

The ~75:1 Sunlight Trade-Off

A New UK Biobank Preprint Reframes the Sunlight

For decades, public health messaging around sunlight has been simple and absolute: avoid the sun. But a long-awaited new analysis suggests that message may be dangerously incomplete.

IN JANUARY 2026, a major medRxiv preprint led by Richard Weller was published using data from more than 419,000 adults in the UK Biobank. Instead of focusing narrowly on skin cancer, the researchers asked a broader—and far more important—question: ***What happens to total mortality when habitual sun exposure is reduced or increased across an entire population?***

The answer reframes the conversation.

The most striking finding doesn't come from a complex statistical table. It comes from population-level modeling designed to quantify real-world trade-offs. If everyone followed a low sun-exposure pattern, the model estimates about 40 fewer skin-cancer deaths—but ~2,982 additional deaths from all causes. That's roughly 75 extra all-cause deaths for every one skin-cancer death avoided.

To move beyond crude proxies like latitude or simple "time outdoors" questions, the researchers created a multidimensional UV exposure score called Sun-BEEM. It combined:

- Time spent outdoors
- Ambient UV levels at a person's residence
- Sunlamp use
- Sun-protection behavior

Participants were grouped into low, medium, or high habitual UV exposure. After adjusting for age, sex, BMI, smoking, alcohol use, physical activity, education, deprivation, and sleep quality, the pattern was consistent:

- Medium UV exposure was associated with ~11% lower all-cause mortality
- High UV exposure was associated with ~16% lower all-cause mortality

Similar inverse associations were seen for cardiovascular mortality and non-skin cancer mortality—the two largest drivers of premature death.

The study does not claim UV exposure is harmless. Non-melanoma skin cancer incidence increased with higher UV exposure But when it came to skin-cancer mortality, the picture was far less dramatic. The study did not show a clear dose-response increase in deaths from melanoma or other skin cancers across UV categories, while the reductions in cardiovascular and internal-cancer deaths were substantial.

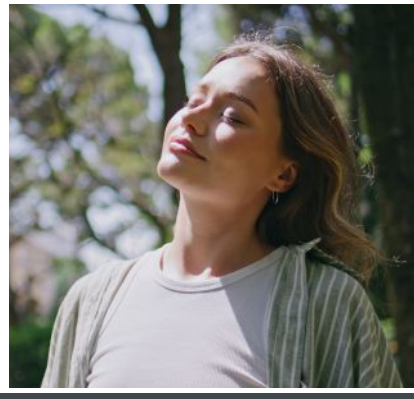
The authors also modeled the opposite scenario: what if everyone followed a high habitual UV exposure pattern?

The estimates:

- ~4,736 fewer deaths from all causes
- At the cost of ~35 additional skin-cancer deaths

That works out to roughly 135 fewer all-cause deaths per additional skin-cancer death. Even when the model assumes more fatal skin cancers, the net survival benefit remains strongly positive.

Sun-BEEM scores tracked with higher vitamin D levels, but the study's deeper analysis points to non-vitamin-D pathways—including immune regulation, vascular function, and neuroendocrine signaling—as possible mechanisms.



That supports a growing body of evidence suggesting sunlight is not biologically interchangeable with supplements.

SmartTan.com news articles regularly report medical and scientific information to keep you abreast of current events related to UV light. This information is not intended to be used by any party to make unwarranted health claims to promote sunbed usage. Contact your Smart Tan representative to find out more about what you can and can't say in your tanning salon business.