

Analysis of occupational hygiene exposure data

On 23 and 24 October, the University of the Witwatersrand School of Public Health (SoPH), Occupational Health Division (OHD) held a short course on the analysis of occupational hygiene exposure data. The aim of the course was to equip participants with knowledge and skills for appropriately analysing occupational exposure data. It was attended by approximately 40 professionals in the field of occupational hygiene, mostly employed by the larger industrial companies, mines and consultancies. Prof. Jérôme Lavoué (University of Montreal, Canada) was the principal lecturer, assisted by Prof. Derk Brouwer and other Wits OHD staff.

The first part of the course comprised lectures on relevant statistical methods for exposure data analysis, with emphasis on (log-normal) distributions, imputation of non-detects, and calculation of exceedance of an Occupational Exposure Limit (OEL). In addition, various exposure measurement strategies were introduced and the strategies currently applied in South Africa were discussed in the context of recent worldwide developments.

The second part of the course focused on grouping workers into Homogeneous or Similar Exposure Groups (HEGs/SEGs). Approaches to test the 'homogeneity' of the HEGs/SEGs, e.g. by quantile-quantile plots, and within and between workers' variances, were explored. Emphasis was on the constitution of HEGs/SEGs using various information sources, e.g. expert judgement, historical data and exposure models. The principle of Bayesian inference was introduced,

as well as Bayesian hierarchical frameworks that facilitate the use of such information by combining it with actual exposure data to strengthen the data interpretation. This was further demonstrated by exploring two existing Bayesian tools: IH Data Analyst and the Advances Reach Tool (ART).

The final part of the course was 'hands on' in the computer laboratory where occupational hygiene data analysis tools were introduced, and two examples of 'frequentist' tools, i.e. IHSTAT and BW_stats, were further explored. In addition, the web-based Bayesian Expostats tool was explained; participants were able to use their own datasets to familiarise themselves with the various interpretation tools.

Apart from some 'hiccups' during the downloading of the standalone tools during the first practical session, the course logistics progressed smoothly. The course content was highly appreciated, especially since the needed statistical theory was very much focused on the practical application in the field of occupational exposure data. The course proved to be a new and valuable asset to occupational hygiene professional development education and will be repeated in 2018.

*Report by: Derk Brouwer
Chair: Occupational Hygiene
Occupational Health Division
University of the Witwatersrand School of Public Health
e-mail: derk.brouwer@wits.ac.za*



Jérôme Lavoué (University of Montreal, Canada) assisting short course participants

Photograph: Goitsewang Keretsetse



Wits School of Public Health representatives Kevin Renton, Dudu Mditshwa, Derk Brouwer and Daniel Masekameni with Jérôme Lavoué (second from left)

Photograph: Goitsewang Keretsetse