



NDA–PHE Epidemiology Governance Group Annual Report FY2017/2018

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 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 FY2017/2018 year's activity in relation to work governed by the NDA–PHE Epidemiology Governance Group.

Further information on the epidemiology and radiobiology work can be found online at: www.gov.uk/government/collections/radiation-epidemiology

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 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 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). Using these intakes estimates doses

can be calculated. The project was completed in October 2016 and two papers are now being developed covering the development and validation of the JEM.

SOLO¹ 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-FP7² 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. Two papers have been published in Radiation Research this year: one detailing the results of the lung cancer analysis in December 2017 [1] and a second on cardiovascular disease mortality [2].

Case–control Analysis of Uranium and Plutonium Exposed Workers

This work, originally part of the EC-FP6³ 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 CREAL⁴. The final paper relating to this project, an epidemiology paper, was published in the journal Epidemiology in August 2017 [3].

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 WSC⁵ before August 2010. Radiobiological examination of blood samples, provided by consent, has been undertaken to assess the cellular impact of exposure to ionising radiation. A paper examining chromosomal aberrations in tritium workers has been published online by the Journal of Radiological Protection [4].

University of Bristol and Manchester Ischaemic Heart Disease (IHD) case-control study

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 is being undertaken by collaboration between the Universities of Bristol and Manchester, funded under DH PRP⁶. Dose data from the ex-BNFL database has been provided to the researchers for this study. The results of the work will be published in the peer reviewed scientific literature.

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

Funded by an EC-FP7 project (DoReMi), work was undertaken to digitise bioassay data previously only held on paper. All bioassay data from the UKAEA cohort has now been loaded into the SHIELD database. Software, making use of IMBA⁷ techniques, has been developed to calculate organ doses from this data which can now be used in future epidemiology studies.

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). Following viability testing of the samples and a review of the associated databases, it has been concluded that the samples are suitable for further research. A proposal is under development.

STAKEHOLDERS AND RELATED ENGAGEMENTS

The Governance Group met three times during the reporting year, on 8 September 2017, 24 November 2017 and 9 March 2018.

PHE researchers have engaged throughout the year with other radiation researchers within the UK and internationally primarily at scientific meetings or conferences. The aim is to promote awareness of the cohort among the radiation protection community. Also to develop links that will foster opportunities for collaborative research that will be more informative than studying the cohort on its own.

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 updated at its meeting held on 15 March 2018.

Information Governance (IG) Training

All relevant staff have completed annual IG training.

Subject Access Requests

No subject access requests were received during the FY2017/2018 period.

Caldicott Audits

A Caldicott audit of the ex-UKAEA database work was conducted on September 2017 and reported a satisfactory outcome.

A Caldicott audit of the ex-BNFL database work was conducted on March 2018 and reported a satisfactory outcome.

General Data Protection Regulation (GDPR)

Work is being undertaken to ensure that the epidemiology and radiobiology programmes are compliant with the GDPR. The operation of both programmes is expected to satisfy the conditions of the new legislation when it comes into force in May 2018.

PUBLICATIONS

The following papers can be accessed for free online by entering the doi number (digital object identifier) into a search engine.

[1] Gillies *et al.* Lung Cancer Risk from Plutonium: A Pooled Analysis of the Mayak and Sellafield Worker Cohorts. *Radiat Res.* 2017 Dec; 188(6):645-660. doi: 10.1667/RR14719.1 [Open Access]

[2] Azizova *et al.* An Assessment of Radiation-Associated Risks of Mortality from Circulatory Disease in the Cohorts of Mayak and Sellafield Nuclear Workers. *Radiat Res.* 2018 Apr;189(4):371-388. doi: 10.1667/RR14468.1 [Open Access]

[3] Grellier J *et al.* Risk of Lung Cancer Mortality in Nuclear Workers from Internal Exposure to Alpha Particle-emitting Radionuclides. *Epidemiology.* 2017 Sep;28(5):675-684. doi: 10.1097/EDE.0000000000000684 [Open Access]

[4] Tawn *et al.* Chromosome aberrations in workers occupationally exposed to tritium. *J Radiol Prot.* 2018 Jun;38(2):N9-N16. doi: 10.1088/1361-6498/aab0d0 [Open Access]

¹ SOLO – Epidemiological Studies of Exposed Southern Urals Populations

² EC-FP7 – European Commission's 7th Framework Programme for Research and Technological Development

³ EC-FP6 – European Commission's 6th Framework Programme for Research and Technological Development

⁴ CREAL – Centre for Research in Environmental Epidemiology in Barcelona (CREAL is now part of a merged organisation, ISGlobal)

⁵ WSC – Westlakes Scientific Consulting

⁶ DH PRP – the Department of Health's Policy Research Programme for Radiation Protection Research

⁷ IMBA – Integrated Modules for Bioassay Assessment (dose calculation software)