Irradiance, as well as body site and timing of readings, is important in determining ultraviolet A minimal erythemal dose. (Response to Gambichler et al. July BJD)
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Dear Sir,

Irradiance, as well as body site and timing of readings, is important in determining ultraviolet A minimal erythemal dose. (Response to Gambichler et al. July BJD)

Gambichler et al. demonstrated that, in their population, using a 25 mWcm$^{-2}$ ultraviolet A-1 (UVA-1) source the median 24-hour delayed minimal erythema dose (MED) on the inner forearm was > 130 Jcm$^{-2}$.\textsuperscript{1} This differs from the 20 Jcm$^{-2}$ to 28 Jcm$^{-2}$ median MED reported from our centre.\textsuperscript{2} The authors suggested the disparity might be explained by different methodologies. We agree and wish to expand on this point. Rather than being contradictory, the studies by Gambichler et al. and Beattie et al. are in excellent agreement.

The first main difference between the studies was the time when the MED was determined. Beattie et al. demonstrated that UVA-1 erythema peaked between 4 and 8 hours (h) with the MED being approximately half that at 24 hours.\textsuperscript{2}

A second difference between the two studies was the site of testing. The inner forearm was tested in the Gambichler study whilst both back and inner forearm were tested in the Dundee study. Our study demonstrated that the back is around twice as sensitive to UVA1 as the inner forearm.

In recognition of this, in their discussion Gambichler et al. noted that their result at 24 h on the inner forearm should be compared with the Beattie result at the same time point and in the same body location, that is a median MED of 68 Jcm$^{-2}$.
Critical, however, is a third difference between the two studies. In a study by Kagetsu et al. it was demonstrated that UVA-induced erythema is irradiance dependent,\(^3\) at 24 hour observations. They showed that a higher irradiance gave a lower MED.

The irradiance of the Gambichler et al. study was 25 mWcm\(^{-2}\) and the Beattie study was 70 – 77 mWcm\(^{-2}\). Taking the median MED from the recent study and correcting for time of observation, site of testing and irradiance of light source results in a reduction in MED from >130 Jcm\(^{-2}\) to >24 Jcm\(^{-2}\), similar to the median MED of 20 Jcm\(^{-2}\) – 28 Jcm\(^{-2}\) reported by Beattie et al.

This highlights that variables including body site, time point and irradiance, must be considered when interpreting ultraviolet threshold erythema dose characteristics.

References: