34 ABSTRACT

35   Studies of health risks associated with recreational water exposure require investigators to make

36   choices about water quality indicator averaging techniques, exposure definitions, follow-up

37   periods, and model specifications; but, investigators seldom describe the impact of these choices

38   on reported results. The objectives of this article were to: 1) report illness risk from swimming at

39   a non-point source and urban runoff impacted marine beach, 2) measure associations between

40   traditional and rapid fecal indicator bacteria (FIB) levels and subsequent illness among

41   swimmers and 3) investigate the sensitivity of results to a range of exposure and outcome

42   definitions. In 2009, the authors enrolled 5,674 people in a prospective cohort at Malibu Beach

43   and measured health outcomes 10-19 days later. Concurrent water quality samples were

44   measured for FIB using traditional- and rapid analytical methods. The authors compared illness

45   risk between non-swimmers and swimmers, and among swimmers exposed to different FIB

46   levels. Diarrhea was more common among swimmers than non-swimmers (OR=1.88 95% CI

47   1.09, 3.24) within 3 days of the beach visit. There was no consistent association between FIB

48   levels and swimmer illness under conditions of relatively good water quality; sensitivity analyses

49   demonstrated that overall inference was not substantially affected by exposure and outcome

50   definition choice.