RMIT University MONASH University

The Car Wash Pilot Study

Report to Participants
January 2014

Aim

The aim of this study was to pilot test a methodology to measure indirect water ingestion from spray exposure. This involved measuring the excretion of the non-toxic chemical cyanuric acid (CYA) in the urine of volunteers who carried out a simulated car washing activity using tap water containing this chemical.

The research team had already developed a method that we believed would be capable of detecting very small ingested volumes of water (in the order of 0.1 mL or less), but this pilot study was needed see if the method would work in the real world:

- could we design an experimental rig to simulate real car washing?
- how difficult would it be to recruit participants?
- would people actually turn up for their appointment and do the test?
- would they collect all their urine and bring it back on time?
- how many urine and water samples would we be able to analyse each week?
- could we actually detect any water ingestion or would all the results be “below detection limit”?
- what percentage of people (if any) would ingest quantifiable amounts?

The target sample size chosen for the car wash part of the pilot study was 25 participants, as this was considered sufficient to assess the logistical aspects. Tests were also done on a further 12 randomly selected participants to check our previous finding that average excretion of CYA is about 85% (not 100% as published in the literature).

Results

The pilot study was carried out over a 12 week period at RMIT city campus:

- the car replica rig, laboratory facilities and test procedures worked well,
- advertising methods were effective in generating interest in the study among eligible people,
- recruitment targets were achieved, with 26 participants completing the car wash test and 12 completing the known dose test,
- only a few problems were encountered with participant compliance with study requirements, and most participants completed the 24 hour urine collection in a satisfactory manner,
- the analytical method for cyanuric acid performed well, however the analysis was the rate limiting step in the study, partly due to limited access to the analytical equipment,
- the results of the known dose tests showed an average of 86% excretion of cyanuric acid, very similar to the 85% observed in our preliminary trial,
- we were successful in detecting water ingestion in most car wash participants, and the ingested volumes were in the quantifiable range of the assay for more than half of the participants.

Conclusions

This successful pilot study showed that the methodology was practical and we now have a way to actually measure water ingestion from spray exposures instead of using “expert opinion”. The information obtained from this pilot study will allow us to design larger studies to provide a statistically robust measurement of water exposure for different activities or for comparison of different scenarios. This will provide more accurate information for risk assessment and allow us to improve water quality regulations for use of recycled water and other non-potable (non-drinking) types of water.

Acknowledgments

This study was funded by Coliban Region Water Corporation, Melbourne Water Corporation, South Australian Water Corporation, Sydney Water Corporation and Water Research Australia.