

Report NCU grant

Report submission date:

Main applicant: Eero Pukkala

Project title: Work and cancer: in-depth studies initiated by the NOCCA project

NCU grant received (€): 85,000

Project commencement and completion dates: 2012, on-going

Please e-mail report to: ncu@kreftforeningen.no

1. Brief description of the project, written in a language understandable to non-scientists (Maximum length: 100 words)

The project will assess cancer risks related to occupational factors in all Nordic populations. A method to estimate exposure to cancer-causing factors for every Nordic person will be utilised to find out possible dose-response relations and turned to population attributable fractions.

2. Summarize the major findings of the project (Maximum length: 400 words)

During the first year of NCU-funded period, about 20 scientific articles have been published or analyses for the publications done. The overall burden of the work-related factors in total cancer incidence is less than 5%, but if also the factors such as lack of exercise, workplace-driven negative health habits etc. are taken into account, much larger. The giant Nordic data has made it possible to study occupational risks of very rare cancer types. For instance heavy wood dust exposure (in the Nordic countries mainly soft wood) has shown to cause at least 30-fold excess risk of nasal adenocarcinoma.

3. Describe how the project has increased our knowledge of the prevention, cause and/or cure for cancer (Maximum length: 150 words)

The findings of this project are directly incorporated to work related to occupational health and understanding of cancer hazards in the work places.

4. Outline how Nordic cooperation has added value to this project (Maximum length 100 words)

This type and quality of analysis cannot be done in any other part of the world. Many of the results to be achieved will be novel findings or have importance in confirmation of earlier findings from earlier small studies.

5. Publications resulting from this grant

The output of NOCCA research in 2011-2012 has been extensive. The outcomes - according to the Interim report (24 August 2012) of the first-year progress in the study program are listed below. Our next Interim report will be constructed in August 2013. The collaboration with IARC is close, and NOCCA data are systematically requested, for instance for the monograph evaluations.

Published/accepted articles

Occupation and scrotal cancer: Results of the NOCCA study. Verhoeven, R.H.A., Kiemeny, L.A.L.M., Coebergh, J.W.W., Weiderpass, E., Kjaerheim, K., Martinsen, J.I., Lynge, E., Pukkala, E.. *Acta Oncol.* 2011; 50: 1244-1246.

Occupation and risk of primary Fallopian tube carcinoma in Nordic countries. Riska, A., Martinsen, J.I., Kjaerheim, K., Lynge, E., Sparen, P., Tryggvadottir, L., Weiderpass, E., Pukkala, E.. *Int. J. Cancer* 2012; 131: 186-192.

Cancer incidence among priests – 45 years of follow-up in four Nordic countries. Stang, A., Martinsen, J.I., Kjaerheim, K., Weiderpass, E., Sparén, P., Tryggvadottir, L., Pukkala, E.: *Eur. J. Epidemiol.* 2012; 27: 101-108, DOI: 10.1007/s10654-011-9645-7

Incidence of uterine leiomyosarcoma and endometrial stromal sarcoma in Nordic countries: Results from NORDCAN and NOCCA databases. Koivisto-Korander R., Martinsen J.I., Weiderpass E., Leminen A., Pukkala, E.: *Maturitas* 2012; 72: 56-60.

Occupational exposure to wood dust and formaldehyde and risk of nasal, nasopharyngeal, and lung cancer among Finnish men. Siew SS, Kauppinen T, Kyyrönen P, Heikkilä P, Pukkala E. *Cancer Manag Res.* 2012;4:223-32. Epub 2012 Aug 7 (<http://www.ncbi.nlm.nih.gov/pubmed/22904644>).

Occupation and leukemia in Nordic countries. Talibov, M., Kautiainen, S., Martinsen, J.I., Kjaerheim, K., Lynge, E., Sparen, P., Tryggvadottir, L., Weiderpass, E., Pukkala, E.: *Occupation and leukaemia in Nordic countries. J. Occup. Environ. Med.* (in press, accepted June 2012).

Analyses done, manuscript finalisation in progress

Cancer among Nordic firefighters (Paul Demers, Canada)

Cancer among veterinarians (Laura Laakso, Finland, in collaboration with veterinarians from other Nordic countries)

Occupational factors of mesothelioma in Sweden (Nils Plato, Sweden)

Occupational risk of esophageal cancer (Catarina Jansson and Jesper Lagergren, Sweden)

Tri and tetrachloroethylene as cause of non-Hodgkin lymphoma (Jelle Vlaanderen and Kurt Straif, IARC, France)

Opposite cancer patterns among fishermen and sea workers (a paper to be jointly written by Nordic seafarers' occupational health experts)

Physical activity at work and cancer risk in men (first author Jorma Sormunen, Belgium, doctoral student supervised by Eero Pukkala)

Dose-response analyses on wood dust and adenocarcinoma of nose (doctoral student Angelica Siew, Malaysia, supervised by Eero Pukkala)

Does alcohol consumption explain the large occupational variation in risk of oral cavity and pharynx (doctoral student Laura Tarvainen, Finland, supervised by Nea Malila/Eero Pukkala)

Trends in cancer incidence among restaurant waiters; relation to changes in passive smoking? (doctoral student Jere Reijula, Finland, supervised by Kari Reijula/Eero Pukkala)

Does occupational variation explain the difference in colorectal cancer risk between Denmark and Norway (Elsebeth Lynge, Denmark; Jan Ivar Martinsen, Norway)

Changes in socioeconomic variation in incidence in cancers over time and region (Susanne Dalton, Denmark).

Analyses in progress

Formaldehyde exposure and risk of cancer at selected sites (Tom Grimsrud, Norway)

Cancer risk related to exposure to electromagnetic fields at work (doctoral student Pauline Slottje, the Netherlands, supervised by Roel Vermeulen)

Adjusting effects of smoking and drinking using proxy variables (student Ville Karhunen, UK/Finland, supervised by Esa Läärä)

Occupational variation in incidence of granulosa cell tumours (doctoral student Saara Bryk, Finland, supervised by Annika Riska)

Occupation, smoking and bladder cancer phenotype: an investigation of the link between different carcinogens and tumour biology (James Catto, UK)

Occupational variation in cancer patient survival (Arun Pokhrel, Nepal/Finland)

Economic cycles, employment and health: disentangling causal pathways in a cross-national study (Mauricio Avendado, UK & France)

Book chapters

Biobanks and registers in epidemiological research on cancer. by Pukkala, E. In: Dillner, J. (ed.): *Methods in Biobanking. Methods in Molecular Biology*, 2011, Volume 675. Totowa, Humana Press 2011, pp. 127-164. DOI: 10.1007/978-1-59745-423-0_3 {includes 8 pages of description of NOCCA project as an example of sophisticated use of Nordic data registers}.

A book chapter written by Grimsrud, T., Weiderpass, E. and Pukkala for the book "Occupational Cancer" by Springer, editors Sisko Anttila, Paolo Boffetta, and Kurt Straif (deadline September 2012).

An updated overview of the NOCCA methods and results invited for the book "Recent Advances in Occupational Epidemiology" by Oxford University Press (deadline December 2012).

Workshop on occupational cancer

Nordic Institute for Advanced Training in Occupational Health (NIVA) workshop "Nordic Occupational Cancer (NOCCA) Studies" in Mariehamn on Åland in August 2011, with 25 participants from 10 countries. The 2.5-day workshop was based on usage of the NOCCA data material and methodology and related results. {Because of most positive evaluation scores, NIVA asked NOCCA team to organise another course on work and cancer which will be organised in Porvoo 17-20 September 2013.}

NOCCA-related lectures

Aug 2011 International symposium on assessment of the burden of work-related diseases, Finnish Institute of Occupational Health, Helsinki, Finland (Eero Pukkala invited speaker).

Sep 2011 22nd International Conference on Epidemiology in Occupational Health - EPICOH 2011, Oxford, UK: NOCCA minisymposium in Oxford in EPICOH2011 meeting with five presentations: Eero Pukkala (general presentation, chair), Kristina Kjarheim (farmers, chair), Nils Plato (JEM), Johnni Hansen (shift work), Paul Demers (fire-fighters) and Angelica Siew (welding and metals).

Sep 2011 Symposium "Epidemiological Research on Data from Population-Based Cancer Registries" (at the Annual Convention GMDS & DGEpi), Mainz, Germany (Eero Pukkala invited speaker)

Oct 2011 Seminar on factors related to unemployment of young people, Epidemiological Society in Finland and Social Insurance Institution, Helsinki, Finland (Eero Pukkala organiser, chairman)

Nov 2011 Laboratory Medicine Day symposium, University of Lund, Sweden (Eero Pukkala plenary speaker)

Nov 2011 Cancer registries for better cancer control in the EU: Unity and diversity in reporting risk and outcome, European Cancer Control Summit, Brussels, Belgium (Laufey Tryggvadottir invited speaker)

Feb 2012 Workshop on "Roadblocks and remedies for the use of cancer registries in translational research" at IARC, Lyon, France (Eero Pukkala invited expert)

Apr 2012 Finnish Cancer Registry 60 years Symposium: "Miracle of Register-based research", Helsinki, Finland (Eero Pukkala invited speaker)

Apr 2012 Symposium of Belgian Research Society, Antwerp, Belgium (Eero Pukkala invited speaker)

Aug 2012 ANCR Meeting, Oslo (Laufey Tryggvadottir invited to speak under header "Flagships of Nordic collaboration")

Sep 2012 European Epidemiology Congress, Porto, Portugal (Eero Pukkala session organiser and invited plenary speaker)