

Risks and Benefits of Sun Exposure

Implications for Public Health Practice

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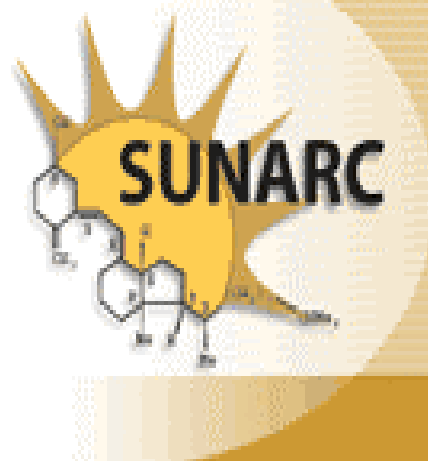
Reduce Your Risk of Cancer With Sunlight Exposure

By William B. Grant, Ph.D.

[SUNARC](#)

With all of the publicity that UV radiation (UVR) is an important cause of skin cancer, premature skin aging and cataract formation, one might think that avoidance of UVR would be the best policy. Not so fast. If protection against UVR were the most important thing, all humans would have very dark skin, since the melanin in dark skin protects against skin cancer and premature skin aging.

Skin pigmentation becomes paler the closer one's ancestors lived to the polar-regions, evidently to balance cutaneous production of vitamin D with protection against free radicals and DNA damage from UVR [Jablonski and Chaplin, 2000]. In addition, even a cursory look at the geographic variation in cancer mortality rates in the United States [Devesa et al., 1999] indicates that some environmental factor has to explain why mortality rates for a number of internal cancers are approximately twice as high in



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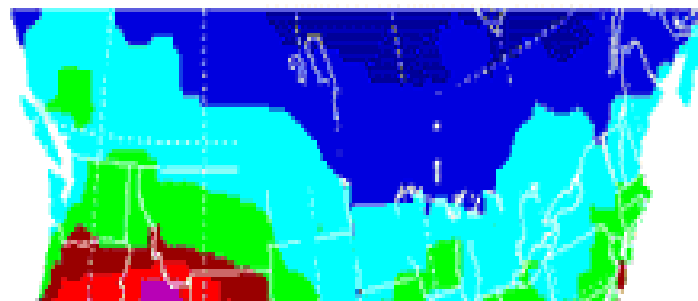
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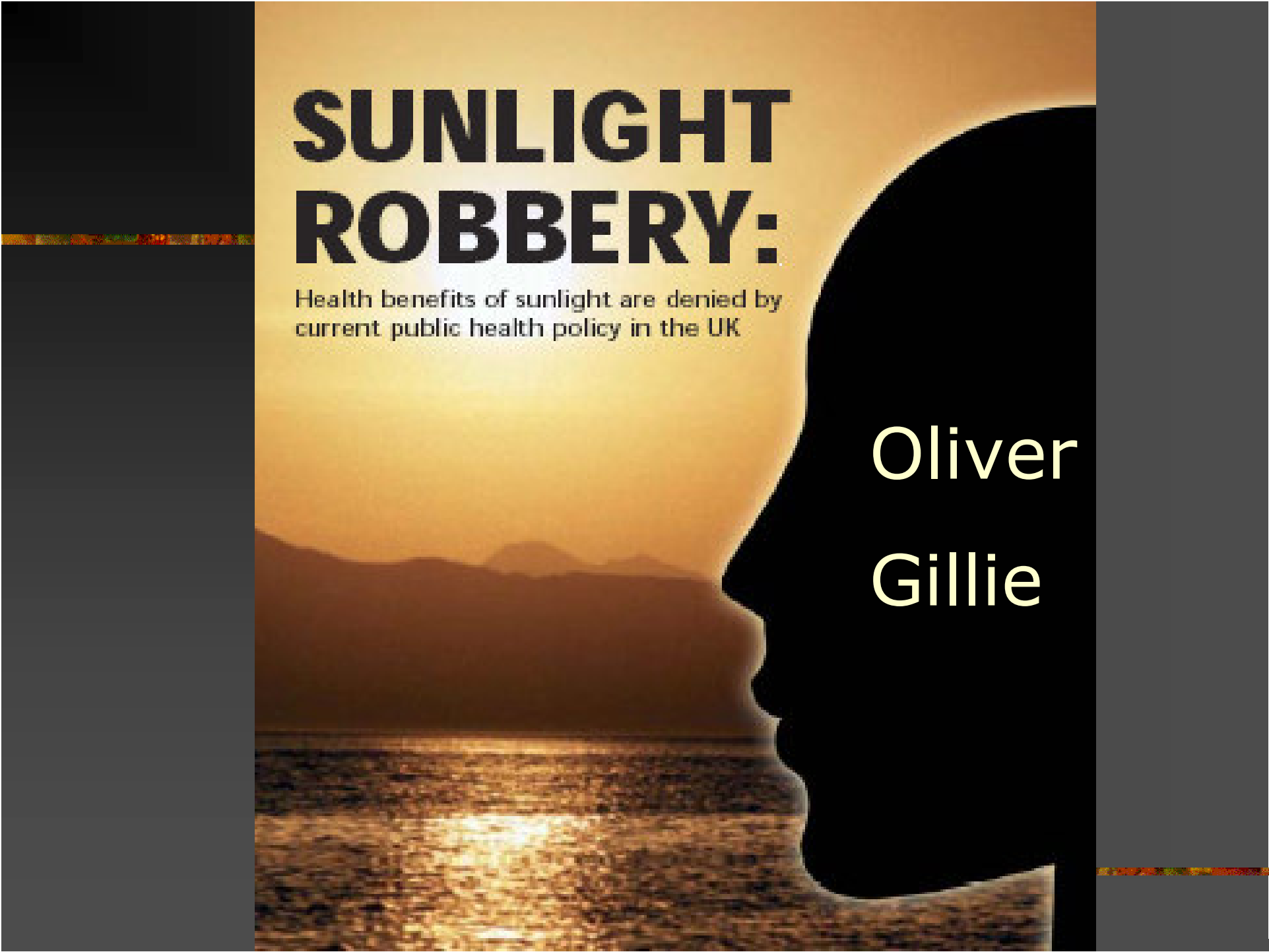
- UVB / Vitamin D Breast

It's the great cancer cover-up. Panicked into avoiding sunlight by health experts, we are now dying in our thousands from diseases linked to deficiencies of vitamin D. But still the exaggerated warnings come.

- Oliver Gillie

**Cancer mortality rates and multiple sclerosis prevalence rates for U.S. states
compared to UVB doses for July**
DNA SPECTRAL EXPOSURE (kJ/m²) FOR JULY 1992





SUNLIGHT ROBBERY:

Health benefits of sunlight are denied by
current public health policy in the UK

Oliver
Gillie

Vitamin D and its link to other known conditions

- **Likely beneficial for reducing the risk of osteoporosis**
 - Some studies have shown beneficial effects of sun exposure related to non Hodgkin lymphoma, and multiple sclerosis.
 - NHL possible link, however only limited studies and the biological pathways are unclear.
 - MS again possible, however the biological pathways are unclear and it is not known how much sun exposure is necessary.
-

NHL: Non-working day exposure odds ratios

Hughes AM et al IJC 2005

Sun exposure quarter	All (n=1398)	Men (n=807)	Women (n=591)
Lowest	1.00	1.00	1.00
Second	0.83 (0.61-1.11)	1.01 (0.67-1.50)	0.79 (0.50-1.24)
Third	0.57 (0.42-0.79)	0.78 (0.51-1.20)	0.52 (0.32-0.85)
Highest	0.47 (0.34-0.66)	0.56 (0.35-0.88)	0.39 (0.23-0.64)

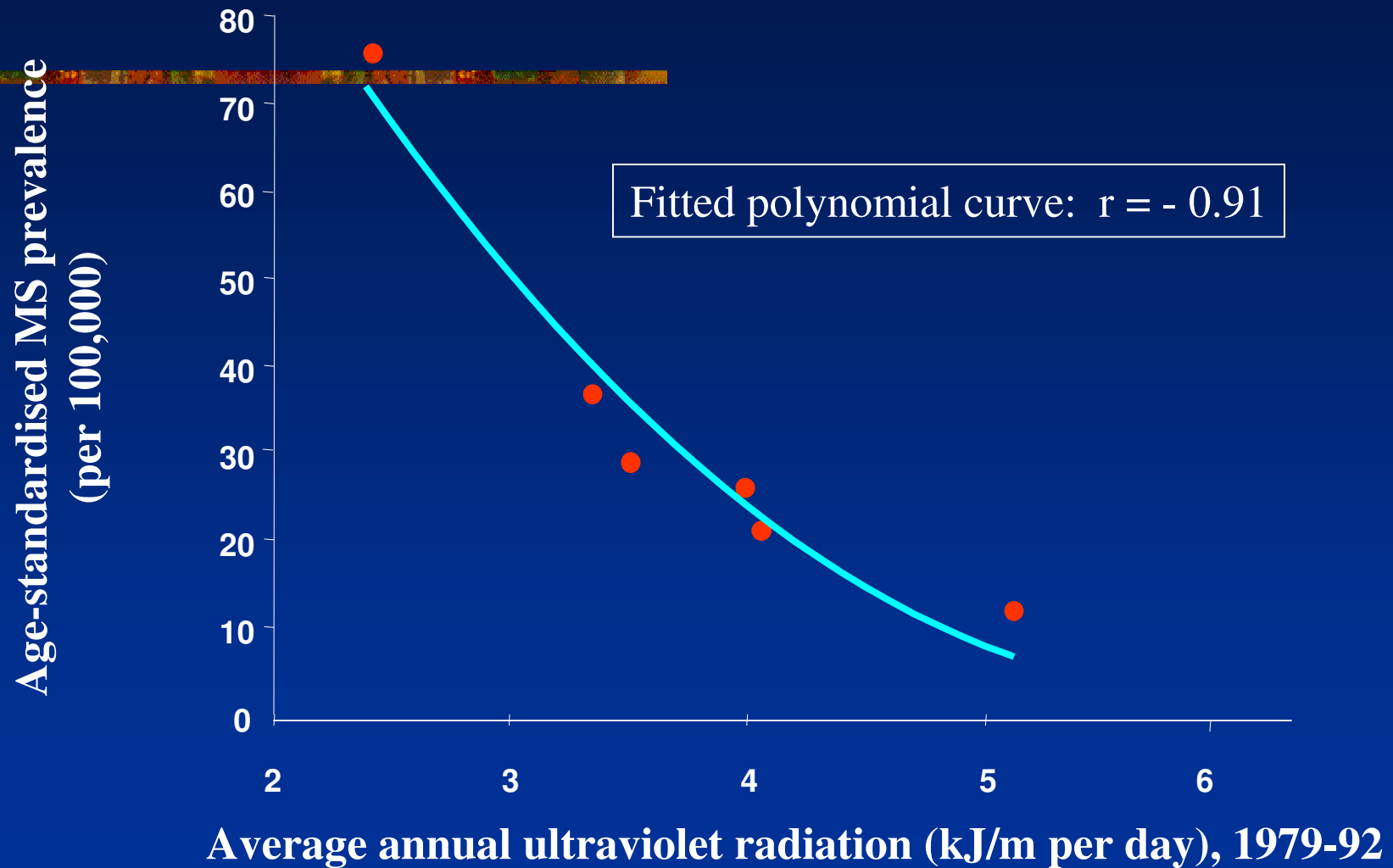
Table 3: Vacation exposure odds ratios

Sun exposure quarter	All (n=1398)	Men (n=807)	Women (n=591)
Lowest	1.00	1.00	1.00
Second	0.98 (0.72-1.32)	1.04 (0.70-1.54)	0.72 (0.46-1.14)
Third	0.82 (0.60-1.12)	0.77 (0.51-1.17)	0.77 (0.49-1.22)
Highest	0.60 (0.43-0.85)	0.53 (0.34-0.82)	0.53 (0.33-0.86)
<i>p</i> heterogeneity	0.01	0.008	0.08
<i>p</i> trend	0.003	0.002	0.02

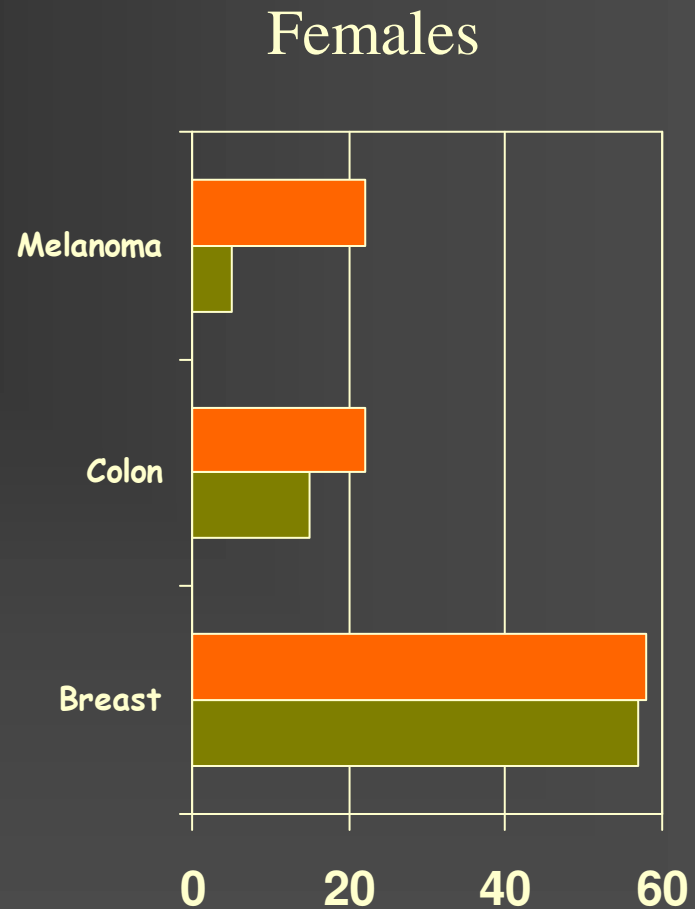
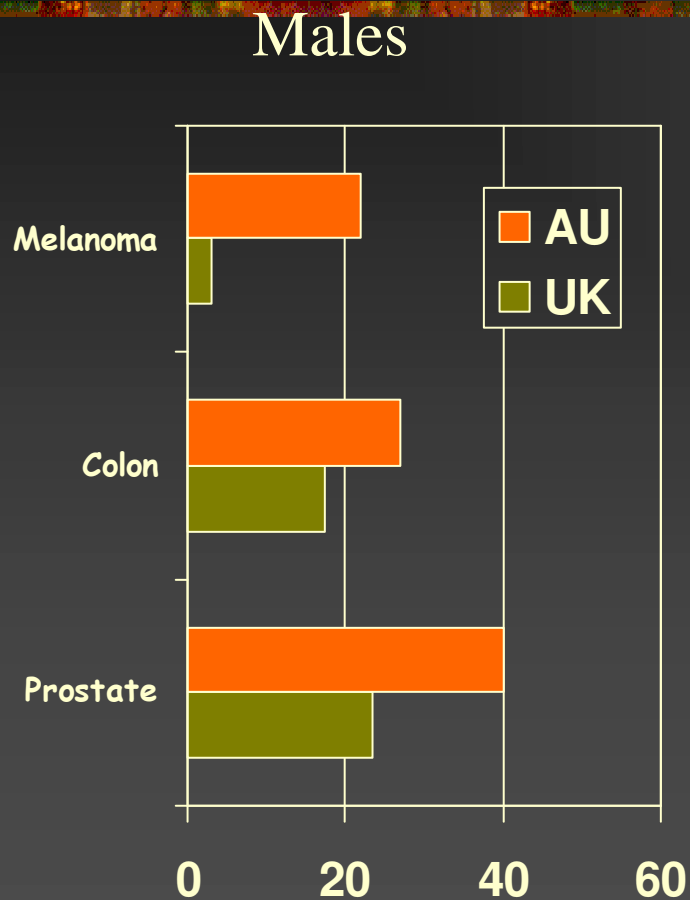
Table 4: Working day exposure odds ratios

Sun exposure quarter	All (n=1398)	Men (n=807)	Women (n=591)
Lowest	1.00	1.00	1.00
Second	0.98 (0.73-1.33)	0.81 (0.54-1.21)	1.34 (0.38-2.16)
Third	0.91 (0.66-1.25)	0.94 (0.61-1.37)	1.08 (0.65-1.80)
Highest	0.95 (0.68-1.33)	0.88 (0.58-1.35)	0.77 (0.45-1.33)
<i>p</i> heterogeneity	0.94	0.77	0.16
<i>p</i> trend	0.68	0.69	0.22

Age-standardised MS prevalence in relation to ambient ultraviolet radiation, Australia, 1981



Incidence UK vs Australia mid 1980s



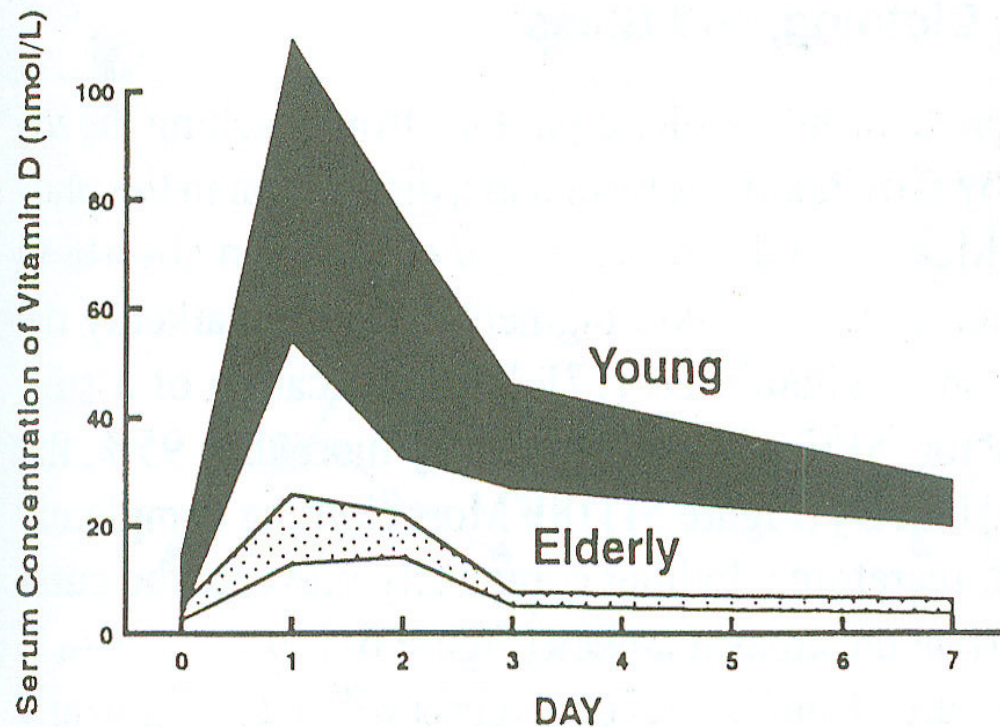


Figure 4 Circulating concentrations of vitamin D in response to a whole-body exposure to one minimal erythemal dose in healthy young and elderly subjects.

Holick, Vitamin D in Dermatology, 2000

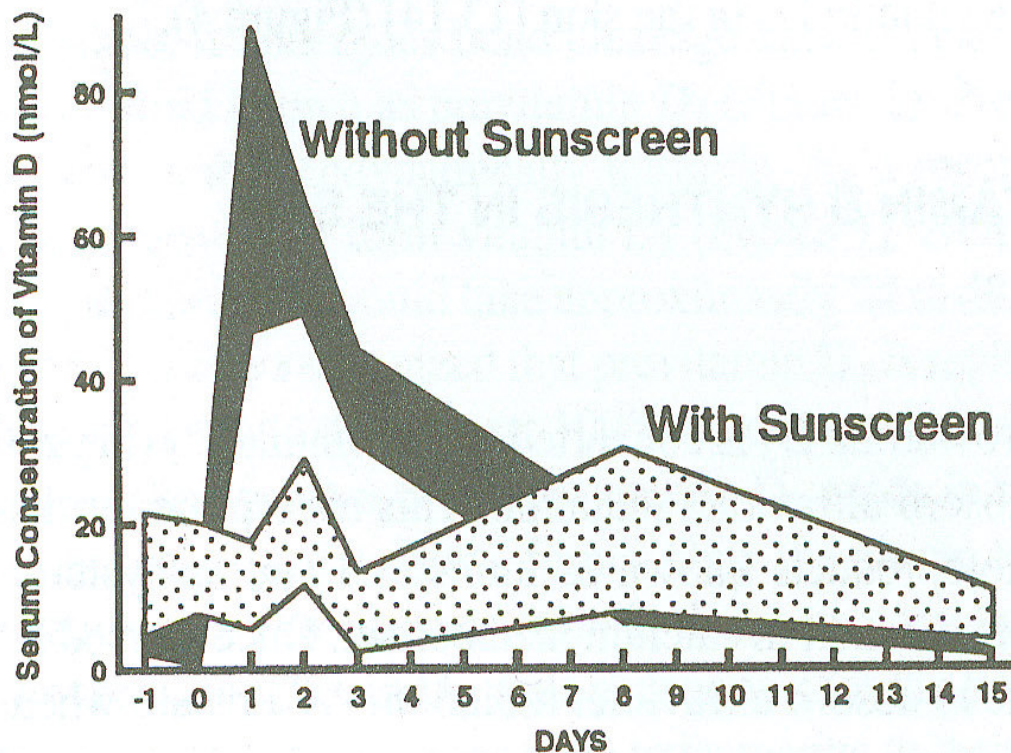


Figure 5 Circulating concentrations of vitamin D after a single exposure to one minimal erythemal dose of simulated sunlight either with a sunscreen, with a sun protection factor of 8, or a topical placebo cream.

Matsouka et al; J Clin Endocrinol Metab, 1987

Where are we seeing Vitamin D Deficiency

- Based on Australian studies, we are seeing Vitamin D insufficiency ($<50\text{nmol/l}$) at latitudes $>37^\circ$ in the general population
 - 43% of F over the winter months
 - 10% of healthy 8 yo (mean age) TAS
- Deficiency ($<25\text{ nmol/l}$)
 - 8% 20 – 59 yo women
 - 80% dark skinned veiled women

Canadian Context

- In Canada, there are no national survey data for estimation of intake and levels.
- Particularly in the northwest territories for a large portion of the year, there is inadequate UV to stimulate Vit D formation in the skin.
- Pop'n largely dependent on fortified food as the main source
- 34% of healthy subjects had vitamin D insufficiency at at least one point during the year

Rucker D et al 2002

Who is most at risk?

- elderly,
 - those who are housebound or are in institutional care
 - dark skinned people who cover their skin for religious or cultural purposes
 - babies from Vit D deficient mothers
-

How much sun exposure is enough?

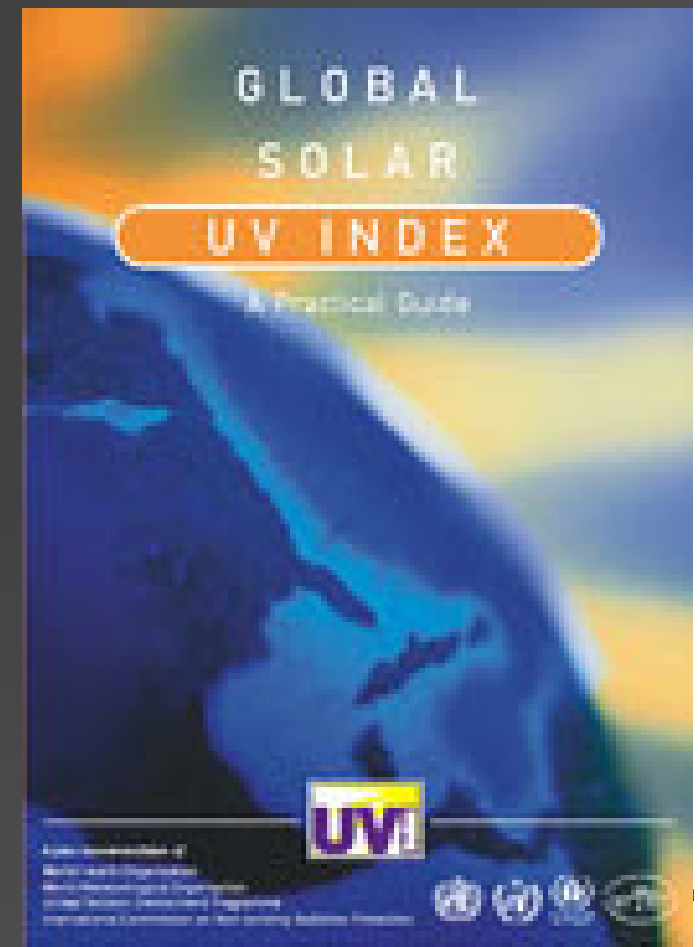
- No firm evidence
 - Research in the area of osteoporosis provides some guidance
 - Recommendation: One-third of a MED most days of the week to 15% of the body (hand, face and arms).
-

Recommendations

Cancer Council Australia, College of Dermatologists, Osteoporosis Australia

- A balance is required between avoiding an increase in skin cancer and maintaining adequate vitamin D levels
- Sun Protection is required only when UV index is >3 , unless at high altitude or near water
- Adequate vitamin D can be achieved in summer by the face, arms and hands being exposed to as little as 5 mins of sunlight either side of the peak UV period most days of the week. 2-3 hours in winter per week
- Those who are at high risk of skin cancer should consider Vitamin D supplementation

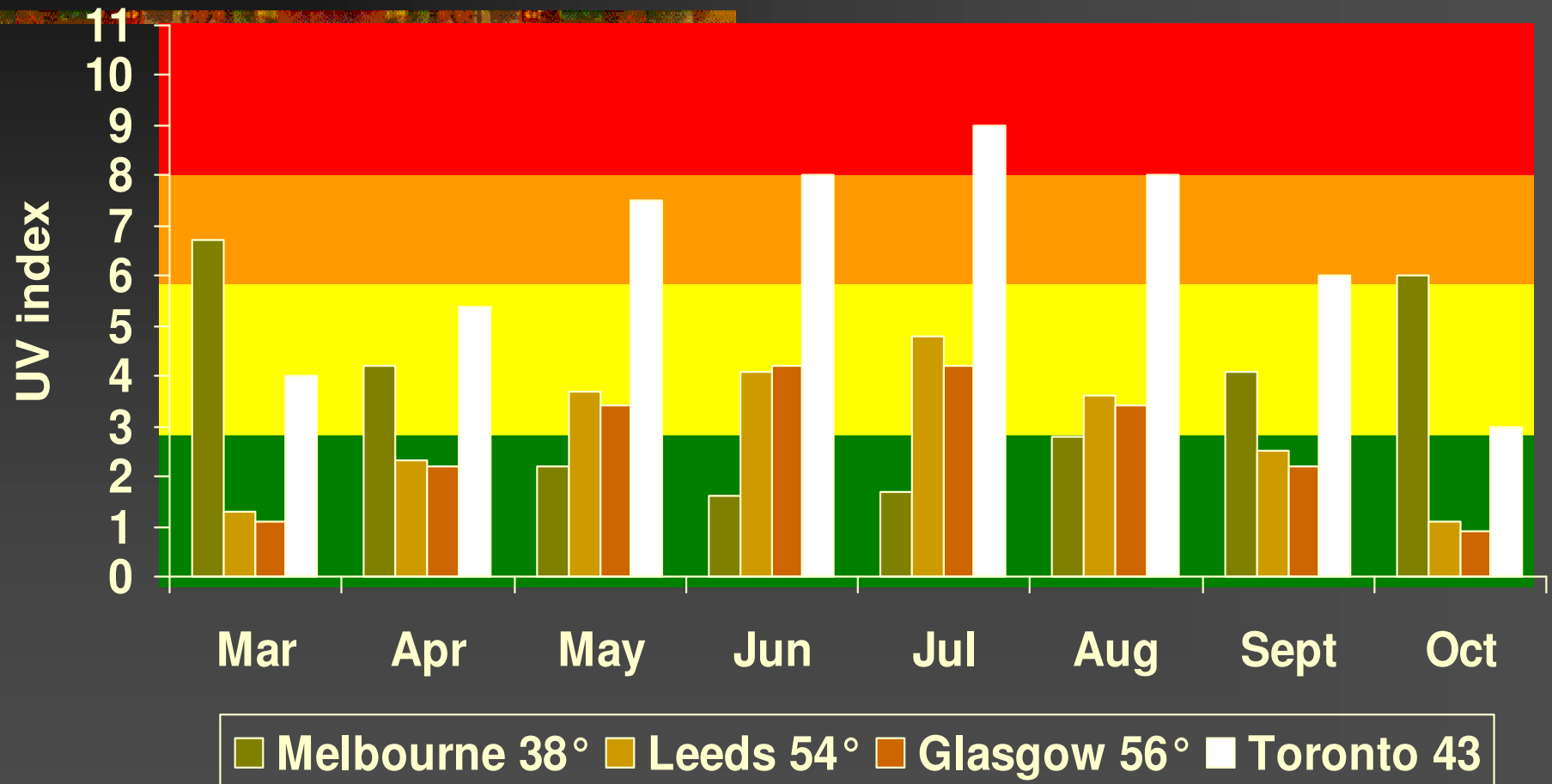
Global Solar UV Index



UV INDEX	UV INDEX	UV INDEX	UV INDEX	UV INDEX	UV INDEX	UV INDEX	UV INDEX	UV INDEX	UV INDEX	UV INDEX
1	2	3	4	5	6	7	8	9	10	11 ⁺
Low (1,2)		Moderate (3,4,5)			High (6,7)		Very high (8,9,10)		Extreme (11 ⁺)	
Green		Yellow			Orange		Red		Purple	
PMS 375		PMS 102			PMS 151		PMS 032		PMS 265	

Table 4: Presenting the UVI: International colour codes¹

UV index



How can the message be complementary?

- Vitamin D deficiency is largely confined to winter months when the sun protection message should not be relevant
 - In some studies, > obesity levels = > risk of deficiency
 - When UVI is in the moderate to extreme range, sun protection will not reduce Vitamin D intake.
 - Vitamin D accumulated in summer/autumn can last 30 – 60 days
-

How can the message be complementary?

- Ensure the sun protection message is relevant to the times when $UVI \geq 3$
 - Greater reliance on the UV Index to guide behaviour
 - Refrain from messages that relate to 'stay indoors'
 - Acknowledge both known benefits and detrimental effects of sun exposure
-

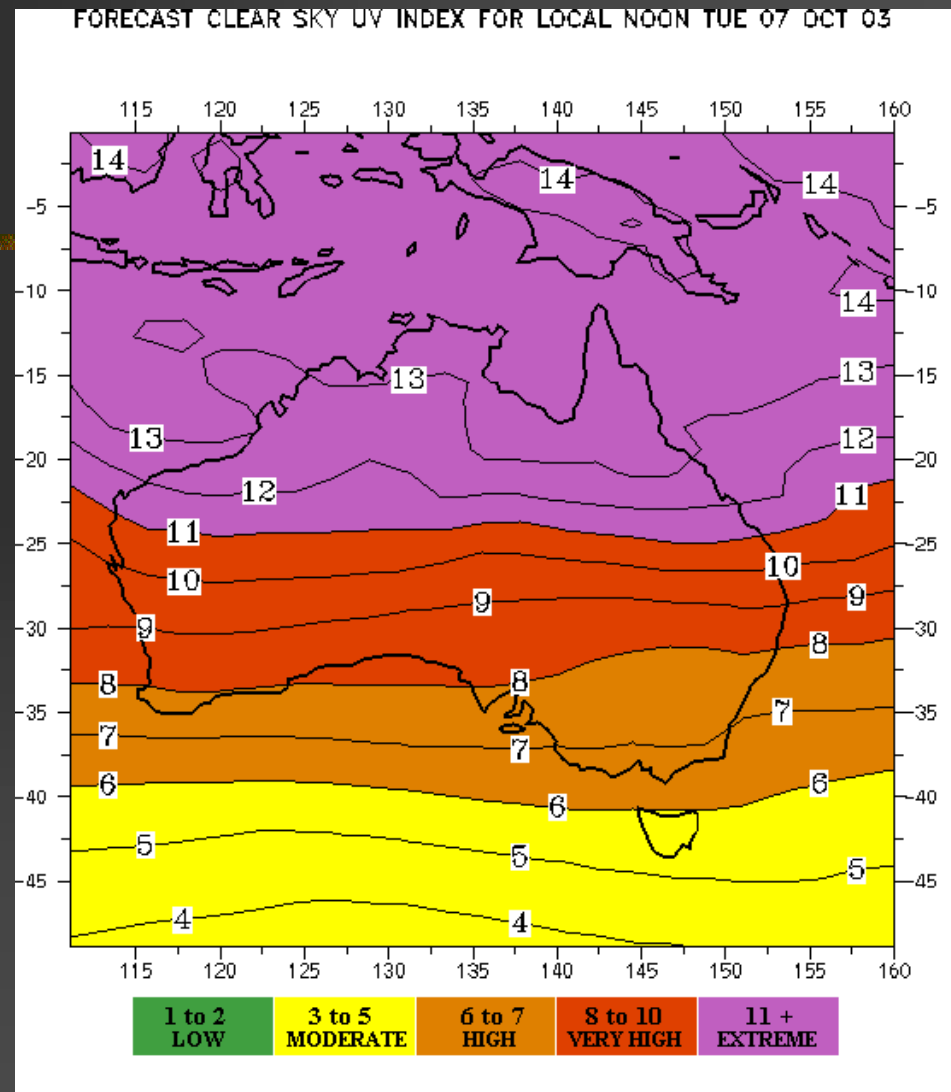
Purpose of the UV Index

An essential vehicle to:

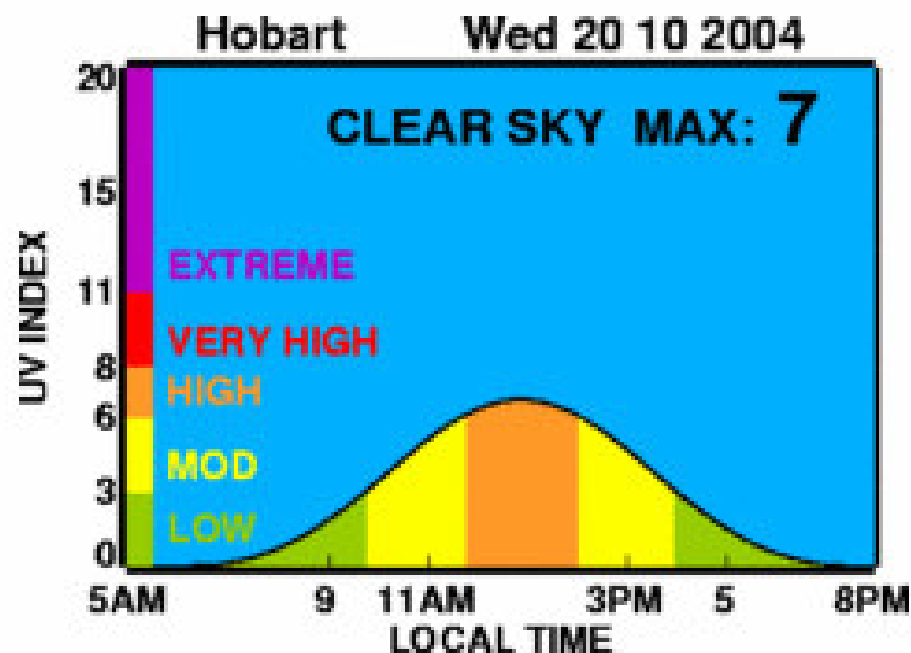
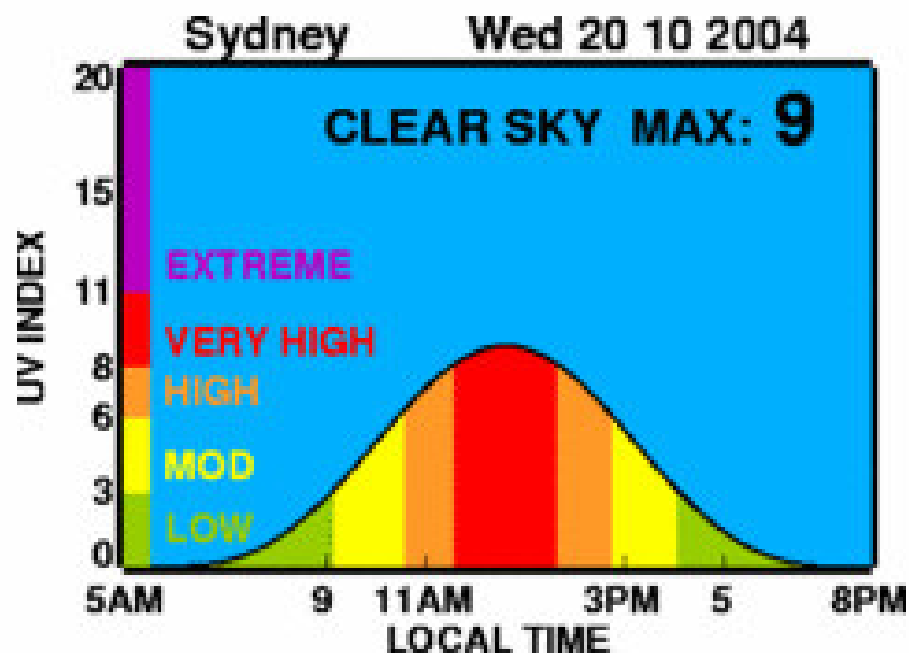
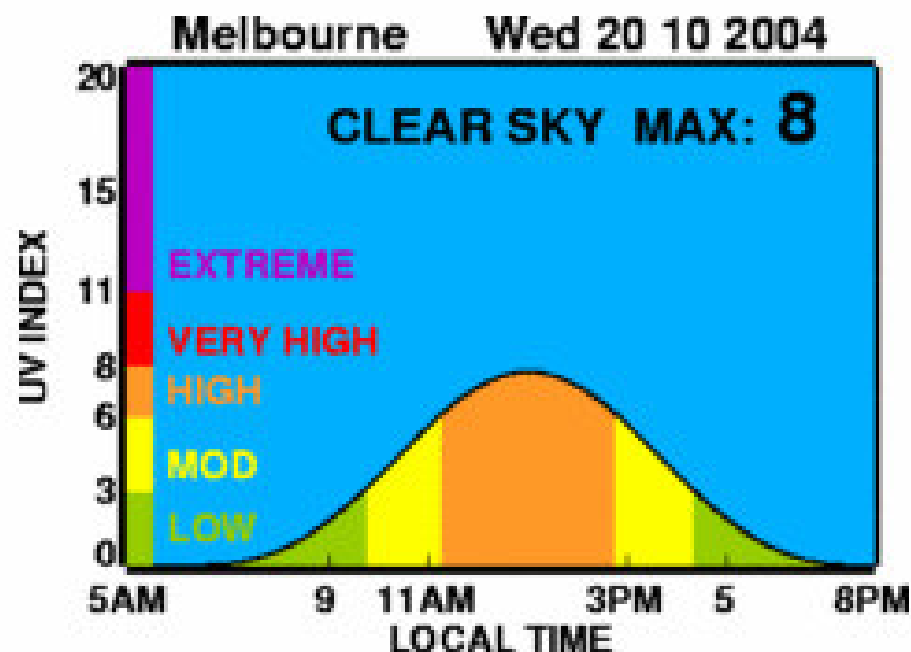
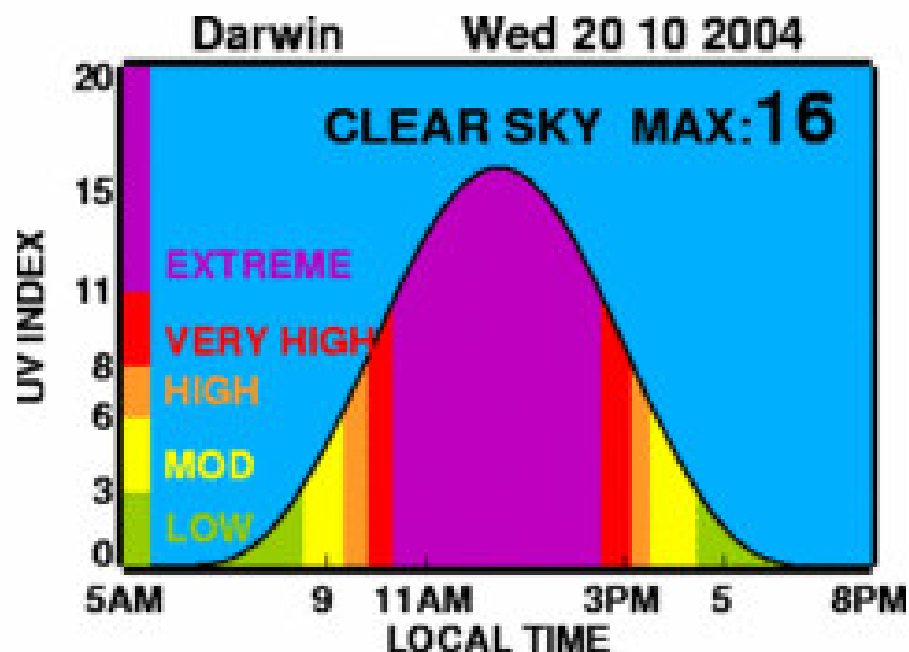
- Raise public awareness of potential health effects from excessive exposure to UV radiation
 - Promote sun protection by:
 - drawing attention to the hazards of excessive sun exposure
 - educating the public about how ambient UV varies
 - encouraging protective sun exposure behaviour
-

UV Index

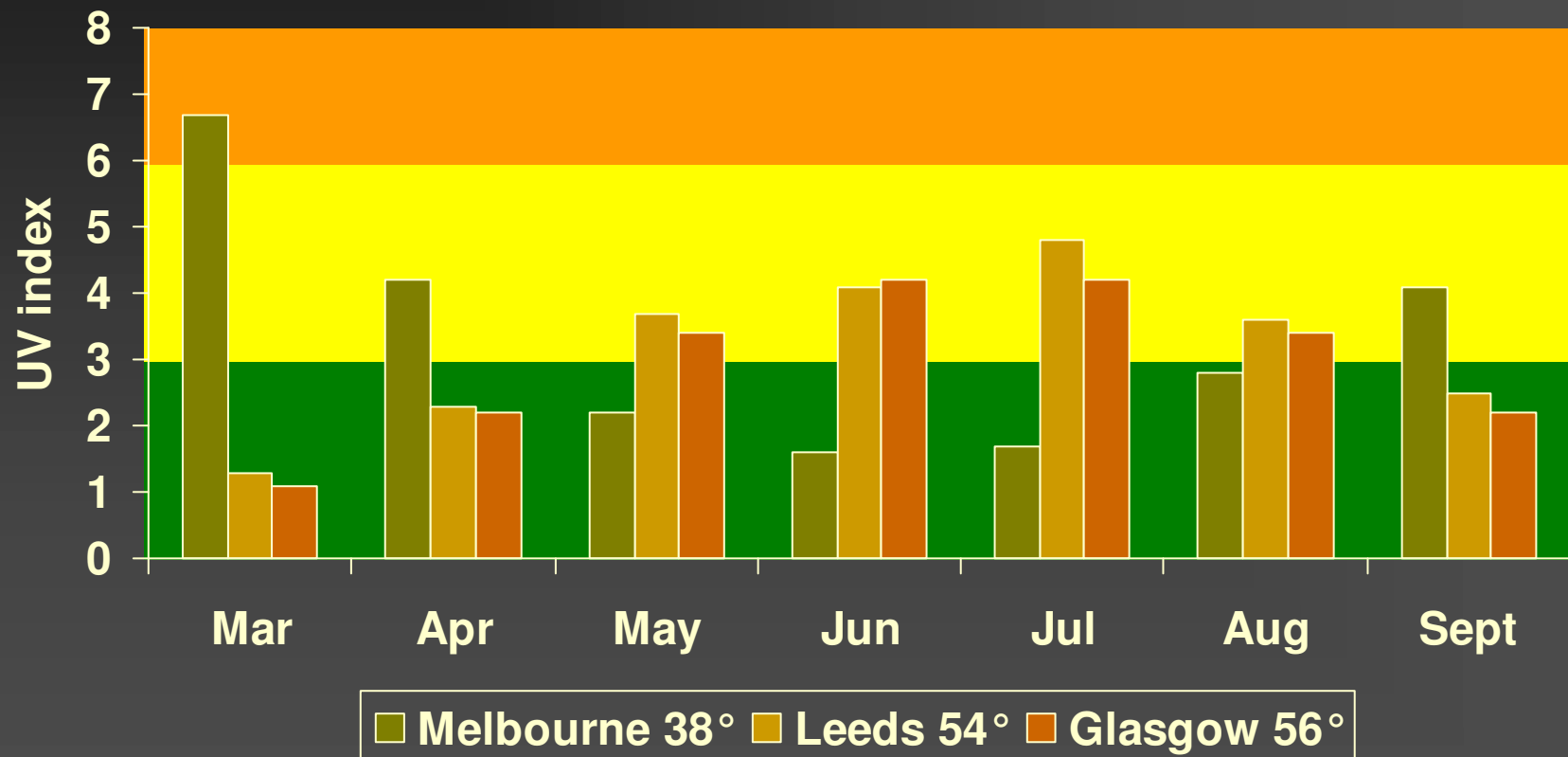
UV INDEX	DANGER CATEGORY
1 to 2	Low
3 to 5	Moderate
6 to 7	High
8 to 10	Very High
11+	Extreme



Source: Bureau of Meteorology website:
http://www.bom.gov.au/info/about_uv.html



UV index



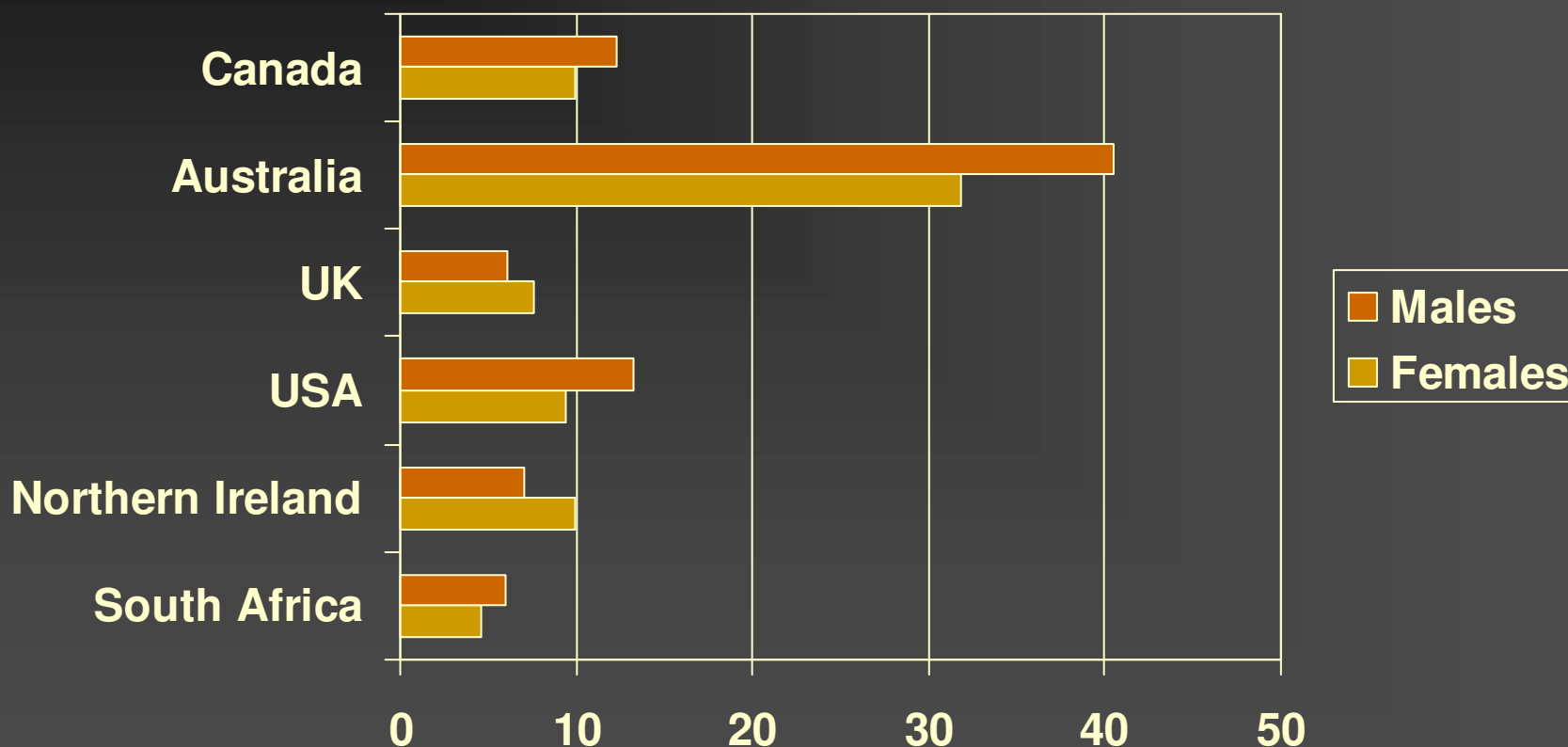
Implications for the Sunbed Industry

- NONE!
 - Emit largely UVA, not related to Vitamin D absorption
 - Not medically controlled conditions
-

Tasmanian studies of vitamin D

Study sample	% < 25nmol/l	% < 50nmol/l
Elderly presenting to hospital, n=161, mean age 79	52	85
Healthy Hobart children, N=201, mean age 8	0.5	10
Healthy Burnie children, N=136, mean age 16	11	68
MS study controls N=262, all <60	9	49
Prostate cancer controls N=140, mean age 63	1	29
TASOAC study N=1046, aged 50-79, healthy	6	47

Comparative world age-standardised rates for malignant melanoma





WHO
Collaborative
Centre for the
Promotion of
Sun Protection



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Australia's Risk and Benefits Position
Statement can be viewed at
www.cancer.org.au