

# Assessment of drinking water quality and user perceptions between filling stations and water fountains on a college campus: a mixed methods approach

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## Abstract

Installation and use of water filling stations for reusable bottles on college campuses is increasing. Filling station conditions and reusable water bottle use may impact public health and safety due to increased water access and a risk of cross-contamination. The purpose of this study was to enumerate microbial populations on public sources and assess influence of water delivery infrastructure on consumer acceptability. Five focus groups investigated participant experiences with water fountains, filling stations, and tap water (total n=23 participants). Eight categories emerged regarding participant opinions and water source usage. Buildings (n=4), with near-proximity water fountain and filling stations, were sampled three times over three months. Spouts and the drain surface (10cm<sup>2</sup>) were swabbed on the water fountain and filling station. Water samples were collected at each location for chemical (pH, chlorine, and metals) and microbial (APC and *E.coli*/coliforms) evaluation. T-tests were used to determine statistical differences between the fountains and filling stations ( $\alpha=0.05$ ). Filling stations had higher APC (10.4x10<sup>3</sup> CFU/cm<sup>2</sup>) than fountains (8.8 CFU/cm<sup>2</sup>) ( $p<0.05$ ) in the drain surface (10cm<sup>2</sup>) but not on the spouts. Water chemistry and water microbial levels (<1 CFU/ml) were not different ( $p>0.05$ ). Coliforms were present at three of four filling station drain surface sites while not found at fountain sites. Qualitative data contradicts quantitative results, as participants disliked using water fountains due to unsanitary perceptions and felt filling stations were cleaner as well as more user-friendly. The poor sanitation of public filling stations may provide cross-contamination opportunities at impacting public health and safety.