CN Davies annual report 2016

By: Alison Connolly

My research project is to investigate the occupational exposure to pesticides of horticultural amenity workers. Early in 2015, I developed biological monitoring protocols to conduct the study. These protocols were reviewed by the National University of Ireland, Galway's Ethical Committee and received full ethical approval. My project is funded by the Office of Public Works, a government body in Ireland responsible for the maintenance and upkeep of the country's historical monuments and national parks and the pesticide users within this company were invited to participate in the study. This sampling involved taking urine samples of the workers before the task began and within one hour of the task completion. I obtained 80 samples, 40 paired samples of two substances, glyphosate and fluroxypyr. The samples have been grouped into four similar exposure groups. These samples have been sent for analysis to the Health and Safety Laboratory (HSL) in the United Kingdom and it has been approximated that we will have results by the end of January 2016.

I was on site for the sampling and obtained a large amount of contextual information on the tasks such as chemical type, quantity used, applicator, weather conditions, use of personal protective clothing etc. and I also recorded the pesticide application tasks of any worker that gave consent (approximately, over half the workers allowed a video to be taken). Once the task was completed, an observational assessment was conducted of the task using a modelling tool called the GuLF DREAM assessment tool, (the GuLF Long-term Follow-up DeRmal Exposure Assessment Method) developed by the Institute of Occupational Medicine (IOM). The videos were also sent to an expert on the GuLF DREAM modelling tool and I completed training on conducting these assessments and comparison of scores of each task was completed. This assessment tool is used to determine exposure to aerosols by emission, deposition and surface transfer and it gives an overall score for dermal exposure.

Some changes have occurred from when the original essay that was submitted for the CN Davies award in 2015. The assessment of bystanders was not included in the biological monitoring programme, as the definition of bystander and the recruitment was likely to raise many research ethical issues. Another change that occurred was that we did not obtain inhalation samples of the workers. From previous research, it was found that approximately 1% of exposure to pesticide is from inhalation and that up to 99% of exposure is from dermal absorption. We obtained the biological monitoring samples to determine the uptake of the pesticide and conducted dermal assessments using the GuLF DREAM modelling tool. The measured exposure results from the biological monitoring and the estimated exposure results from the modelled data will be compared to determine whether if there is a correlation. Other routes of exposure have such little contribution to overall exposure that we expect it will make little or no difference to the study.

I also completed a small pilot study to determine whether a fluorescent dye study could be conducted among these workers to give a visual image to qualitative demonstrate the exposure to the worker but also be used to determine the route of exposure from the contamination pattern. This was conducted on two workers and would need further development.

Last year I attended the International Occupational Hygiene Society conference in London and I have submitted an abstract to the UK Irish exposure science meeting in Brixton for April 2016. I am also attending the International Exposure Science meeting in the Netherlands in October 2016, to do an oral presentation, as part of a symposium on pesticide exposure, on the work I have done to date.