

Letter to the Editor

RE: "A MELANOMA EPIDEMIC IN ICELAND: POSSIBLE INFLUENCE OF SUNBED USE"

The recent report by Héry et al. (1) provides an interesting example of piecing together population-level epidemiologic data in an orderly way to better understand an emerging public health problem. Héry et al.'s results documented a population-level rise in melanoma rates in Iceland that coincided with a population-level rise in sunbed use. In the accompanying editorial, Berwick stated, "These data appear to demonstrate a relation between sunbed use and the development of melanoma; however, as they are ecologic, the results are not based on individual measures and are only weakly supportive of this relation" (2, p. 769).

Héry et al.'s study (1) relied on population-level data, but the specific circumstances enhanced its value beyond that of a simple ecologic study. Studying trends in rates before and after the introduction of a new exposure in a population adds inferential power. If the new exposure and the disease outcome correlate at the population level, the evidence begins to rise beyond the level of an ecologic study to "quasi-experimental" evidence, with time-series data to document the change in rates before and after the exposure. In the study by Héry et al., the internal consistency of the patterns further bolstered the likelihood that the population-level patterns may have reflected a true association, since melanoma incidence rates rose more precipitously in the population subgroups with the highest prevalence of sunbed use—namely women as compared with men and younger women as compared with older women (1). This situation brings to mind the words penned by Sir Austin Bradford Hill on the causal criterion of coherence: "Thus in the discussion of lung cancer the Committee finds its association with cigarette smoking coherent with the temporal rise that has taken place in the two variables over the last generation and with the sex difference in mortality" (3, p. 298).

An even stronger test of whether sunbed use can be pinpointed as the culprit in the observed increase in melanoma is whether public health interventions implemented to decrease sunbed use resulted in a concomitant decrease in melanoma rates. Héry et al. presented data to suggest that this may have been the case. When interventions to discourage sunbed use were introduced, the incidence of melanoma among women decreased (although the chronology of these events did not perfectly coincide) (1). In Hill's view, this type of evidence rises to the level of a "semi-experiment," a strong form of evidence for inferring causation: "For example, because of an observed association some preventive action is taken. Does it in fact prevent? . . . Is the frequency of the associated events affected? Here the strongest support

for the causation hypothesis may be revealed" (3, pp. 298–299). Drawing from the past, this concept is exemplified by the association between cigarette smoking and lung cancer. Even with an extremely large body of observational epidemiologic studies, the pattern of smoking prevalence mirrored lung cancer rates at the population level (accounting for latency period), providing powerful evidence to solidify the cause-effect association.

Thus, despite its reliance on population-level data, the study by Héry et al. provides a stronger level of evidence than might first be apparent. Because a range of data are pieced together in a unique setting, this is a circumstance where the whole exceeds the sum of its parts. Within the context of a causal framework, the evidence provided under this specific set of circumstances adds uniquely to the overall body of evidence. By itself, the evidence provided by a population-level study may seem limited, but under circumstances such as these, the evidence can be critically important in complementing the evidence provided by observational epidemiologic studies.

ACKNOWLEDGMENTS

The author was supported by funding from the National Cancer Institute (grant R01 CA105069).

Conflict of interest: none declared.

REFERENCES

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3. Hill AB. The environment and disease: association or causation? *Proc R Soc Med.* 1965;58:295–300.

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Editor's note: In accordance with Journal policy, Héry et al. were asked if they wished to respond to this letter, but they chose not to do so.

DOI: 10.1093/aje/kwr031; Advance Access publication March 4, 2011