Finding population and demographic markers in wastewater using samples collected during a population census

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Population size has been considered the largest uncertainty for wastewater-based epidemiology estimates. In an earlier study we attempted to address this uncertainty by identifying potential population markers in wastewater samples collected from 10 wastewater treatment plants during the 2011 Australian Census which allowed for accurate population counts to be determined. The potential markers (mostly pharmaceuticals and personal care products) were combined in a Bayesian inference model to estimate the daily (*de facto*) population size. This sampling approach was applied more comprehensively during the 2016 Australian Census for approximately 100 wastewater treatment plants covering approximately 70% of the population. In addition to accurate population data, the Census data also provide insight into demographics of communities such as age, ethnicity, gender, income, level of income.

Through both targeted and non-targeted analysis approaches of the wastewater influent samples and statistical interrogation, it is envisaged that both population size and demographic markers will be identified in these samples. Work has commenced on analysing these samples to allow for recalibration of the previous model and to screen for additional population and demographic markers. Census data become available from June 2017.

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