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Association of sunbed use with skin cancer risk factors in Europe: an investigation within the Euromelanoma skin cancer prevention campaign

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Introduction. Sunbed use has been significantly associated with increased risk of melanoma and non-melanoma skin cancer (NMSC), but its relationship with melanoma's risk factors such as high nevus count, atypical nevi and lentigines (**Figure 1**) is poorly studied. Euromelanoma is a skin cancer prevention campaign conducted all over Europe. It offers a once-a-year screening during which participants' data, including sunbed use and phenotype, are collected via questionnaires.

Objectives. To investigate the association of sunbed use with nevus count, atypical nevi, lentigines and suspicion of skin cancer.

Material and methods. To ensure reliability of the data, we defined inclusion and exclusion criteria for countries' eligibility for the risk analysis. Multivariate logistic regression models (including age, gender, education, skin type, family history of melanoma, personal history of skin cancer, any sun exposure, and any sunscreen use) were used to calculate summary odds ratios (SORs) of each clinical endpoint for ever sunbed use.

Results. Overall, 227,888 individuals from 30 countries completed the Euromelanoma questionnaire. After the data quality check, 16 countries were eligible for the multivariate analysis, for a total of 145,980 participants (64.8% females; median age 43 years; 62.3% highly educated; 28.5% skin type I-II; 11.0% ever sunbed use). Ever sunbed use was independently associated with suspicion of melanoma [SOR=1.13 (1.00-1.27)] (**Figure 2A**), nevus count >50 [SOR=1.05 (1.01-1.10)] (**Figure 2B**), atypical nevi [SOR=1.04 (1.00-1.09)] (**Figure 2C**), and lentigines [SOR=1.16 (1.04-1.29)] (**Figure 2D**). Conversely no significant association was found between ever sunbed use and suspicion of NMSC [SOR=1.00 (0.91-1.10)].

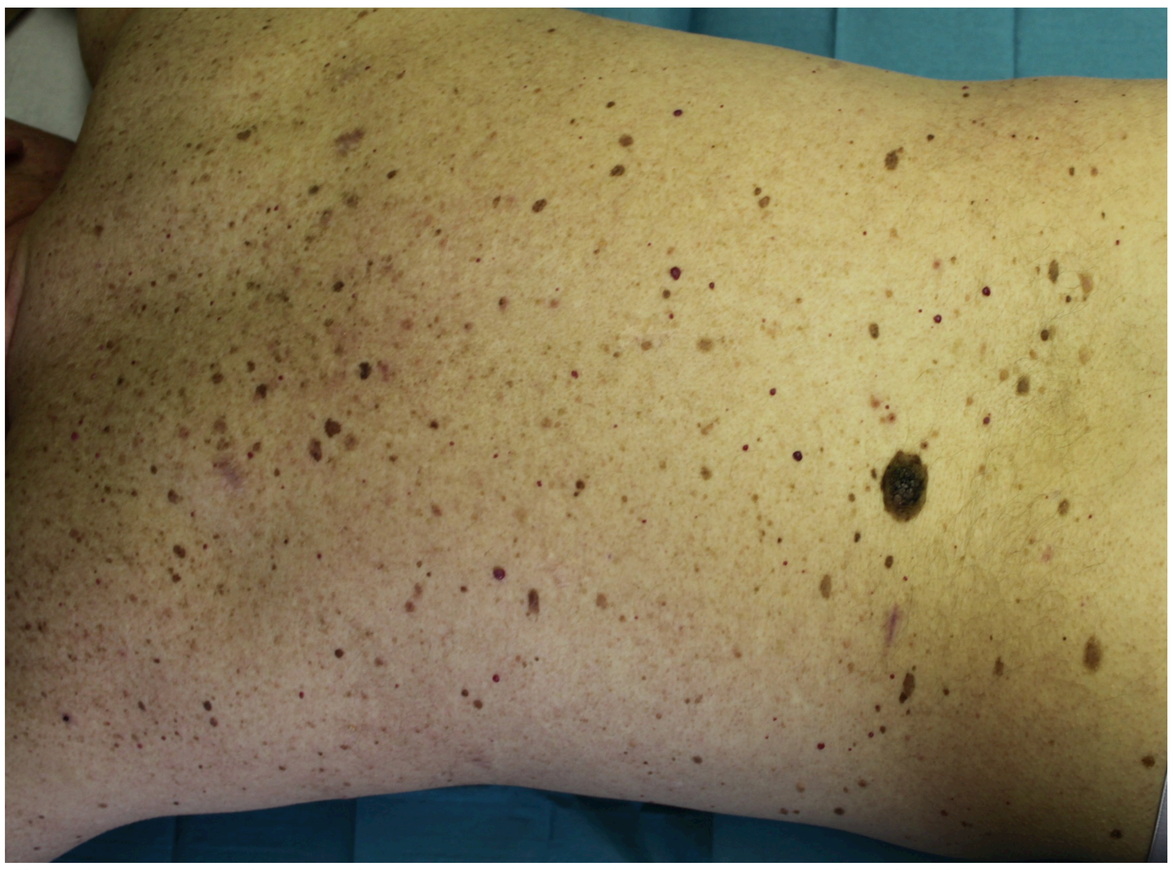

Figure 1. Example of skin cancer risk factors on the back of a 55 years old man, including high nevus count (>50), presence of atypical nevi and lentigines, as well as suspected melanomas.

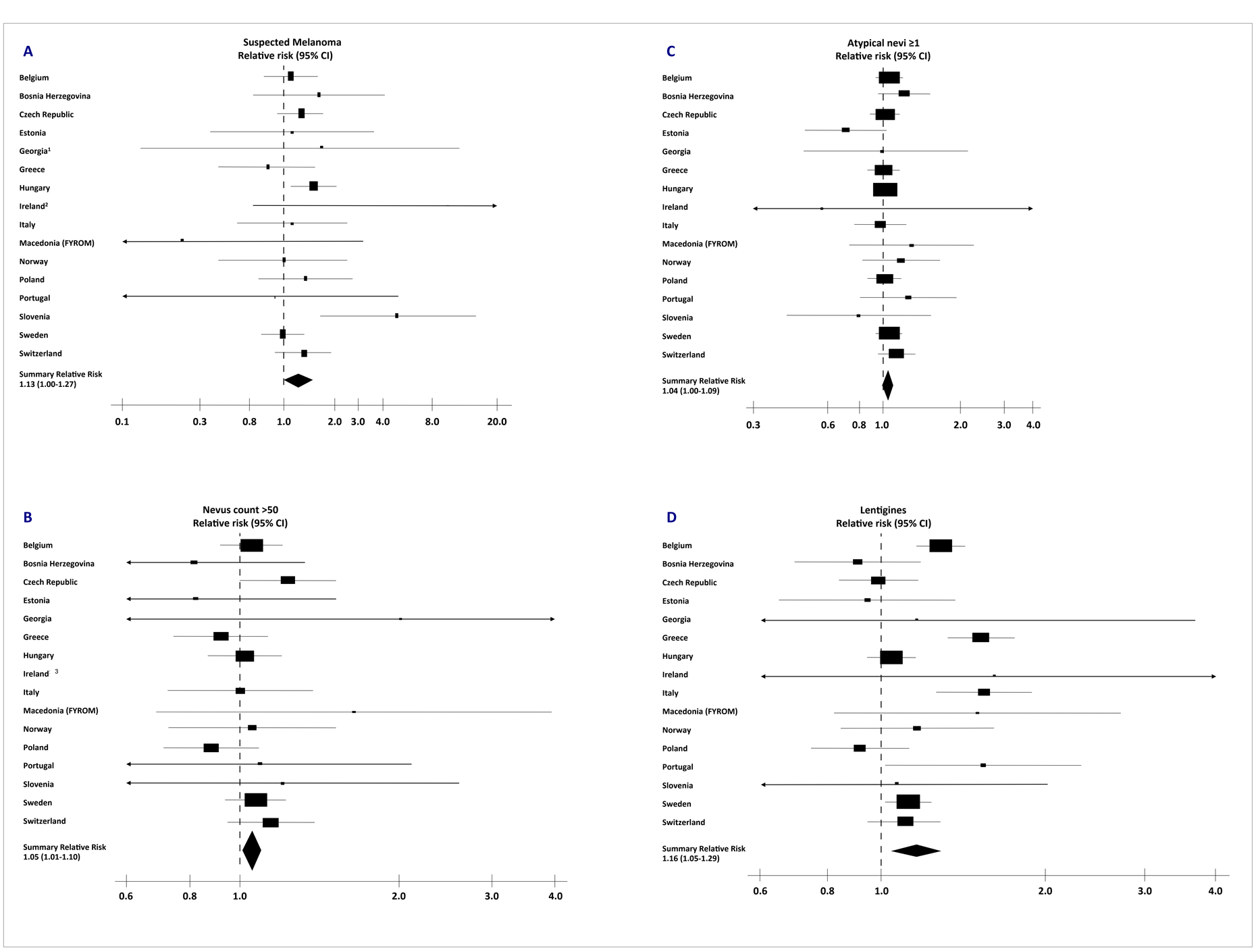

Figure 2. Forest plots of association of suspected melanoma (A), high nevus count (>50 nevi) (B), ≥1 atypical nevus (C), lentigines on back/chest (D) with ever use of sunbeds.

All odds ratios are adjusted for age, gender, education, skin type, family history of melanoma, personal history of skin cancer, any sun exposure, and any sunscreen use. FYROM, Former Yugoslav Republic of Macedonia.

Heterogeneity I^2=11% (suspected melanoma), I^2=0% (high nevus count), I^2=0% (≥1 atypical nevus), I^2=68% (lentigines) for all countries.

[1]In order to calculate the odds ratio for Georgia, the model for this country was not adjusted for age, skin type and personal history of skin cancer, due to frequency of suspected melanoma being too low in exposed individuals.

[2]A sensitivity analysis for Ireland, the only country with a considerable amount of missing data on sunbed use (20.3%, Supplementary Table S2) found that the odds ratio of suspected melanoma associated with the missing values was similar to the odds ratio for exposed individuals [6.31 (0.74-53.71) and 6.27 (0.69-57.27), respectively].

[3]The odds ratio for Ireland was not available, due to frequency of high nevus count being too low in exposed individuals.

Conclusions. Indoor tanning is significantly associated with well-recognised risk factors for melanoma (including high nevus count, presence of atypical nevi and lentigines) as well as suspicion of melanoma within the Euromelanoma screenees. In order to reduce the prevalence of melanoma risk factors, avoidance/discontinuation of sunbed use should always be encouraged, especially but not exclusively for individuals with high-risk phenotypes.

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