



Cancer incidence in the AGRICAN cohort study (2005–2011)



Clémentine Lemarchand^{a,b,c,*}, Séverine Tual^{a,b,c}, Noémie Levêque-Morlais^{a,b,c},
Stéphanie Perrier^{a,b,c}, Aurélien Belot^d, Michel Velten^e, Anne-Valérie Guizard^{a,f},
Elisabeth Marcotullio^g, Alain Monnereau^{h,i,l}, Bénédicte Clin^{a,b,j}, Isabelle Baldi^{i,k,l},
Pierre Lebailly^{a,b,c}, the AGRICAN group¹

^aINSERM, UMR 1086 Cancers et Préventions, F-14076, Caen, France

^bUniversité de Caen Normandie, F-14032, Caen, France

^cCentre de Lutte Contre le Cancer François Baclesse, F-14076, Caen, France

^dHospices Civils de Lyon, Service de Biostatistique, F-69003, Lyon, France

^eRegistre des Cancers du Bas-Rhin, Faculté de Médecine, Université de Strasbourg, F-67085, Strasbourg, France

^fRegistre Général des Tumeurs du Calvados, Centre François Baclesse, F-14076, Caen, France

^gCaisse Centrale de la Mutualité Sociale Agricole, Direction de la santé sécurité au travail, F-93547, Bagnolet, France

^hRegistre des hémopathies malignes de la Gironde, F-33076, Bordeaux, France

ⁱINSERM, ISPED, Centre INSERM U1219—Bordeaux Population Health Center, EPICENE team, F-33076, Bordeaux, France

^jCHU de Caen, Service de Pathologie Professionnelle, F-14033, Caen, France

^kService de Médecine du Travail et Pathologies professionnelles, CHU de Bordeaux, F-33000, Bordeaux, France

^lUniversité de Bordeaux, ISPED, Centre INSERM U1219—Bordeaux Population Health Center, EPICENE Team, F-33000, Bordeaux, France

ARTICLE INFO

Article history:

Received 9 January 2017

Received in revised form 22 April 2017

Accepted 6 June 2017

Available online 11 July 2017

Keywords:

Neoplasms
Incidence
Cohort studies
Agriculture
Farmers

ABSTRACT

Background: Numerous studies have been conducted among farmers, but very few of them have involved large prospective cohorts, and few have included a significant proportion of women and farm workers. Our aim was to compare cancer incidence in the cohort (overall, by sex, and by work on farm, occupational status and pesticide use) within the general population.

Methods: More than 180,000 participants in the AGRICAN cohort were matched to cancer registries to identify cancer cases diagnosed from enrolment (2005–2007) to 31st December 2011. We calculated standardized incidence ratios (SIRs) and 95% confidence intervals (95% CIs).

Results: Over the period, 11,067 incident cancer cases were identified (7304 men and 3763 women). Overall cancer incidence did not differ between the cohort and the general population. Moreover, SIRs were significantly higher for prostate cancer (SIR = 1.07, 95%CI 1.03–1.11) and non-Hodgkin lymphoma (SIR = 1.09, 95%CI 1.01–1.18) among men, skin melanoma among women (SIR = 1.23, 95%CI 1.05–1.43) and multiple myeloma (men: SIR = 1.38, 95%CI 1.18–1.62; women: SIR = 1.26, 95%CI 1.02–1.54). In contrast, SIRs were lower for upper aerodigestive tract and respiratory cancers. Increase in risk was greater in male farm workers for prostate and lip cancer, in female farm workers for skin melanoma, and in male farm owners for multiple myeloma. Moreover, incidence of multiple myeloma and skin melanoma was higher among male and female pesticide users respectively.

Conclusion: We found a decreased incidence for tobacco-related cancers and an increased incidence of prostate cancers, skin melanoma and multiple myeloma. Specific subgroups had a higher cancer incidence related to occupational status and pesticide use.

© 2017 Elsevier Ltd. All rights reserved.

* Corresponding author at: UMR 1086 Cancers et Préventions, Centre François Baclesse, Avenue du Général Harris, 14076 Caen Cedex 5, France.

E-mail address: c.lemarchand@mail.baclesse.fr (C. Lemarchand).

¹ French Network of Cancer Registries (FRANCIM): Patrick Arveux (Côte d'Or gynecological tumours CR); Valérie Jooste, Anne-Marie Bouvier (Côte d'Or digestive tumours CR); Marc Maynadié, Morgane Mounier (Côte d'Or malignant hemopathies CR); Anne-Sophie Woronoff (Doubs CR); Gaëlle Coureau, Sylvain Maurisset (Gironde general CR); Marc Colonna (Isère CR); Florence Molinié (Loire-Atlantique CR); Simona Bara (Manche CR); Emilie Marrer (Haut Rhin CR); Bénédicte Lapôtre-Ledoux (Somme CR); Pascale Grosclaude, Laetitia Daubisse-Marliac (Tarn CR); Anne Cowppli-Bony (Vendée CR); Olivier Dejardin, Véronique Bouvier, Guy Launoy, Xavier Troussard (Fédération des Registres de Cancers Bas-Normand) and the Mutualité Sociale Agricole (A.M. Cremieux (Caisse centrale), J.M. Thibaudier (MSA Alpes du Nord), P. Herbrecht (MSA Alsace), D. Lenoir (MSA Bourgogne), P. Pouzet (MSA Côtes Normandes), J.J. Laplante (MSA Franche Comté), T. Busquet (MSA Gironde), E. Wavelet (MSA Loire Atlantique-Vendée), M. Delanoë (MSA Midi Pyrénées Nord), A. Paumier (MSA Picardie)). Note: CR = Cancer Registry.

1. Introduction

The relationship between farming and cancer has received considerable attention [1,2] and has given rise to general meta-analyses [3,4] and the assessment of specific cancers [5–8]. Most studies found a reduced risk in farmers for cancer overall, especially those related to tobacco smoking, and an excess risk for some other cancers (lymphohematopoietic, prostate, brain, and lip cancers and skin melanoma), but they were restricted mainly to the male population. Farming entails a wide range of occupational hazards such as ultraviolet radiation, diesel exhaust, viruses, dust, and pesticide use, the latter being the most widely studied regarding cancer risk in the agricultural context [9,10]. These exposures may differ according to gender, occupational status (farm owner, farm worker), and farm activities, potentially leading to different health effects. In some studies, various associations have been reported according to whether farm owners and farm workers [11,12] or self-employed, employee and family workers [13] were studied.

Apart from small retrospective studies based largely on mortality data, more recent cohorts have provided results on cancer incidence among farmers, especially from Nordic countries [14], with data on the type of farm production from farm registries [15] or from a large prospective cohort study – the Agricultural Health Study (AHS) – which included pesticide applicators (mainly white male farm owners) and their spouses [16].

In Europe, the AGRiculture and CANcer (AGRICAN) cohort study assessed cancer risk in agricultural populations in France, with detailed individual information on farming activities and life habits [17]. The analysis of mortality by cancers found a lower cancer mortality overall – and especially for colon and rectal cancers among males – which was more pronounced for farm owners than for farm workers [17]. Almost half of the AGRICAN subjects were women, so cancer risk could be investigated in this understudied population. Even if pesticide use on crops was infrequent among AGRICAN women, they used pesticides on animals or on embankments and in farmyards. We assessed cancer risk in relation to various profiles (gender, occupational status, work on farm, pesticide use) in a large cohort of subjects insured by the farmers' health insurance scheme and enrolled in AGRICAN. This analysis is an initial part of the overall project which was and will be completed by further analyses on specific cancer sites, adjusting on potential confounders, with more detailed information on agricultural activities and additional duration of follow-up.

2. Methods

2.1. Population, data collection and enrolment

People involved in agriculture in France have a specific health insurance scheme, the Mutualité Sociale Agricole (MSA), which includes active and retired people as well as farm owners and farm workers involved in agriculture-related jobs. This insurance agency concerns people working on a farm but also beekeepers, foresters, oyster farmers, people working in agricultural cooperatives, and even tertiary workers serving the agricultural population, defined here as individuals who had never worked on a farm. The AGRICAN cohort is described in detail elsewhere [17]. Briefly, 181,842 subjects were enrolled between 2005 and 2007 with the following criteria: living in one of the 11 French geographical areas covered by one of the 16 general or specialized population-based cancer registries at the time of enrolment; being >18 years of age; and having been insured by the MSA for 3 years or more. A self-administered enrolment questionnaire was sent to collect individual data on demographic characteristics, lifestyle habits, health, occupational history and lifetime history (years of

beginning and end of activities and tasks including pesticide use in each crop and animal) of 18 agricultural activities (five types of animal and 13 types of crop). Information was also collected on herbicide use on embankments and/or in the farmyard.

2.2. Cohort follow-up

Subjects were followed from enrolment (1st November 2005 to 31st December 2007) to 31st December 2011. Incident and prevalent cancer cases were identified by cross-linkage with population-based cancer registries in the 11 geographical areas, and were coded according to the International Classification of Diseases for Oncology, 3rd edition (ICD-O-3). These registries meet high-quality criteria: the completeness and quality of data are regularly assessed by the *Comité National des Registres* [French Institute of Health and Medical Research (INSERM), National Cancer Institute (Inca) and the French Institute for Public Health Surveillance (InVS)], and data are regularly published by IARC in Cancer Incidence in the series Five Continents (CI5). Matching with cancer registries was based on married and maiden names, first names, gender, date and place of birth, place of residence, vital status and date of death (if applicable). Only malignant tumors (exclusion of in-situ) were used in this analysis, with the exception of non-melanoma skin cancers due to their non-exhaustive registration. Vital status and place of residence were checked annually using the MSA data, the French National Postal Service (La Poste) and the French National Death Index (*Répertoire National pour l'Identification des Personnes Physiques*). People moving outside the AGRICAN area (0.8%) were no longer followed for cancer diagnosis. Person-years accumulation was calculated from the date of reception of the enrolment questionnaire and ended at cancer diagnosis, date of death (11%), date of loss to follow-up (less than 2% of subjects) or 31st December 2011, whichever occurred first. For a given type of cancer, diagnosis between 1st January 2005 (date of implementation of the most recent registry in the areas concerned) and enrolment was considered as prevalent and excluded from analysis. Earlier information was not considered because of a major heterogeneity between registries (implementation of registries extended over 30 years) in order to avoid selection bias between areas.

2.3. Analysis

Standardized incidence ratios (SIRs) were computed to compare the cancer incidence in people enrolled in the cohort to the total population of the area covered by the study. The expected numbers of cancer cases were calculated by multiplying the number of person-years in each 5-year age group from 20 to 24 to >85 by the corresponding gender-, age- and geographical-area-specific cancer incidence for the period of observation (2005–2011).

Ninety-five per cent confidence intervals (95%CI) for the SIRs were calculated as recommended by Breslow and Day [18]. Statistical significance was tested by the chi-square test on the assumption that the number of observed cases followed a Poisson distribution. Stratified analyses were also conducted by sex, by farm work (ever/never worked on a farm during lifetime), and among subjects who ever worked on a farm, by occupational status (farm owner/farm worker) and pesticide use during lifetime: three exclusive categories: (1) at least pesticide use on crops, (2) use of insecticides on animals or herbicides on embankments or farmyard but no pesticides on crops, and (3) no occupational pesticide use. To assess the robustness of associations, we performed complementary analyses by censoring cancer cases at the first date of diagnosis and (1) excluding all prevalent cases between 2005 and enrolment, and (2) excluding all prevalent

Download English Version:

<https://daneshyari.com/en/article/5524787>

Download Persian Version:

<https://daneshyari.com/article/5524787>

[Daneshyari.com](https://daneshyari.com)