



## Changes in breath trihalomethane levels resulting from household water-use activities.

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### Source

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### Abstract

Common household water-use activities such as showering, bathing, drinking, and washing clothes or dishes are potentially important contributors to individual exposure to trihalomethanes (THMs), the major class of disinfection by-products of water treated with chlorine. Previous studies have focused on showering or bathing activities. In this study, we selected 12 common water-use activities and determined which may lead to the greatest THM exposures and result in the greatest increase in the internal dose. Seven subjects performed the various water-use activities in two residences served by water utilities with relatively high and moderate total THM levels. To maintain a consistent exposure environment, the activities, exposure times, air exchange rates, water flows, water temperatures, and extraneous THM emissions to the indoor air were carefully controlled. Water, indoor air, blood, and exhaled-breath samples were collected during each exposure session for each activity, in accordance with a strict, well-defined protocol. Although showering (for 10 min) and bathing (for 14 min), as well as machine washing of clothes and opening mechanical dishwashers at the end of the cycle, resulted in substantial increases in indoor air chloroform concentrations, only showering and bathing caused significant increases in the breath chloroform levels. In the case of bromodichloromethane (BDCM), only bathing yielded a significantly higher air level in relation to the preexposure concentration. For chloroform from showering, strong correlations were observed for indoor air and exhaled breath, blood and exhaled breath, indoor air and blood, and tap water and blood. Only water and breath, and blood and breath were significantly associated for chloroform from bathing. For BDCM, significant correlations were obtained for blood and air, and blood and water from showering. Neither dibromochloromethane nor bromoform gave measurable breath concentrations for any of the activities investigated because of their much lower tap-water concentrations. Future studies will address the effects that changes in these common water-use activities may have on exposure.