

# Assessment of Toll Booth Plaza Workers' Exposure to Traffic Pollutants and its Resultant Effect on Lung Functions

## Executive summary

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While the quality of outdoor air is often a subject of discussion, it would be equally appropriate to focus on people engaged in occupations in the outdoors. These would be people engaged at toll booth plazas and refuelling retail outlets (or the petrol pumps).

Vehicular traffic emit volatile organic compounds (VOCs), respirable suspended particulate matter (RSPM), oxides of sulphur (SO<sub>x</sub>), oxides of nitrogen (NO<sub>x</sub>), and carbon monoxide (CO), which in high levels may bring adverse health effects on the exposed populations.

This mix of air pollutants increases the risk of respiratory illnesses associated with particles and also exposure to known carcinogens, such as benzene. Small particles and oxides of nitrogen penetrate deep into the respiratory tract and affect both, the respiratory and immune systems. Clinical effects of exposure include a shallow respiratory rate, rapid heart rate, wheezing, shortness of breath, and coughing lasting from 2 to 3 weeks. Sensitive individuals, including children, asthmatics, and people with chronic obstructive pulmonary disease are particularly affected.



MCD toll plaza: Various factors at tollbooth sites affect air quality



Air quality monitoring in progress at tollbooth at NHAI toll plaza

### **MCD toll plaza various factors at tollbooth sites affect air quality**

Among the outdoor workers, tollbooth workers are potentially exposed to high levels of traffic related air pollutants due to their proximity to vehicle idling, deceleration, and acceleration.

Needless to say, exposure level to traffic pollutants for highways and municipality tollbooth locations in Delhi-NCR was high. On comparing the worksites we found-

- Average pollutant concentration for PM<sub>2.5</sub> for 8 hour average was highest at municipality toll plaza (219 µg/m<sup>3</sup>) followed by highway toll plaza (149 µg/m<sup>3</sup>). Lowest pollutant concentration was found in the outdoor workers (100 µg/m<sup>3</sup>).
- Average pollutant concentration for NO<sub>x</sub> for 8 hour average was also highest at the municipality toll plaza (226 µg/m<sup>3</sup>) followed by highway toll plaza (98 µg/m<sup>3</sup>). In this case also, the outdoor workers recorded the lowest (60 µg/m<sup>3</sup>).

Our study results suggest a need for intervention at toll plazas to reduce the exposure of booth workers. These measures include, installation of toll booths with ventilation system so that the work area is flushed with clean (or filtered), uncontaminated air and maintenance of positive air pressure. Long-term measures to reduce exposure of outdoor workers could be brought by following stricter vehicular emission norms and by adopting better vehicle technology.

Further, exposure can also be minimized through management of congestion by increasing number of lanes, promotion of smart cards for prepaid toll tax lanes at the toll plaza, and landscaping or creating green belts.