



**University of Dundee**

**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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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  $25\text{ mWcm}^{-2}$   
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17 ultraviolet A-1 (UVA-1) source the median *24-hour* delayed minimal erythema dose  
18  
19 (MED) on the *inner forearm* was  $> 130\text{ Jcm}^{-2}$ .<sup>1</sup> This differs from the  $20\text{ Jcm}^{-2}$  to  $28$   
20  
21  $\text{Jcm}^{-2}$  median MED reported from our centre.<sup>2</sup> The authors suggested the disparity  
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23 might be explained by different methodologies. We agree and wish to expand on this  
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25 point. Rather than being contradictory, the studies by Gambichler *et al.* and Beattie *et*  
26  
27 *al.* are in excellent agreement.  
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32 The first main difference between the studies was the time when the MED was  
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34 determined. Beattie *et al.* demonstrated that UVA-1 erythema peaked between 4 and  
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36 8 hours (h) with the MED being approximately half that at 24 hours.<sup>2</sup>  
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40 A second difference between the two studies was the site of testing. The inner  
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42 forearm was tested in the Gambichler study whilst both back and inner forearm were  
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44 tested in the Dundee study. Our study demonstrated that the back is around twice as  
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46 sensitive to UVA1 as the inner forearm.  
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50 In recognition of this, in their discussion Gambichler *et al.* noted that their result at 24  
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52 h on the inner forearm should be compared with the Beattie result at the same time  
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54 point and in the same body location, that is a median MED of  $68\text{ Jcm}^{-2}$ .  
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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,<sup>3</sup> at  
6  
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<sup>-2</sup> and the Beattie study  
12  
13 was 70 – 77 mWcm<sup>-2</sup>. 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<sup>-2</sup> to >24 Jcm<sup>-2</sup>, similar to the median MED of  
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19 20 Jcm<sup>-2</sup> – 28 Jcm<sup>-2</sup> 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:**

- 32  
33 1 Gambichler T, Majert J, Pljakic A *et al.* Determination of the minimal erythema  
34  
35 dose for ultraviolet A1 radiation. *Br J Dermatol* 2017; **177**: 238-44.  
36  
37 2 Beattie PE, Dawe RS, Ferguson J *et al.* Dose-response and time-course  
38  
39 characteristics of UV-A1 erythema. *Arch Dermatol* 2005; **141**: 1549-55.  
40  
41 3 Kagetsu N, Gange RW, Parrish JA. UVA-induced erythema, pigmentation,  
42  
43 and skin surface temperature changes are irradiance dependent. *J Invest*  
44  
45 *Dermatol* 1985; **85**: 445-7.  
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