relevant sources of grey literature. Inclusion criteria: 1. All evaluated initiatives: successful, unsuccessful, and inconclusive; 2. Initiatives implemented in any region, sub-region, or country, etc. no matter the level of economic development or government unit level; 3. Initiatives targeting at micro, meso, or macro-level, within or outside the realm of precarious employment; 4. Reports and peer-reviewed primary studies with a qualitative, quantitative, or mixed-methods design; 5. English, Catalan, Danish, Dutch, French, Italian, Norwegian, Romanian, Spanish or Swedish language studies.

Results Our results will be grouped according to the specific outcomes targeted by interventions, such as health, well-being, health equity, work environment conditions and characteristics, access to social security services or benefits, and worker skills.

Conclusions

By sharing our intermediate findings, we hope to get feedback from key stakeholders and learn of interventions that we may have missed through the literature search. Given the increase in precarious work in both highly-developed and developing countries, we have to strengthen and diversify our efforts to address such challenges.

Rapid-Fire Presentations

Agricultural exposures

RF-33 OCCUPATIONAL RISK EXPOSURES TO PESTICIDES AMONG FARMERS AND FARMWORKERS IN THE PHILIPPINES

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Objective This was a cross-sectional study conducted among 534 farmers in the largest vegetable –producing area in the northern part of the Philippines. This study assessed ergonomic risk factors, and occupational health and safety conditions, among farmers exposed to multiple pesticides.

Methods Methods consisted of interviewer-guided survey questionnaires on pesticide use among farmers, agricultural safety risk factors associated with pesticide exposure, and physical health assessment. Subjects were selected using multi-stage random sampling, yielding a total of 534 farmers.

Results The majority of study subjects were males (53.3%), with a mean age of 47 years old. Occupational exposure accounted for major exposure (84.8%). Farmers often complained of headache (69.4%) and dizziness (41.0%) after their exposure to pesticides. As for common respiratory symptoms, farmers often complained of coughing (39.4%), difficulty of breathing (15.6%), breathlessness (14.9%) and having pulmonary secretions (13.3%). Farmers reported pesticide spills on their body parts while spraying (79%), and 49% complained of getting sick because of their work. Of those who got ill, 69.8% did not receive any medical attention. 40.9% of the farmers were diagnosed with abnormal physical examination findings and less than 10% of the farmers exhibited abnormal laboratory results.

Conclusion The results showed that farmers were exposed to pesticides while undertaking their agricultural work and that certain occupationally-related health symptoms manifested themselves. This underscores the need to improve protection measures so as to reduce the exposure of farmers to pesticides.

RF-152 AGRICULTURAL EXPOSURES AND RISK OF OVARIAN CANCER IN THE AGRICULTURE AND CANCER (AGRICAN) COHORT

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Introduction Ovarian cancer is uncommon, with poor prognosis, and it ranks among the 1st causes of gynecological cancer death in females in developed countries. Few risk (age, genetic, hormonal) and protective (oral contraceptive) factors are established. The role of asbestos, estrogen menopausal therapy and tobacco smoking in ovarian cancers is supported by sufficient evidence in humans (CIRC). The influence of hormones and reproductive factors on ovarian cancer suggests that endocrine disrupters may impact risk.

Objectives We assessed the risk of ovarian cancer among women farmers, and studied associations with livestock, crops and related tasks.

Methods Our analysis included 83,048 women, enrolled in AGRICAN cohort in 2005–2007 in France, who completed an enrolment questionnaire on lifelong agricultural exposures and reproductive life. Ovarian cancer cases were identified by cross-linkage with cancer registries.

Results Until 2015, 186 incident cases of ovarian cancer were identified. Late menopause increased the risk of ovarian cancer, while parity and oral contraceptive use were protective. Decreased risks of ovarian cancer were observed (1) in female farmers compared to non-farmers (HR=0.65[0.43–0.98]), but remained only for those who used oral contraceptive, (2) for some activities (wheat and corn, poultry and sheep/goat), probably due to residual confounding. However, increased risks were observed among (1) female pig-breeders (HR>15 pigs = 1.93[1.08–3.44]), (2) female fruit-growers (HR HR=2.58[1.03–6.41]). Increased risks observed on crops were reinforced among women who did not use oral contraception and results in livestock were unchanged according to oral contraception use.

Conclusion In the AGRICAN cohort established risk (late menopause) and protective factors (oral contraceptive and parity) were confirmed in female farmers. We found positive association for some crops and animal breeding but we also found decreased risks possibly due to residual confounding.

RF-210 EXPOSURE TO PESTICIDES AND RISK OF HODGKIN LYMPHOMA IN AN INTERNATIONAL CONSORTIUM OF AGRICULTURAL COHORTS (AGRICOH)

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Introduction Hodgkin lymphoma is a rare cancer of B-lymphocytes diagnosed in approximately 80,000 individuals worldwide each year. While the use of some pesticides may increase the risk of other lymphoid malignancies, associations with Hodgkin lymphoma remain poorly understood.

Objectives We investigated associations of use of 22 pesticide active ingredients and 13 chemical groups with Hodgkin lymphoma incidence in three large agricultural cohorts from

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

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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

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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 Lymphoplasmacytic 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