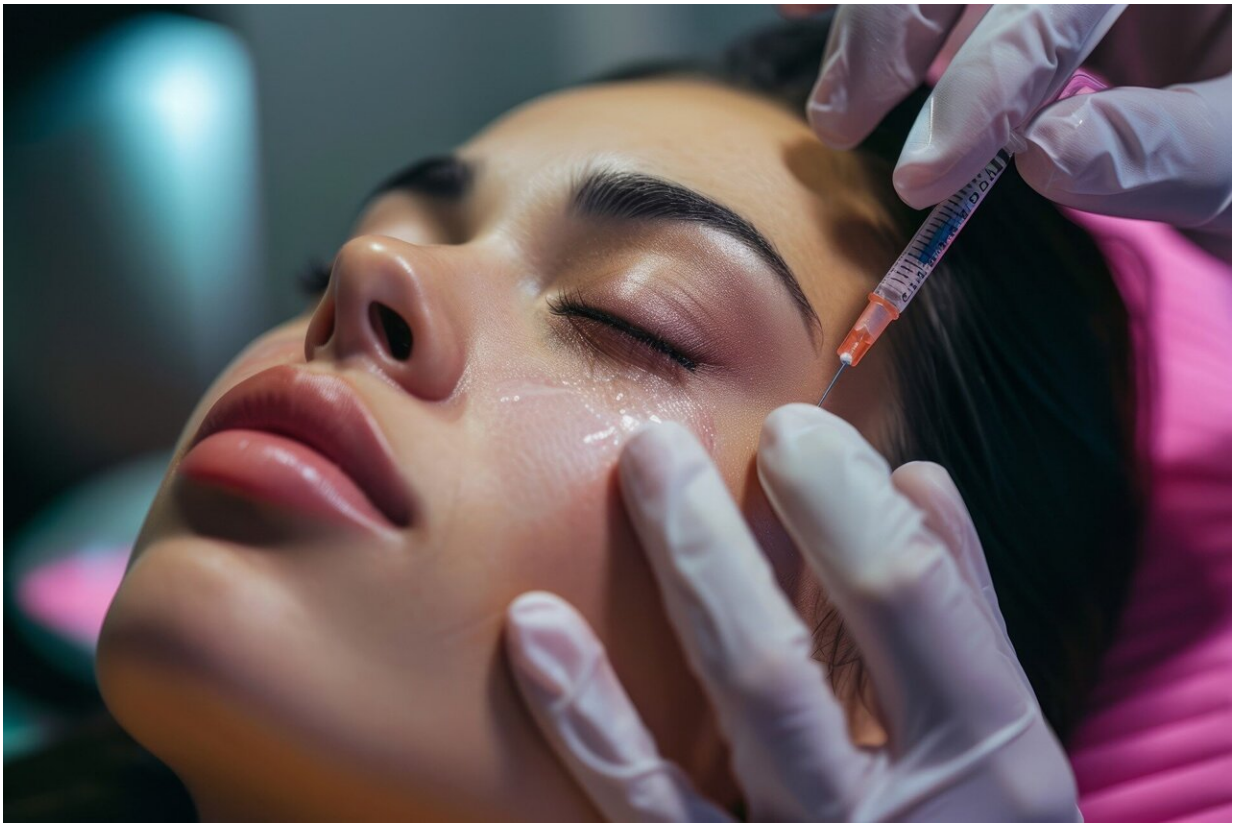


Climate affects dose requirements for cosmetic Botox injections

July 1 2024



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Patients living in "high-sun" climates may require higher doses of Botox to achieve good results in cosmetic treatment of facial lines and wrinkles, [reports a study](#) in the July issue of *Plastic and Reconstructive*

Surgery.

"In countries with higher sun exposure, higher doses of Botox may be needed to achieve the same degree of forehead muscle paralysis, compared to less-sunny countries," comments lead author Kim L. Borsky, MBBS, MD, MRCS, of Stoke Mandeville Hospital, Aylesbury, UK. "Our results suggest that [plastic surgeons](#) may need to adjust their Botox dosing protocols to account for the effects of climate on the results of this cosmetic treatment."

Could sun exposure affect responses to cosmetic Botox?

Administration of "injectables" is the most common minimally invasive cosmetic procedure performed by plastic surgeons. According to ASPS statistics, injection of neuromodulators such as botulinum toxin type A—best known by the brand name Botox—was performed more than 8.7 million times in 2022. Botox blocks nerve signals to the injected muscles, causing reversible muscle paralysis. This allows softening and relaxation of lines and wrinkles of the overlying skin.

Plastic surgeons have noticed variations in the improvement achieved by Botox injections. While several factors are known to affect the response—including muscle mass, gender, age, and ethnicity—other, unidentified factors may also play a role.

Could climate contribute to differences in the response to cosmetic Botox injection? Dr. Borsky and colleagues compared outcomes of Botox treatment in two groups of patients: a "high-sun" group of 292 women in the Mediterranean island nation of Malta and a "low-sun" group of 231 women treated in London, UK. Patients in Malta were treated during the summer months while the UK patients were treated in

the winter months.

Botox treatments 'may need to account for climate'

The patients underwent Botox injections into the glabellar muscles of the lower forehead; all treatments were performed by experienced plastic surgeons following a standardized technique. At follow-up visits, patients received "top-up" doses as needed to achieve "full clinical paralysis." The total Botox dose needed to achieve this result was compared between the high-sun and low-sun groups.

The results showed a higher average total Botox dose in the high-sun group: 29.2 versus 27.3 units. Patients in Malta also received a higher average top-up dose: 2.24 versus 1.98 units. The differences in Botox dose remained significant after adjustment for age and other factors.

Why would [patients](#) in sunny climates need more Botox? Noting that the glabellar muscles are the main muscle group involved in squinting, Dr. Borsky and colleagues speculate that the difference may reflect greater development and functional activation of these muscles. Other possibilities include effects of higher temperatures or direct effects of sunlight on the response to Botox.

The researchers note that the small difference in their study isn't likely to have a large impact on treatment costs, but it may have implications for training and [treatment](#).

"Rigid protocols about doses and distributions may lead to undertreatment if applied in sunnier climates," Dr. Borsky and co-authors conclude. "Treatment protocols may need to account for the climate in which treatments are being undertaken to achieve more predictable results."

More information: Kim L. Borsky et al, The Effect of Climate on the Dose Requirements of Botulinum Toxin A in Cosmetic Interventions, *Plastic & Reconstructive Surgery* (2023). [DOI: 10.1097/PRS.00000000000010913](https://doi.org/10.1097/PRS.00000000000010913)

Provided by Wolters Kluwer Health

Citation: Climate affects dose requirements for cosmetic Botox injections (2024, July 1) retrieved 3 July 2024 from <https://medicalxpress.com/news/2024-07-climate-affects-dose-requirements-cosmetic.html>

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