

**Lucy Carpenter** (Faculty Fellow) this year was particularly pleased to see completion of a large epidemiological study of the long-term health of almost 20,000 members of the UK armed forces who had been included in chemical warfare agent tests at Porton Down between the 1940s and the 1980s. This was a research project which, way back in 2002, she started taking the lead on jointly with Dr Katherine Venables (Department of Public Health, University of Oxford) thanks to the award of a research grant from the Medical Research Council. This funding allowed employment of the necessary research teams to undertake extensive manual abstraction, computer entry, checking, cleaning and linkage of data and the consequent statistical analyses.

Abstraction of personnel data from military file archives was required both for the Porton Down veterans who took part in the chemical tests and a similar number of veterans who had not taken part in tests (non-Porton Down veterans). These were then submitted to the Office of National Statistics who provided information on deaths, emigrations and cancer registrations up to the end of 2004. Assembly of data on the chemical tests involved manual abstraction of data from 97 books held in the Porton Down historical experimental archive covering the years 1941 to 1989. Over the period studied, just under 200,000 tests were recorded involving up to 500 different chemicals. Two of the commonest chemicals used in tests were mustard gas (a vesicant or blistering agent) and sarin (a nerve agent).

This large cohort study has provided valuable insight into the long term health of Porton Down veterans. While this study found all-cause mortality to be slightly higher in Porton Down veterans, this excess did not seem to be associated with any particular type of chemical test. Moreover, the lack of information on other important factors (e.g. smoking) meant that it was not possible to simply attribute the excess mortality to chemical exposures at Porton Down. It also found cancer risk in Porton Down veterans to be the same as that in non-Porton Down veterans providing no evidence of the carcinogenic effects of veterans' exposures to these chemical tests. This research project benefitted greatly from collaboration with Professor Valerie Beral (Cancer Research UK); Professor Pat Doyle, Dr Noreen Maconochie and Dr Tony Fletcher (London School of Hygiene and Tropical Medicine); Dr Mark Nieuwenhuijsen (Imperial College, London). Valuable guidance on exact analytical methods with Sir David Cox, Dr Bianca De Stavola (London School of Hygiene and Tropical Medicine) and Michael Hills was also much appreciated.

Completion of her work on the Porton Down study has allowed more time to be spent on another research area of interest: infectious diseases and cancer in sub-Saharan Africa. Recently, her attention has moved from a common childhood cancer not thought to be associated with infection with HIV (Burkitt lymphoma) to one which is (Kaposi sarcoma). Additional epidemiological research areas being pursued include studying patterns of childhood cancer in the UK using routinely collected data, risk factors for three common types of cancer in adults (breast, prostate and colorectal) and .

### ***Publications***

(with T. Keegan, S. Walker, C. Brooks, T. Langdon, L. Linsell, N. Maconochie, P. Doyle, T. Fletcher, M. Nieuwenhuijsen and K Venables) 'Exposures Recorded for Participants in the UK Chemical Warfare Agent Human Research Programme, 1941–1989', *Annals of Occupational Hygiene*, 53, 83–97, 2009.

(with K Venables, C Brooks, L Linsell, T Keegan, T Langdon, T Fletcher, M Nieuwenhuijsen, N Maconochie, P Doyle and V Beral) 'Mortality in British military participants in human experimental research into chemical warfare agents at Porton Down: cohort study', *British Medical Journal*, 338:b613, 2009.

(with L Linsell, C Brooks, T Keegan, T Langdon, P Doyle, N Maconochie, T Fletcher, M Nieuwenhuijsen, V Beral and K Venables) 'Cancer morbidity in British military veterans included in chemical warfare agent experiments at Porton Down: cohort study', *British Medical Journal*, 338:b655, 2009.