. Unfortunately, the statements and modeled estimates in the article by Brinks et al do not lead to a better understanding of these unknowns, fail to incorporate some of the known, and even serve to misconstrue and cloud the true research priorities for beach managers and health departments in southern California.

The simulation model used in the Brinks et al article contains several faulty assumptions that undermine the accuracy of the estimated illness rates in bathers. The two central, faulty assumptions in Brinks et al are as follows.

1. Significant quantities of human pathogenic microbes from sewage or wastewater effluent are regularly impacting southern California beaches.

The article states that "urban runoff in this region often carries significant volumes of untreated sewage . . . ." The references listed do not support this statement. For San Diego County, aside from the Tijuana River, this statement is not supported by data or research. For human pathogenic microbes from sewage and treated wastewater to cause illness in a bather, the bather must contact these microbes. In southern California, ocean outfalls that discharge treated wastewater effluent are typically located miles offshore and far below the surface. No studies have indicated that effluent from these ocean outfalls impact the shoreline with any frequency or regularity. At three locations where outfall discharges are suspected to impact the shoreline, the discharge effluent has been disinfected.

2. All of the measured bacterial densities of enterococci or fecal streptococci originate from human sources.

Research has shown that these bacteria have many other sources, including soils, wildlife, and rotting vegetation like kelp. At San Diego County beaches, source investigation studies conducted since 2002 have found that most enterococci bacterial sources are nonhuman. Furthermore, a southern California marine water epidemiology study (cited in Brinks et al) found that enterococci and other fecal indicator bacteria from these nonhuman sources do not correspond to illnesses in bathers, or the Cabelli and Kay predictive illness rates used in the simulation model in the article under discussion here. Therefore, using illness rates derived from epidemiology studies based on point (human) sources of contamination will likely overestimate illness rates for bathers at beaches where most of the bacteria sources are nonhuman.

Finally, some of the references cited in the article are either estimates based on similar models or have conclusions based on data of unknown quality. The work of Dwight et al (2004) and the work of Turbow et al (2007) are flawed in measuring health effects related to beach water contact because they fail to use data from a controlled epidemiological study. The work of Turbow et al (2003) and Given et al (2006) are modeled estimates based on the same quantitative data used in the article by Brinks et al (bacterial indicator densities, beach visitation numbers, etc). These references also share the same aforesaid faulty assumptions contained in Brinks et al, thereby undermining the accuracy of the modeled outcomes.

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