

France, Norway and the USA participating in an international consortium of agricultural cohorts (AGRICOH).

Methods Use of each active ingredient was estimated from self-report (USA) or crop production combined with crop pesticide exposure matrices (France and Norway). Multivariable Cox regression was used to estimate overall and age-stratified (adjusted for exposure to other pesticides and other potential confounders. Cohort-specific estimates were combined using random effects meta-analysis.

Results Among 316,270 farmers (75% male), 63% had ever used at least one pesticide, and 91 incident Hodgkin lymphoma cases were diagnosed during follow-up from 1993 to 2011 (3,574,815 person-years). Risks were elevated in association with use of the herbicide dicamba (meta-HR=1.63, 95% CI: 0.83–3.22; 35 exposed cases), DDT (meta-HR=1.79, 95% CI: 0.73–4.37; 27 exposed cases), and the synthetic pyrethroid insecticides deltamethrin (meta-HR=1.86, 95% CI: 0.76–4.52; 25 exposed cases) and esfenvalerate (meta-HR=1.86, 95% CI: 0.78–4.43; 22 exposed cases), though precision was low.

Conclusion This was the largest effort from prospective studies to evaluate associations between the use of specific pesticides and the risk of Hodgkin lymphoma. Nevertheless, analyses were relatively underpowered due to low numbers of exposed cases. Future studies should aim to include data on Hodgkin lymphoma incidence among younger farmers and strive to further refine exposure assessment methods.

RF-289 COLLECTING REAL-TIME SELF-REPORTED INFORMATION ON INTERMITTENT AGRICULTURAL ACTIVITIES USING SMARTPHONES

¹Pabitra Josse, Sarah Locke, Laura Beane Freeman, Jonathan Hofmann, Heather Bowles, Jon Moon, Melissa Friesen. ¹U.S. National Cancer Institute, United States

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Introduction/Objective Farming is a highly variable occupation, with many tasks and exposures, making exposure assessment for epidemiologic studies challenging. We developed and deployed a smartphone app to collect real-time information on intermittent agricultural activities to characterize farming task variability.

Methods We recruited 19 male Iowa farmers, age 50–60 years, to log their farming activities in the app on 24 randomly selected days over 6 months. We populated the app with 350 farming activities; 152 activities were also linked to contextual questions (e.g., pesticide application method, PPE use). We calculated descriptive statistics on the number of activities reported and their duration.

Results The farmers provided activity information for 283 days. The farmers submitted 1,331 activities, representing 124 unique farming tasks. The median duration of a logged day was 545 minutes (interquartile range, IQR: 431–698). The median number of tasks reported per farmer was 18 (IQR: 5–31), with a median of 4 activities per day (maximum 17). The median duration of activities was 63 minutes (IQR: 32–133). The three most frequently reported tasks were related to animal work (36% of activities), transportation (12%), and crops (10%). The tasks with the longest daily duration were planting crops (median: 415 minutes), mixing/loading/applying pesticides (365 minutes), and loading corn (270 minutes). The

shortest tasks (median duration 10 minutes), were fueling trucks, collecting/storing eggs, and tree work. Over 36% of the submitted activities also included responses to contextual questions; these were most frequently about feeding animals (56%), transportation (25%), and mixing/loading/applying pesticides (6%).

Conclusion Our findings show that it is possible to collect real-time, intermittent activity information over the span of several months. We captured most of the farming day and, as expected, observed substantial heterogeneity in activities and their durations, highlighting the need for individual-level activity data when evaluating risks in farmers.

RF-401 AGRICULTURAL EXPOSURES AND RISK OF LYMPHOPLASMACYTIC LYMPHOMA/WALDENSTRÖM'S MACROGLOBULINEMIA IN THE AGRICULTURE AND CANCER (AGRICAN) COHORT

¹Amandine Busson, Pierre Lebaillay, Séverine Tual, Alain Monnereau, Isabelle Baldi, Matthieu Meryet-Figuère, Stephanie Perrier, Mathilde Boulanger. ¹Institut National de la Santé et de la Recherche Médicale (INSERM), France

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Introduction Many studies and meta-analyses concluded that farmers have an excess risk of Non-Hodgkin's Lymphoma (NHL) overall but results remain scarce for rare subtypes, like Lymphoplasmocytic Lymphoma/Waldenström macroglobulinemia (LPL/WM). In the AGRICAN cohort, the incidence of LPL/MW was found significantly higher among farmers than in the general population.

Objective Our aim was to study the association of LPL/WM with some agricultural exposures, like specific crops and livestock, or related tasks.

Methods Our analysis included 155,192 individuals from the 181,842 affiliated to the social agricultural scheme enrolled in 2005–2007 in 11 French areas. Exposure was determined from the report of work on 13 different crops and 5 livestock, for which 2 to 5 specific tasks (including duration and size information) were collected. Incident cases were identified by cross-linkage with population-based cancer registries. Associations with crops, animals and specific tasks were analyzed using Cox models with age as time scale and farmers who were not exposed to the crop/livestock of interest as the referent group.

Results From enrollment to 2015, 1,349 incident NHL cases were identified including 122 LPL/WM cases. Elevated LPL/WM risks were observed in (i) users of pesticides on crops (HR=1.56, 95%CI=1.03–2.38), especially on grasslands (HR=1.85, 95%CI=1.01–3.38), wheat/barley (HR=1.98, 95%CI=1.24–3.16), and corn (HR=2.21, 95%CI=1.41–3.47); (ii) hay-makers (HR=1.66, 95%CI=1.02–2.71); (iii) sowers (HR=1.28, 95%CI=0.75–2.20), especially on wheat/barley: (HR=1.70, 95%CI=1.09–2.65), corn (HR=1.59, 95%CI=0.997–2.551) and root (HR=1.52, 95%CI=0.93–2.50); (iv) cattle breeders (HR=1.92, 95%CI=1.00–3.70), particularly with care (HR=1.97, 95%CI=1.02–3.81). Inverse associations were observed in poultry breeders (HR=0.44, 95%CI=0.28–0.70), particularly with care (HR=0.52, 95%CI=0.32–0.85), and disinfection of livestock premises (HR=0.28, 95%CI=0.11–0.68).

Conclusion Elevated LPL/WM risks were linked with use of pesticide, haymaking and sowing tasks on several crops. Furthermore, specific associations were observed with some

livestock in both directions (positive with cattle breeding and inverse with poultry), although based on small numbers for some activities.

Burden of Disease

RF-184 ESTIMATING THE BURDEN OF CARDIOVASCULAR DISEASES AND DEPRESSION ATTRIBUTABLE TO PSYCHOSOCIAL WORK EXPOSURES IN 28 EUROPEAN UNION COUNTRIES

¹Hélène Sultan-Taieb, Tania Villeneuve, Jean-François Chastang, Isabelle Niedhammer.
¹Université du Québec à Montréal (UQAM), Canada

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Objectives This study aimed to estimate the annual burden of cardiovascular diseases and depression attributable to psychosocial work exposures in 28 EU countries (EU28) in 2015.

Methods This study was based on up-to-date estimates of the fractions of cardiovascular diseases and depression attributable to five psychosocial work exposures in EU28: job strain, effort-reward imbalance, job insecurity, long working hours, and workplace bullying. The outcomes included: coronary/ischemic heart diseases (CHD), stroke, atrial fibrillation, peripheral artery disease, and depression. Burden indicators were prevalent cases, deaths, Years of Life Lost, Years of Life Lost due to Disability, and Disability Adjusted Life Years (DALY). Health outcome data were extracted from the Global Health Data Exchange database, provided by the Institute for Health Metrics and Evaluation. To take into account differences in population sizes between countries, we calculated the prevalence rate, the mortality rate, and the DALY rate per 100,000 workers for each health outcome attributable to each exposure and tested the differences between countries using the Wald test. Results were plotted on maps.

Results The overall burden of CHD attributable to all studied psychosocial work exposures in EU28 was 181,870 to 415,368 prevalent cases, 3,759 to 8,586 deaths, and 129,280 to 295,259 DALYs in 2015. The overall burden of depression was 1,715,026 to 3,645,262 prevalent cases, 8,471 to 18,005 deaths, and 651,665 to 1,385,104 DALYs. Differences between countries for DALY rates per 100,000 workers were significant for all exposures and health outcomes. The highest burdens in DALY rate corresponded to depression attributable to job strain (680 DALY rate per 100,000 workers in Lithuania, 418 in Hungary) and to depression attributable to workplace bullying (371 in France).

Conclusion Such results are necessary as decision tools for decision-makers and policy makers (governments, employers, trade unions) when defining public health priorities and preventive strategies in European countries regarding work stress prevention.

RF-223 CAUSE-SPECIFIC MORTALITY AND SITE-SPECIFIC CANCER INCIDENCE AMONG GREENSPACE WORKERS IN THE AGRICAN COHORT STUDY.

¹Lucie De Graaf, Madar Talibov, Mathilde Boulanger, Mathilde Bureau, Elsa Robelot, Pierre Lebaillly, Isabelle Baldi. ¹INSERM 1219 – Bordeaux Population Health, France

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Introduction Workers in the greenspace industry are exposed to a range of occupational hazards including pesticides. Occupational exposure to pesticides and their health effects have been mainly studied among farmers while data on greenspace workers remain scarce. Exposures in greenspaces are not similar to those in farming: there are differences in applied substances, equipment, application scenario, general environment etc. Studying the impact of pesticides highly used in this specific population provides relevant data on some specific substances like total herbicides (glyphosate, paraquat, etc.).

Objectives To analyse the causes of death and the incidence of main cancers among greenspace workers.

Methods Within the AGRICAN cohort - that enrolled more than 181,000 workers affiliated to the health insurance for agriculture in 2005–2007 in 11 French areas – we defined a sub-cohort of 6,247 workers from the greenspace industry. We run survival analyses (Cox-proportional hazards models) on main causes of death and on cancer incidence from enrolment to the end of 2015. Comparisons with farmers and non-agricultural workers have been performed.

Results Overall mortality among greenspace workers was comparable to that of farmers and non-agricultural workers. However, greenspace workers' overall cancer incidence (n=446) was higher than among farmers (HR=1.15 [1.04–1.27]). Compared to farmers, increased risks have been found in men for: skin melanoma (HR=2.15 [1.33–3.47]), prostate (HR=1.21 [1.02–1.44]), testicular (HR=3.98 [1.50–10.58]), and thyroid (HR=2.84 [1.60–6.41]) cancers; and in women for breast cancer (HR=1.71 [1.17–2.50]). Elevated risks were also found for cancers of the larynx and bladder and sarcomas. These associations have been found among pesticide applicators as well.

Conclusion The differences in cancer incidence between greenspace workers and farmers could suggest the impacts of occupational risks specific to this population. Additional research is underway to better characterize their exposures and will be used in further analyses.

RF-255 OCCUPATIONAL FACTORS RELATED TO MUSCULOSKELETAL DISEASES (MSD) AMONG NURSING AIDES IN NURSING HOME IN TAIWAN

¹Isabella Yu-Ju Hung, Yue Leon Guo, Kuan-Han Lin, Judith Shu-Chu Shiao. ¹Chung Hua University of Medical Technology, Taiwan

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Introduction The percentage of elderly citizens is continually rising due to improved living conditions and health care system around the world. Nursing aides (NAs) were reported at high risk of musculoskeletal disorders (MSDs) in several studies.

Objective The aim of the study was to investigate the association between occupational risk factors in the workplace and MSD among NAs in nursing home.

Methods A cross-sectional study was conducted among female NAs from nursing home. A self-administered questionnaire, including Nordic questionnaire was used to collect data. The association between work-related risk factors and MSDs were analysed by multiple logistic regression.

Results A total of 329 nursing aides were included in the analysis of the study. The average age and tenure of NAs