Understanding the level of atmospheric ultrafine particles is important to assess their potential impact to human health. However, to our knowledge, there are so far no studies in Vietnam on this topic. This study was hence the first assessment of ultrafine particle concentrations in terms of particle number (PN) in Hanoi, by simultaneously measuring indoor and outdoor concentrations of PN at six households across the city in January, 2016. The occupants of participating households were also asked to keep their diaries of activities during monitoring days. The PNC data and information from activity diaries were then used to determine the factors influenced the PN levels in those buildings. At the same time, PM$_{2.5}$ data were also acquired to compare the general trends between PN and PM$_{2.5}$ concentrations.

Daily mean indoor and outdoor PN concentrations for the monitoring period were 1.8 x 10$^4$ p/cm$^3$ and 3.2 x 10$^4$ p/cm$^3$, respectively, but significantly higher during rush traffic hours. Traffic was concluded to be the main contributor to outdoor PNC. The mean ratio of indoor to outdoor PNCs for all six sites was 0.71 ± 0.23, i.e. indoor PNC was mainly influenced by outdoor PNC except its peak levels were mainly attributed to indoor sources such as cooking. The practice of opening window for ventilation in Vietnam also contributes to influence of outdoor PNC to indoor PNC.

While PNCs and I/O ratios measured in Hanoi were similar to those reported for a number of cities in developed countries its ambient daily average PM$_{2.5}$ concentrations (60 – 70 μg/m$^3$) were significantly higher than those typically recorded in developed countries. These findings demonstrate that urban particle mass (PM$_{2.5}$) concentrations are not indicative of the PNCs, which can be explained by differences in the sources contributing to PN and PM.