

An Occupational Health Risk Assessment for Exposure to Benzene, Toluene, Ethylbenzene and Xylenes: A Case Study of Informal Traders in a Metro Centre (Taxi Rank) in South Africa

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Abstract : Many South Africans commuters use minibus taxis daily and are connected to the informal transport network through metro centres informally known as Taxi Ranks. Taxi ranks form part of an economic nexus for many informal traders, connecting them to commuters, their prime clientele. They work along designated areas along the periphery of the taxi rank and in between taxi lanes. Informal traders are therefore at risk of adverse health effects associated with the inhalation of exhaust fumes from minibus taxis. Of the exhaust emissions, benzene, toluene, ethylbenzene and xylenes (BTEX) have high toxicity. Purpose: The purpose of this study was to conduct a Human Health Risk Assessment for informal traders, looking at their exposure to BTEX compounds. Methods: The study was conducted in a subsection of a taxi rank which is representative of the entire taxi rank. This subsection has a daily average of 400 minibus taxi moving through it and an average of 60 informal traders working in it. In the health risk assessment, a questionnaire was conducted to understand the occupational behaviour of the informal traders. This was used to deduce the exposure scenarios and sampling locations. Three sampling campaigns were run for an average of 10 hours each covering the average working hours of traders. A gas chronograph was used for collecting continuous ambient air samples at 15 min intervals. Results: Over the three sampling days, the average concentrations were, 8.46ppb, 0.63 ppb, 1.27ppb and 1.0ppb for benzene, toluene, ethylbenzene, and xylene respectively. The average cancer risk is 9.46E-03. In several cases, they were incidences of unacceptable risk for the cumulative exposure of all four BTEX compounds. Conclusion: This study adds to the body of knowledge on the Human Health Risk effects of urban BTEX pollution, furthermore focusing on the impact of urban BTEX on high risk personal such as informal traders, in Southern Africa.

Keywords : human health risk assessment, informal traders, occupational risk, urban BTEX

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