

University of Dundee

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

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3 **Irradiance, as well as body site and timing of readings, is important in**
4 **determining ultraviolet A minimal erythema dose.**
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3 Dear Sir,
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7 **Irradiance, as well as body site and timing of readings, is important in**
8 **determining ultraviolet A minimal erythema dose.** (Response to Gambichler *et*
9 *al.* July BJD)
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15 Gambichler *et al.* demonstrated that, in their population, using a 25 mWcm^{-2}
16 ultraviolet A-1 (UVA-1) source the median *24-hour* delayed minimal erythema dose
17 (MED) on the *inner forearm* was $> 130 \text{ Jcm}^{-2}$.¹ This differs from the 20 Jcm^{-2} to 28
18 Jcm^{-2} median MED reported from our centre.² The authors suggested the disparity
19 might be explained by different methodologies. We agree and wish to expand on this
20 point. Rather than being contradictory, the studies by Gambichler *et al.* and Beattie *et*
21 *al.* are in excellent agreement.
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31 The first main difference between the studies was the time when the MED was
32 determined. Beattie *et al.* demonstrated that UVA-1 erythema peaked between 4 and
33 8 hours (h) with the MED being approximately half that at 24 hours.²
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39 A second difference between the two studies was the site of testing. The inner
40 forearm was tested in the Gambichler study whilst both back and inner forearm were
41 tested in the Dundee study. Our study demonstrated that the back is around twice as
42 sensitive to UVA1 as the inner forearm.
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49 In recognition of this, in their discussion Gambichler *et al.* noted that their result at 24
50 h on the inner forearm should be compared with the Beattie result at the same time
51 point and in the same body location, that is a median MED of 68 Jcm^{-2} .
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3 Critical, however, is a third difference between the two studies. In a study by Kagetsu
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5 *et al.* it was demonstrated that UVA-induced erythema is irradiance dependent,³ at
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7 24 hour observations. They showed that a higher irradiance gave a lower MED.
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11 The irradiance of the Gambichler *et al.* study was 25 mWcm⁻² and the Beattie study
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13 was 70 – 77 mWcm⁻². Taking the median MED from the recent study and correcting
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15 for time of observation, site of testing and irradiance of light source results in a
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17 reduction in MED from >130 Jcm⁻² to >24 Jcm⁻², similar to the median MED of
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19 20 Jcm⁻² – 28 Jcm⁻² reported by Beattie *et al.*
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23 This highlights that variables including body site, time point *and irradiance*, must
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25 be considered when interpreting ultraviolet threshold erythema dose
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27 characteristics.
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30 31 **References:**

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