INDOOR / OUTDOOR AIR QUALITY RELATIONSHIP IN AN URBAN ENVIRONMENT: DUBLIN CASE STUDIES.

Avril Challoner, *Trinity College, Ireland*
Dr Laurence Gilll, *Trinity College, Ireland*

Background and Aims: Legislative reductions in air pollutant limits values seek to better outdoor air quality, in turn reducing associated illnesses such as cardiopulmonary mortality, strokes and lung cancer. This study focuses on two major traffic related pollutants NO_x (NO_2 + NO) and $PM_{2.5}$. Previous research suggests that people now spend up to 90% of their day indoors yet in Ireland no legislative indoor air pollutant limits exist. A study carried out a study on 57 office environments and found 75% of our daily NO_2 exposure occurred while at work (Lee et al., 2000). This research aims to determine the relationship between exposure of staff to specific air pollutants in Irish working environments (e.g. shops, offices) and factors such as ventilation systems and door design.
Methods: NO_x data is gathered by a monitor working on Chemiluminescence principles and $PM_{2.5}$ by a monitor using light scattering and Gravimetric techniques. Monitors are placed inside and outside (roof and street levels) of the buildings and run continuously for 4 days per run.
Results: To date monitored 5 work places located on busy street canyons of the city centre in Dublin, Ireland have been monitored. Clear relationships between indoor and outdoor concentrations could be seen for sites. Results indicate that indoor concentrations can be significantly greater than outdoor concentrations, Indoor Outdoor ratios of up to 3.97 for NO and 2.13 for $PM_{2.5}$.
Conclusions: I/O indicate greater exposure to those working within the affected buildings than ambient outdoor concentrations indicate. The compliance of Ireland and many other European countries to air quality limit values is based on outdoor air quality; these results show that outdoor monitoring alone may not be enough to quantify true exposures of those working in urban areas.
References:
LEE, K., YANG, W. & BOFINGER, N. D. 2000. Impact of microenvironmental nitrogen dioxide concentrations on personal exposures in Australia. *Journal of the Air and Waste Management Association,* 50**,** 1739-1744.