

NDA–PHE Epidemiology Governance Group Annual Report FY2015/2016

The Epidemiology Governance Group of the Nuclear Decommissioning Authority (NDA) and Public Health England (PHE) exists to provide independent governance and oversight of epidemiology and radiobiology work proposed or undertaken in relation to the ex-BNFL and ex-UKAEA radiation worker cohorts.

The Governance Group membership includes representatives of the NDA and PHE, data custodians, representatives of both the management and workforces with responsibility (or legacy responsibility) for members of the study cohorts, and an independent chair. The trade union representatives are from GMB, Prospect and UNITE.

This annual report contains a summary of the FY2015/2016 year's activity in relation to work governed by the NDA–PHE Epidemiology Governance Group.

RESEARCH PROJECTS

Research projects are undertaken to improve the understanding of the effects of radiation and with the aim of protecting the health of workers and the wider population. The Governance Group assures that research activity and the reporting of research is consistent with good practice; the Governance Group does not directly commission or undertake research.

A number of projects have been approved, progressed or completed during the year.

JEM: Job Exposure Matrix for Early Sellafield Plutonium Workers

The JEM project is exploring the possibility of deriving estimates of doses for those early Sellafield plutonium workers whose limited monitoring data means that internal doses cannot currently be calculated with confidence. A job exposure matrix will provide intake, and hence dose, estimates based on information on individual exposure locations and times using data from 'exposure analogues' (individuals with similar exposure histories but who have better monitoring data). The project is being run under a DH PRP¹ programme and involves Sellafield, PHE and the universities of Bristol and Manchester. A review of applicable methodology was published in February 2016 [1]. The project is due to be completed in October 2016.

SOLO² SP3 Project – Pooled Plutonium Worker Analysis

A pooled analysis of plutonium workers from Sellafield and from the Mayak plant in the Southern Urals of Russia was undertaken within the framework of the EC-FP7³ SOLO project. The SOLO project was a 5-year integrated, multi-disciplinary project to investigate the risks to health of low and protracted radiation exposures. The plutonium worker statistical analyses were jointly performed by PHE, the University of Manchester and the Southern Urals Biophysics Institute. The EC-FP7 SOLO project finished at the end of February 2015. Three publications on circulatory diseases and papers on lung cancers and plutonium dosimetry are expected to be published during the next year. A report on dose uncertainty analysis was published in the March 2016 issue of the Journal for Radiological Protection [2].

Case-control Analysis of Uranium and Plutonium Exposed Workers

This work, originally part of the EC-FP6⁴ Alpha-Risk project, is a case-control study involving a relatively small cohort of uranium and plutonium exposed workers. The project, involving workers from three countries (France, Belgium and the UK), was led by CREAL⁵. Three papers are currently being prepared covering dosimetry, uncertainty and the epidemiological analysis. They are expected to be submitted for peer-reviewed publication during FY2016/2017.

Genetic Marker Papers

A team from the University of Manchester has worked to complete approved genetic marker work which was begun by radiobiology and genetics staff at WSC⁶ before August 2010. Radiobiological examination of blood samples, provided by consent, has been undertaken to assess the cellular impact of exposure to ionising radiation. One paper examining chromosomal aberrations in workers exposed to plutonium was published in the International Journal of Radiation Biology [3].

CURE⁷: Uranium Worker Study Feasibility Project

This project's aim was to examine the feasibility and, if appropriate, to develop a proposal and supporting documentation for a collaborative European uranium worker study. The project, undertaken within the EC-FP7 DoReMi⁸ programme, was completed on 31 December 2014.

A paper describing the multidisciplinary approach of the CURE project, its main outputs and conclusions, has been submitted to the Journal of Radiological Protection. Two further papers, under preparation, will describe the development of dosimetry protocol and work on uncertainty analysis.

INTREPID: INTernal Radiation EPIDemiology

A proposed UK study of health risks from occupation exposure to tritium, uranium and plutonium was submitted to the call for proposals under the DH PRP in September 2015 but was not accepted.

University of Bristol and Manchester IHD case-control study

A proposal was brought to the Governance Group for a case control analysis involving an existing subset of Sellafield and Springfields workers and aiming to examine the association between radiation and IHD mortality, with adjustment for important lifestyle and occupational confounding factors. During the reporting period, the proposal had been shortlisted for stage 2 consideration under the DH PRP call. The Governance Group was considering the data access request.

ASSETS

Ex-BNFL and ex-UKAEA Databases

Databases holding the information required for the ex-BNFL and the ex-UKAEA epidemiology projects are managed by PHE. The operation of the ex-UKAEA database is undertaken by Nuvia Ltd; the ex-BNFL database is operated by PHE.

Digitisation of ex-UKAEA internal radiation doses

Within an EC-FP7 framework DoReMi project, work was undertaken to digitise bioassay data previously only held on paper. All bioassay data from the UKAEA cohort has been loaded into the SHIELD database. Software, making use of IMBA⁹ techniques, has been developed to calculate organ doses from this data which can now be used in future epidemiology projects.

Biological Samples

The biological samples (from blood) that had been collected, with consent, from radiation workers and their families as part of the pre-2010 WSC Genetics Group's radiobiology programme of work, continue to be stored at the Newcastle University Biomedicine Biobank (NBB). An audit of samples was undertaken during FY2015/2016, providing a satisfactory report. A full review of documentation association with the samples, a literature review and a review of the ethical position relating to further work involving the samples is planned for FY2016/2017.

STAKEHOLDERS AND RELATED ENGAGEMENTS

The Governance Group met three times during the reporting year, on 3 July 2015, 13 November 2015 and 11 March 2016.

Researchers and managers have also engaged with industry representatives through separate engagement or correspondence.

Project researchers have engaged throughout the year with other researchers within the UK and internationally. This has largely been through engagement in follow on from collaborative projects such as SOLO, CURE, and DoReMi but additionally through involvement in MELODI¹⁰, CONCERT¹¹ and other opportunities such as scientific meetings or conferences. Key fields of interest have been epidemiology, radiobiology and dosimetry.

ANNUAL REQUIREMENTS

Terms of Reference

The terms of reference for the Governance Group were reviewed and supported at its meeting held on 11 March 2016.

Information Governance (IG) Training

All relevant staff have completed annual IG training.

Subject Access Requests

No subject access requests were received during the FY2015/2016 period.

Caldicott Audits

A Caldicott audit of the ex-UKAEA database work was conducted on 27 July 2015 and reported a satisfactory outcome.

A Caldicott audit of the ex-BNFL database work was conducted on 12 March 2015 and reported a satisfactory outcome.

PUBLICATIONS

[1] Liu H, Wakeford R, Riddell AE, O'Hagan JA, MacGregor DH, Agius R, Wilson C, Peace M, de Vocht F. A review of job-exposure matrix methodology for application to workers exposed to radiation from internally deposited plutonium or other radioactive materials. *J Radiol Prot.* 2016 Mar;36(1);R1-22. Doi: 10.1088/0952-4746/36/1/R1. Epub 2016 Feb 10. [Open Access]

[2] Puncher M, Riddell AE. A Bayesian analysis of plutonium exposures in Sellafield workers. *J Radiol Prot.* 2016 Mar;36(1):1-19. Doi: 10.1088/0952-4746/36/1/1. Epub 2015 Nov 19. [Open Access]

[3] Tawn EJ *et al.* Chromosome aberrations determined by sFISH and G-banding in lymphocytes from workers with internal deposits of plutonium. *Int J Radiat Biol.* 2016 Jun;92(6):312-320. Doi: 10.3109/09553002.2016.1152414. Epub 2016 Apr 4. [Open Access]

¹ DH PRP – the Department of Health's Policy Research Programme for Radiation Protection Research

² SOLO – Epidemiological Studies of Exposed Southern Urals Populations

³ EC-FP7 – European Commission's 7th Framework Programme for Research and Technological Development

⁴ EC-FP6 – European Commission's 6th Framework Programme for Research and Technological Development

⁵ CREAL – Centre for Research in Environmental Epidemiology in Barcelona (CREAL is now part of a merged organisation, ISGlobal)

⁶ WSC – Westlakes Scientific Consulting

⁷ CURE – Concerted Uranium Research in Europe - Uranium Worker Study Feasibility Project

⁸ DoReMi – Low Dose Research towards Multidisciplinary Integration

⁹ IMBA – Integrated Modules for Bioassay Assessment (dose calculation software)

¹⁰ MELODI – Multidisciplinary European Low Dose Initiative (an EU platform for low dose radiation risk research)

¹¹ CONCERT – European Joint Programme for the Integration of Radiation Protection Research