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Response to "Comment on 'Association between Residential Proximity to Viticultural Areas and Childhood Acute Leukemia Risk in Mainland France: GEOCAP Case–Control Study, 2006–2013'"

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We thank Catherine Hill for her comments[1] on our recent study[2] on the association between residential proximity to viticultural areas and childhood acute leukemia risk in mainland France. However, we believe she has misunderstood certain aspects of our study.

First, Hill's conclusion that the results of our study "[do] not justify the alarming information disseminated by the media in France" inverts the problem: Societal concerns about the environment require documented responses, to which our research contributes. Public concerns about exposures to pesticides and other pollutants in the environment have been expressed for decades, particularly in situations of reported clusters.[3] Many articles have reported an increased risk of leukemia in children whose parents had used pesticides at home or at work,[4–12] and a few studies have suggested an increased risk of leukemia[13–16] and central nervous system tumor[14,17] in children living in agricultural areas.

Based on the literature to date, we hypothesized that living near agricultural activities could increase the risk of cancer in children, and our results, although limited in magnitude, support this hypothesis. Indeed, our study has several strengths: *a*) We focused on vines, a permanent crop subject to intensive phytosanitary treatments[18] and therefore a possible source of exposure to residents nearby; *b*) we minimized selection bias at inclusion; and *c*) our exposure assessment took place without participation or recall bias. The French media considered our results informative and worth relaying to the public.[19–21]

Second, French wine-growing regions are known to be heterogeneous,[22] if only in terms of plot size, other crops present, climate, housing type, and demographic characteristics. Our study was not designed to investigate the association between proximity to vines and childhood acute leukemia risk by region, and the results were not expected to be identical across regions. We do not consider regional heterogeneity an inconsistency (contrary to Hill's assertion that "The authors accept this overall estimation despite the inconsistency of the results by region") but, rather, as a fact that must be further documented and taken into account in the future.

Finally, our Table S4 and Figure S4 were intended only to illustrate the model fits for the Occitanie region, the only region where the linear hypothesis had been rejected (only with the indicator based on both Graphic Parcel Register and Corine Land Cover). The β represents the probability of leukemia on the logit scale according to the deciles of vine density within 1,000 m, and the $\exp(\beta)$ does not estimate the odds ratios.

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References

1. Hill C. 2024. Comment on "association between residential proximity to viticultural areas and childhood acute leukemia risk in mainland France: GEOCAP case–control study, 2006–2013." Environ Health Perspect 132(1):018001, https://doi.org/10.1289/EHP14230.
2. Mancini M, Hémon D, de Crouy-Chanel P, Guldner L, Faure L, Clavel J, et al. 2023. Association between residential proximity to viticultural areas and childhood acute leukemia risk in mainland France: GEOCAP case–control study, 2006–2013. Environ Health Perspect 131(10):107008, PMID: 37850750, https://doi.org/10.1289/EHP12634.
3. Trumbo CW. 2000. Public requests for cancer cluster investigations: a survey of state health departments. Am J Public Health 90(8):1300–1302, PMID: 10937014, https://doi.org/10.2105/ajph.90.8.1300.
4. INSERM Collective Expertise Centre. 2022. *Effects of Pesticides on Health: New Data. [Internet]*. Montrouge: EDP Sciences. https://doi.org/10.1051/978-2-7598-2721-3.
5. Bailey HD, Fritschi L, Infante-Rivard C, Glass DC, Miligi L, Dockerty JD, et al. 2014. Parental occupational pesticide exposure and the risk of childhood leukemia in the offspring: findings from the Childhood Leukemia International Consortium. Int J Cancer 135(9):2157–2172, PMID: 24700406, https://doi.org/10.1002/ijc.28854.
6. Bailey HD, Infante-Rivard C, Metayer C, Clavel J, Lightfoot T, Kaatsch P, et al. 2015. Home pesticide exposures and risk of childhood leukemia: findings from the Childhood Leukemia International Consortium. Int J Cancer 137(11):2644–2663, PMID: 26061779, https://doi.org/10.1002/ijc.29631.
7. Van Maele-Fabry G, Gamet-Payrastre L, Lison D. 2017. Residential exposure to pesticides as risk factor for childhood and young adult brain tumors: a systematic review and meta-analysis. Environ Int 106:69–90, PMID: 28623811, https://doi.org/10.1016/j.envint.2017.05.018.
8. Van Maele-Fabry G, Hoet P, Lison D. 2013. Parental occupational exposure to pesticides as risk factor for brain tumors in children and young adults: a systematic review and meta-analysis. Environ Int 56:19–31, PMID: 23567326, https://doi.org/10.1016/j.envint.2013.02.011.
9. Vidart d'Egurbide Bagazgoïtia N, Bailey HD, Orsi L, Lacour B, Guerrini-Rousseau L, Bertozzi AI, et al. 2018. Maternal residential pesticide use during pregnancy and risk of malignant childhood brain tumors: a pooled analysis of the ESCALE and ESTELLE studies (SFCE). Int J Cancer 142(3):489–497, PMID: 28949017, https://doi.org/10.1002/ijc.31073.
10. Rios P, Bailey HD, Lacour B, Valteau-Couanet D, Michon J, Bergeron C, et al. 2017. Maternal use of household pesticides during pregnancy and risk of neuroblastoma in offspring. A pooled analysis of the ESTELLE and ESCALE French studies (SFCE). Cancer Causes Control 28(10):1125–1132, PMID: 28840389, https://doi.org/10.1007/s10552-017-0944-5.
11. Rios P, Bauer H, Schleiermacher G, Pasqualini C, Boulanger C, Thebaud E, et al. 2020. Environmental exposures related to parental habits in the perinatal period and the risk of Wilms' tumor in children. Cancer Epidemiol 66:101706, PMID: 32247207, https://doi.org/10.1016/j.canep.2020.101706.
12. Mavoungou S, Rios P, Pacquement H, Nolla M, Rigaud C, Simonin M, et al. 2020. Maternal exposure to pesticides and risk of childhood lymphoma in France: a pooled analysis of the ESCALE and ESTELLE studies (SFCE). Cancer Epidemiol 68:101797, PMID: 32882568, https://doi.org/10.1016/j.canep.2020.101797.
13. Booth BJ, Ward MH, Turyk ME, Stayner LT. 2015. Agricultural crop density and risk of childhood cancer in the midwestern United States: an ecologic study. Environ Health 14:82, PMID: 26467084, https://doi.org/10.1186/s12940-015-0070-3.

14. Carozza SE, Li B, Elgethun K, Whitworth R. 2008. Risk of childhood cancers associated with residence in agriculturally intense areas in the United States. Environ Health Perspect 116(4):559–565, PMID: 18414643, https://doi.org/10.1289/ehp.9967.
15. Coste A, Goujon S, Faure L, Hémon D, Clavel J. 2020. Agricultural crop density in the municipalities of France and incidence of childhood leukemia: an ecological study. Environ Res 187:109517, PMID: 32438101, https://doi.org/10.1016/j.envres.2020.109517.
16. Park AS, Ritz B, Yu F, Cockburn M, Heck JE. 2020. Prenatal pesticide exposure and childhood leukemia—a California statewide case–control study. Int J Hyg Environ Health 226:113486, PMID: 32087503, https://doi.org/10.1016/j.ijheh.2020.113486.
17. Lombardi C, Thompson S, Ritz B, Cockburn M, Heck JE. 2021. Residential proximity to pesticide application as a risk factor for childhood central nervous system tumors. Environ Res 197:111078, PMID: 33798513, https://doi.org/10.1016/j.envres.2021.111078.
18. Simonovici M, Caray J. 2023. Enquête Pratiques culturales en viticulture en 2019 - IFT et nombre de traitements. https://www.agreste.agriculture.gouv.fr/agreste-web/disaron/Chd2304/detail/ [accessed 5 December 2023].
19. Foucart S. 2023. Pesticides: la densité de vignes autour du domicile associée à un risque accru de leucémie de l'enfant. *Le Monde*, Planète section, online edition, 18 October 2023. [Website.] https://www.lemonde.fr/planete/article/2023/10/18/la-densite-de-vignes-autour-du-domicile-associee-a-un-risque-accru-de-leucemie-de-l-enfant_6195115_3244.html [accessed 5 December 2023].
20. Chayet D. 2023. Vivre à côté des vignes augmente-t-il les risques de leucémies pédiatriques? *Le Figaro*, online edition, 19 October 2023. https://www.lefigaro.fr/sciences/vivre-a-cote-des-vignes-augmente-t-il-les-risques-de-leucemies-pediatriques-20231018 [accessed 5 December 2023].
21. INSERM. 2023. Une étude de l'Inserm s'intéresse au lien entre le risque de leucémie pédiatrique et le fait d'habiter à proximité de vignes. 18 October 2023. [Press release.] https://presse.inserm.fr/une-etude-de-linserm-sinteresse-au-lien-entre-le-risque-de-leucemie-pediatrique-et-le-fait-dhabiter-a-proximite-de-vignes/67576/ [accessed 5 December 2023].
22. FranceAgriMer. 2020. Les chiffres-clés de la filière viti-vinicole 2009–2019. 10 December 2020. https://www.franceagrimer.fr/Actualite/Filieres/Vin-et-cidriculture/Vin/2020/Les-chiffres-cles-de-la-filiere-vitivinicole-2009-2019 [accessed 5 December 2023].