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Simulation Approach to Assess the Precision of Estimates Derived from Linking Survey and Administrative Records

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Probabilistic record linkage implies that there is some level of uncertainty related to the classification of pairs as links or non-links vis-à-vis their true match status. As record linkage is usually performed as a preliminary step to developing statistical estimates, the question then is how does this linkage uncertainty propagate to them? In this paper, we develop an approach to estimate the impact of linkage uncertainty on derived estimates by using a re-sampling approach. For each iteration of the re-sampling, pairs are classified as links or non-links by Monte-Carlo assignment to model estimated true match probabilities. By looking at the range of estimates produced in a series of re-samples, we can estimate the distribution of derived statistics under the prevailing incidence of linkage uncertainty. For this analysis we use the results of linking the 2014 National Hospital Care Survey to the National Death Index performed at the National Center for Health Statistics. We assess the precision of hospital-level death rate estimates.

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