



UN warns the ozone hole is larger than ever before

The "ozone hole" in the Antarctic has grown to its largest size on record, according to the United Nations (UN).

The UN meteorological agency said it both matched the surface area in 2000 and registered the largest depletion of ozone, the gas that helps protect the Earth from ultraviolet (UV) rays, after measuring the so-called "mass deficit".

The WMO said the hole was caused by the presence of "peak levels" of ozone destroying substances such as chlorofluorocarbons in the atmosphere and the particularly cold South Pole winter.

Large holes over the Antarctic are forecasted to appear over the next two decades before slimming in size and depth.

But it will take until 2065 for the ozone layer to recover and the hole over the Antarctic to close, experts say.

The agency derived measurements from satellites owned by NASA and the European Space Agency (ESA).

On September 25th, NASA found the area of the hole reached 29.5 million square kilometres (11.4 million square miles), compared to 29.4 million in September 2000.

Cette présentation a été effectuée le 24 octobre 2006, au cours du symposium "Saurons-nous conjuguer santé et changements climatiques?" dans le cadre des Journées annuelles de santé publique (JASP) 2006. L'ensemble des présentations est disponible sur le site Web des JASP, à l'adresse <http://www.inspq.qc.ca/jasp>.

The [satellite](#) observed an ozone loss for the year of 40 million tonnes on 2 October 2006, surpassing a loss of 39 million tonnes recorded in 2000.

Ozone loss is calculated by the dimensions of the ozone hole – this year's measurement of the hole was 28 million square kilometres, nearly as large as the record extension registered in 2000, and the depth of the ozone hole is around 100 Dobson units, rivalling the record low ozone values in 1998.

This year was a record year because the two measurements occurred during the same period.

A Dobson unit is a unit of measurement that describes the thickness of the ozone layer in a column directly above the location being measured.

"Such significant ozone loss requires very low temperatures in the stratosphere combined with sunlight," ESA Atmospheric Engineer Claus Zehner said.

"This year's extreme loss of ozone can be explained by the temperatures above Antarctica reaching the lowest recorded in the area since 1979."

The sun and ultraviolet problem in Australia

- ◆ **A European origin population in a high intensity UV environment**
- ◆ **Equals problems**

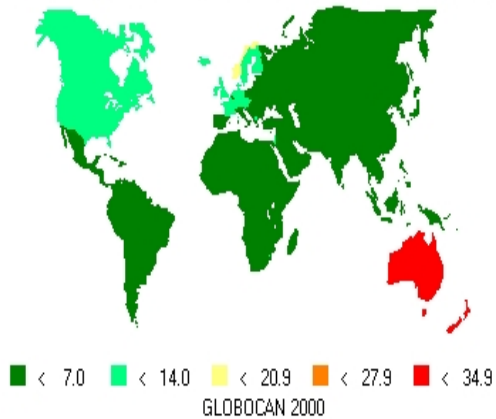
*I love a sunburnt country,
A land of sweeping plains,
Of ragged mountain ranges,
Of droughts and flooding rains.
I love her far horizons,
I love her jewel-sea,
Her beauty and her terror -
The wide brown land for me!*

My Country
by
Dorothea Mackellar
(1885 - 1968)

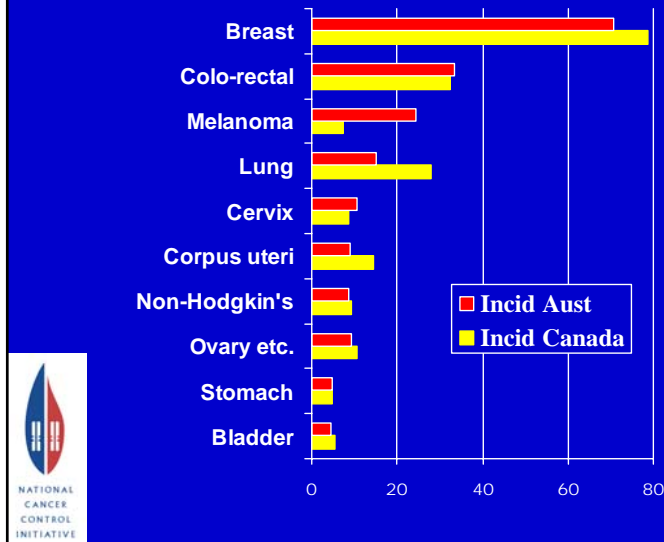


Melanoma

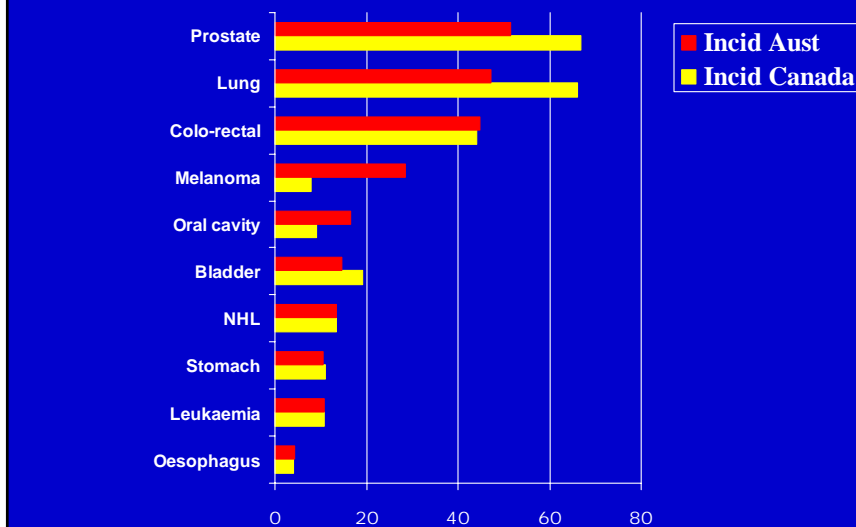
Incidence of Melanoma of skin: ASR (World)-Female (All ages)

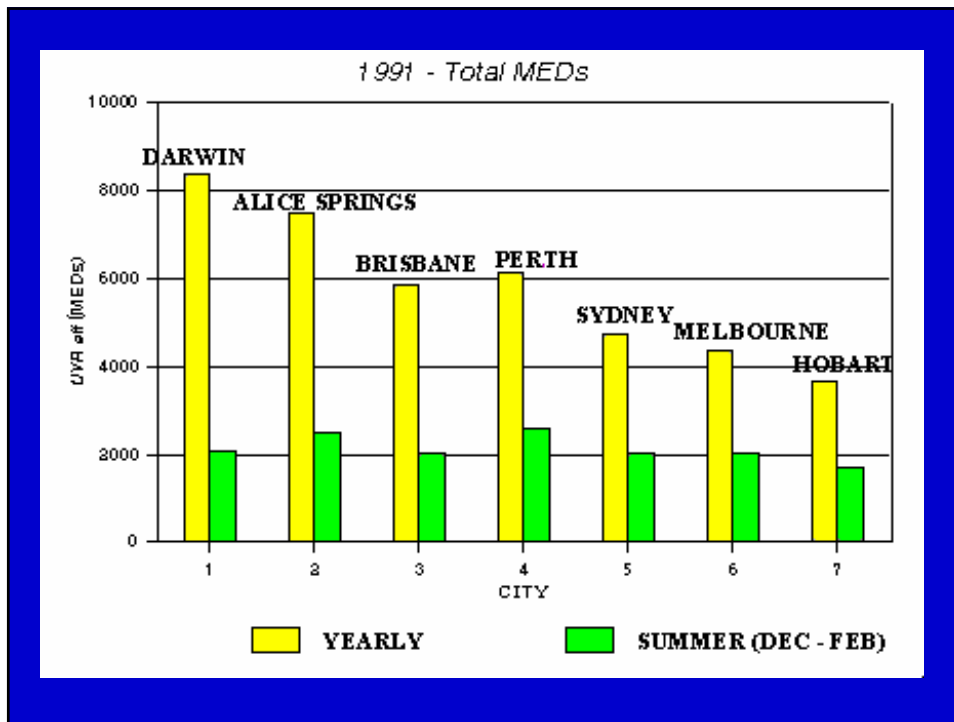


Cancer incidence: Australia and Canada 2000; women; age stand. to world pop



Cancer incidence 2000: Australia and Canada; men; age stand. to world pop





Burden of skin cancer in Australia (pop 19.4 million)

Deaths (2001) melanoma	1074	(m:f 1.75)
NMSC	387	(m:f 2.1)

5.0% of all cancer deaths;

5.4% of all Years of Life Lost;

10.7 % of Years lived with disability

Burden of skin cancer in Australia

Incidence (2001)	melanoma	8,885	(m:f 1.3)
(2002)	BCC	266,000	(m:f 1.3)
	SCC	118,000	(m:f 1.5)
	Total NMSC	384,000	(2% of pop)

15.2% of all cancer care costs

1.0% of all health costs

Hospital admissions 54,700; medical consultations 1.9 million

Health costs (malignant only) \$200 million; health costs (including benign) \$300 million

Responses

- ◆ Behaviour modification

Responses

- ◆ **Behaviour modification**
- ◆ **Media – objective to change knowledge, attitudes and behaviours relevant to excess sun exposure, sunburn, and suntan**

Responses

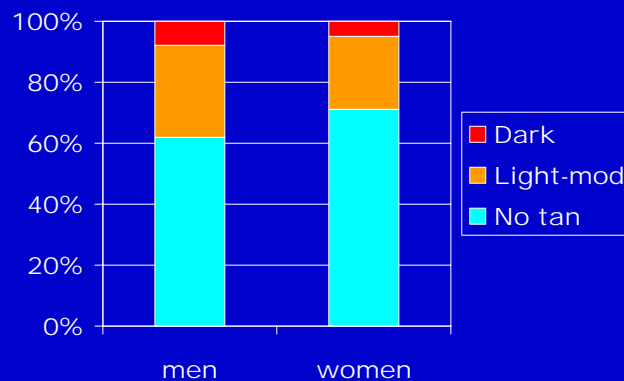
- ◆ **Sunscreens, clothing, hats, sunglasses**
- ◆ **Promotion of standards of UV protection and labelling**

National survey of sun behaviour 2003-4

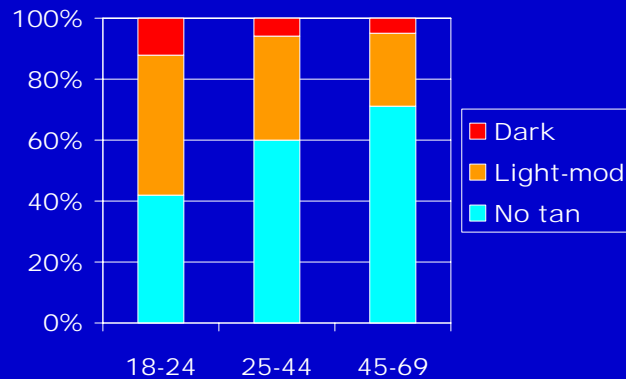
- ◆ Random telephone surveys on Monday & Tuesday evenings asking about the previous weekend
- ◆ For 8 weeks of summer, 27 Nov 2003 to 27 Jan 2004
- ◆ In each of the eight states/territories
- ◆ 5073 adults surveyed

Report: K. Bowles et al., Cancer Council Victoria

What skin tan do you prefer? By sex



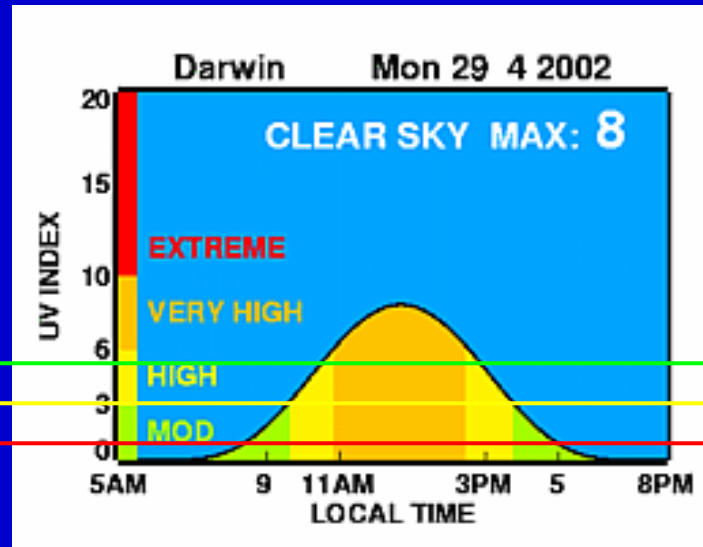
What skin tan do you prefer? By age



Current messages

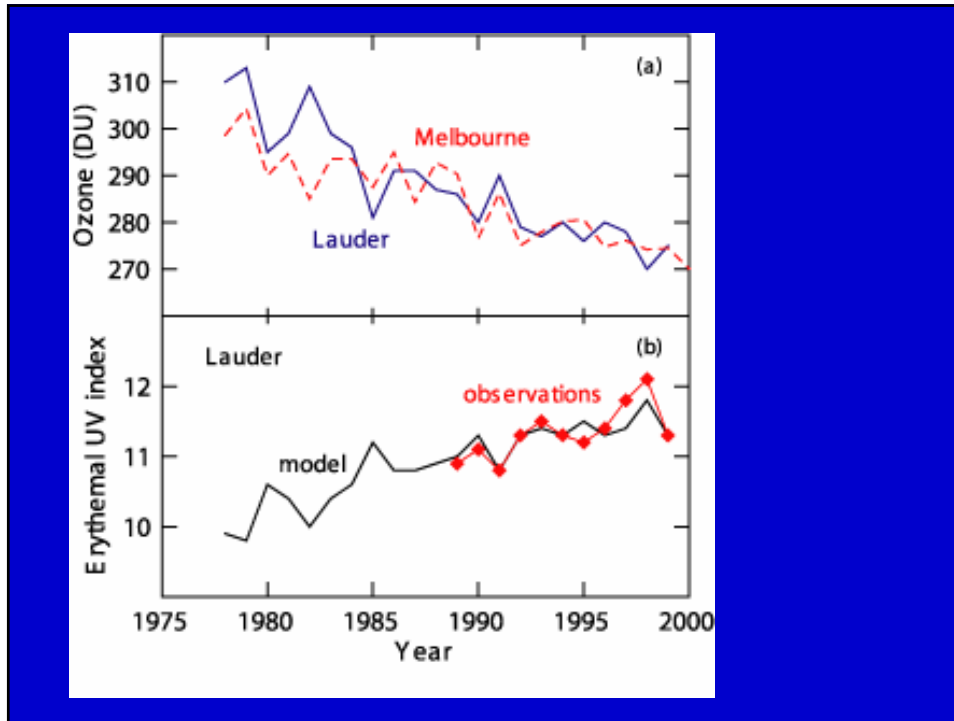
- ◆ 'Everyone should use a combination of five sun protection measures **whenever the UV Index reaches 3 and above**:
- ◆ 1. **Slip** on sun-protective clothing - that covers as much skin as possible
- ◆ 2. **Slop** on SPF30+ sunscreen - make sure it is broad spectrum and water resistant. Put it on 20 minutes before you go outdoors and every two hours afterwards. Sunscreen should never be used to extend the time you spend in the sun.
- ◆ 3. **Slap** on a hat - that protects your face, head, neck and ears
- ◆ 4. **Seek shade**
- ◆ 5. **Slide** on some sunglasses - make sure they meet Australian Standards'.
- ◆ Particular care should be taken between 10 am and 2 pm (11 am and 3 pm daylight saving time) when UV Index levels reach their peak.

Forecast UV Index - Darwin with *Sun sensitivity*



The Ozone 'hole'

- ◆ Sharp reductions in stratospheric ozone were first detected in Antarctica in the Southern Hemisphere spring (September and October).
- ◆ Each winter over the Antarctic, temperatures in the lower stratosphere drop to around minus 85 degrees Celsius. In ice clouds, chlorine and bromine containing compounds (halons) are converted to compounds that can catalytically destroy ozone.
- ◆ The ozone destruction occurs in spring when the sunlight returns to Antarctica, reaching a maximum in early October and lasting to the end of December.



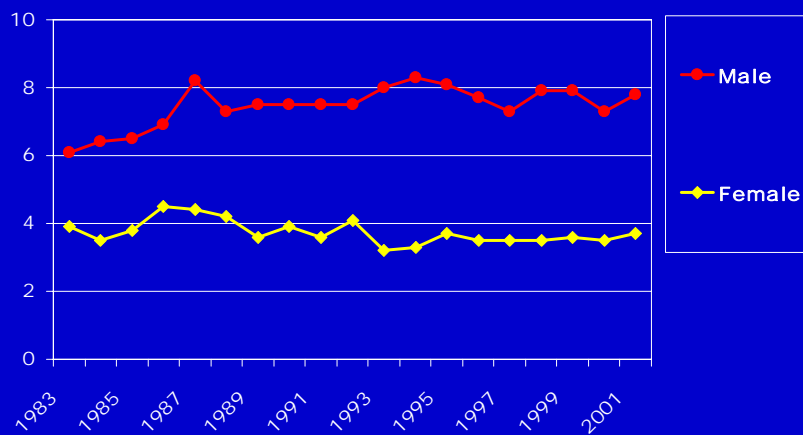
The Montreal protocol

- ◆ In the mid-1980s most countries signed the Montreal Protocol governing the global consumption of ozone depleting substances.
- ◆ Since then the accumulation of ozone-depleting substances in the atmosphere has slowed. Concentrations peaked in the mid-1990s and are now declining.
- ◆ But the substances already in the atmosphere continue to destroy ozone, and the depletion of ozone over Australia and Antarctica may not yet have peaked, although ozone may not decline much further.

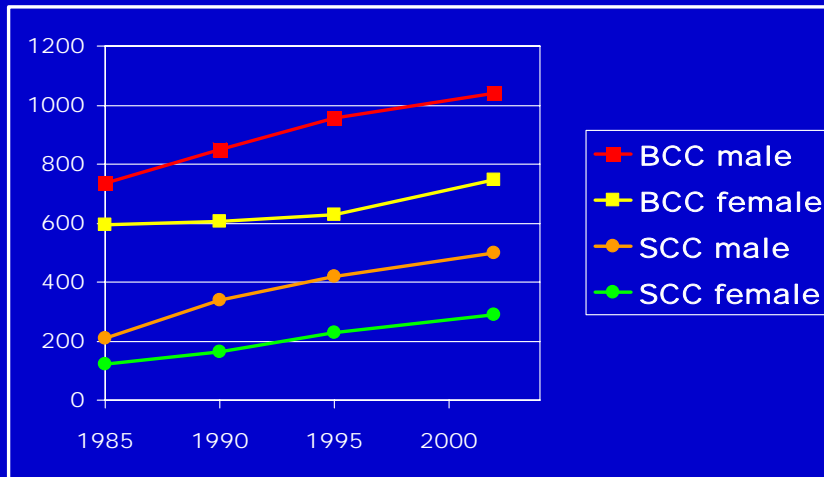
Ozone at the poles

- ◆ Arctic stratospheric air is generally much warmer than in the Antarctic, and fewer ice clouds form, so ozone depletion in the Arctic has been less than in the Antarctic.

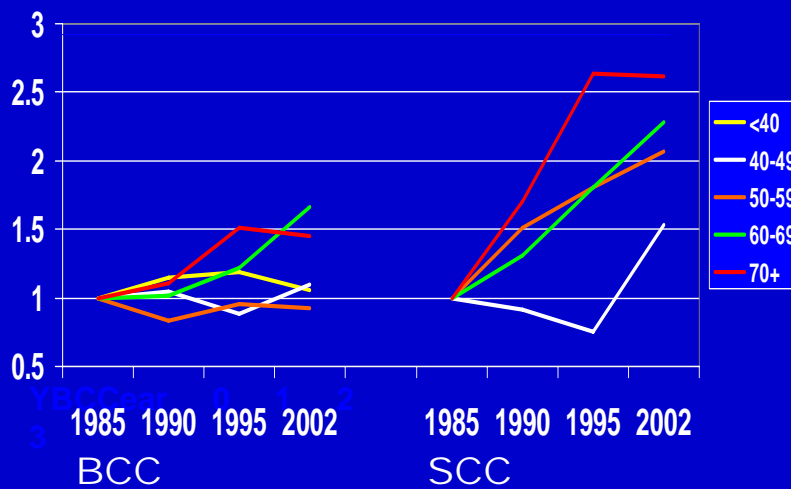
Melanoma mortality per 100,000, Australia, age standardised



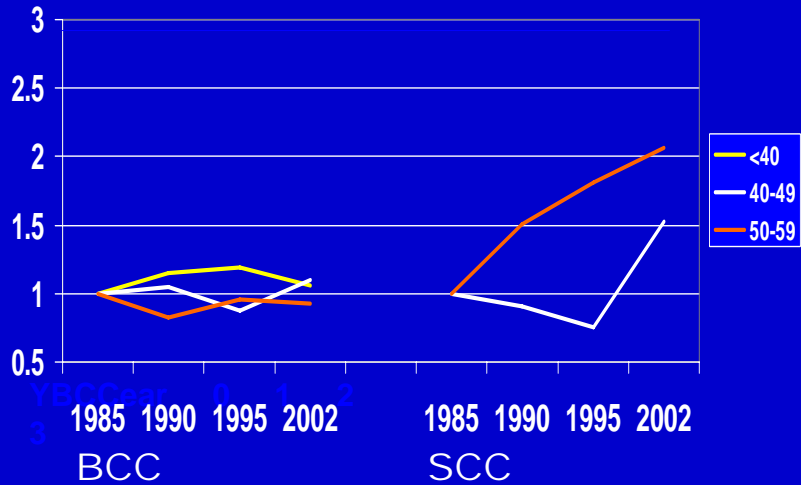
Treated NMSC, Australia; annual incidence per 100,000, by time



Trends in treated BCC and SCC by age, adjusted for other factors. Rates relative to 1985.



Trends in treated BCC and SCC by age, adjusted for other factors.
Rates relative to 1985.



Meta-analysis of 29 melanoma studies

Elwood & Jopson, Int J Cancer, 73,198, 1997

Factor	Studies	Odds ratio	95% C.I.
sun exposure:			
Intermittent	23	1.71	1.54 - 1.90
occupational	20	0.86	0.77 - 0.96
total	11	1.18	1.02 - 1.38
sunburn:			
adult or life	19	1.91	1.69 - 2.17
adolescence	7	1.73	1.44 - 2.07
childhood	9	1.95	1.66 - 2.31

Elwood & Jopson

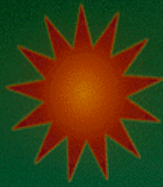
**Cumulative risk of skin cancer
by age**

Changes in social norms, attitudes and self-efficacy for sun-related behaviour

	'88	'89	'90	'92	'95	'98
Social norms						
Friends think a sun tan is a good idea	69%	63%	52%	48%	38%	36%
Close family think a sun tan is good	50%	37%	29%	25%	19%	20%
Attitude						
I feel more healthy with a sun tan	51%	46%	39%	31%	30%	30%
Prefer a dark or very dark tan	20%	18%	14%	9%	8%	7%
Self-efficacy						
I find it difficult to protect myself from the sun	22%	17%	20%	21%	21%	21%
Once you get a suntan its easier to enjoy the summer	62%	54%	43%	37%	30%	29%

Percentage taking sun protection measures between 11am & 3pm on the previous Sunday

	'88	'89	'90	'92	'95	'98
Wore a wide brimmed hat between 11am & 3pm on Sunday	9%	15%	16%	19%	19%	17%
Used sunscreen between 11am & 3pm Sunday	21%	26%	24%	28%	38%	37%
Chose to stay out of the sun between 11am & 3pm on Sunday	n/a	n/a	29%	34%	42%	33%

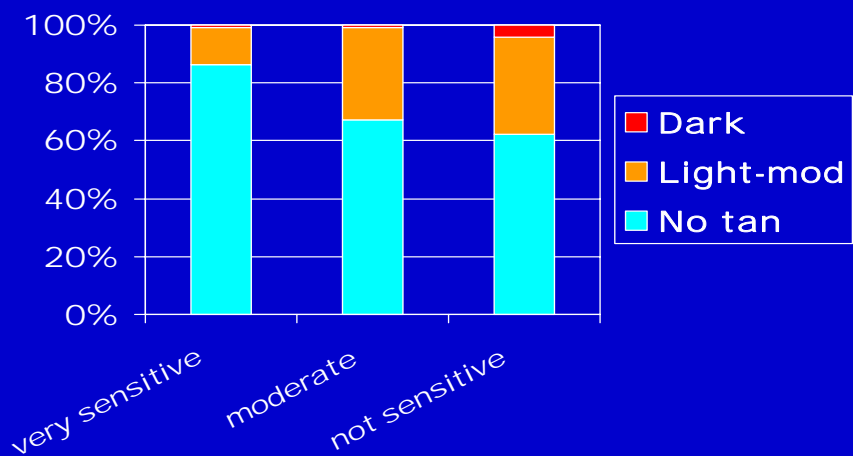


Why sunburn used as intermediate marker of carcinogenic action

Measure of biologically active sunlight reaching skin

- correlates highly with ambient UVR levels
- is person-specific, depends on:
 - skin phenotype
 - degree of melanisation (natural and acquired)
 - degree of epidermal thickening
 - amount of applied protection

What skin tan do you prefer? By sun sensitivity. Australian national survey, 2003



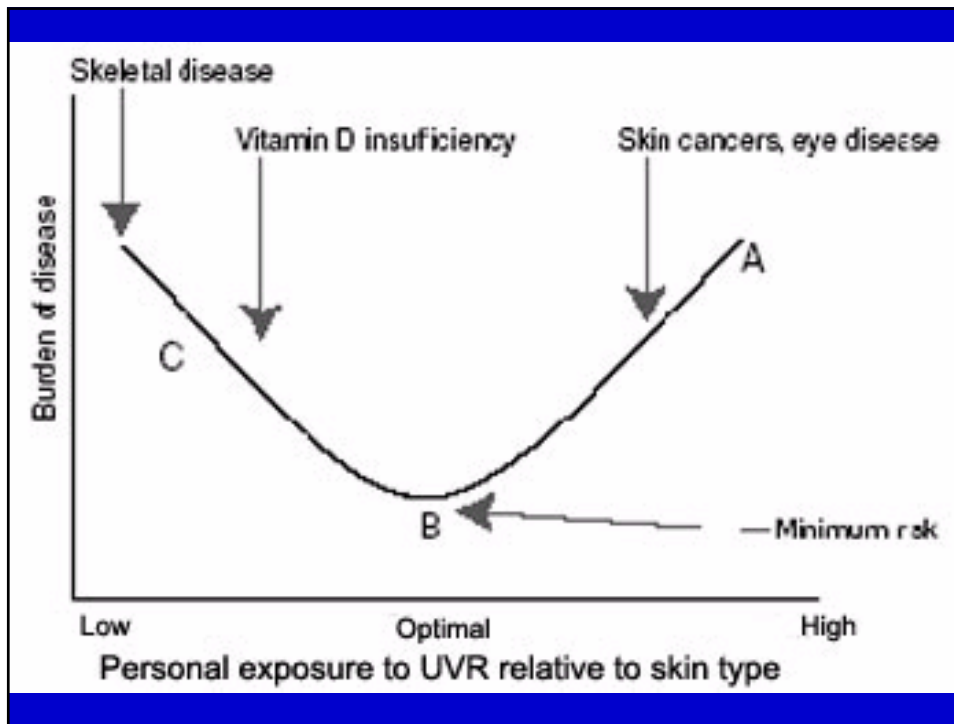
SunSmart

- ◆ State initiatives, little national integration
- ◆ Funding from Cancer Councils
- ◆ CC also support epidemiological and behavioural science research groups
- ◆ Variable state government support
- ◆ Little federal support until recently
- ◆ \$5 million national program planned

Current messages

Everyone should use a combination of five sun protection measures **whenever the UV Index reaches 3 and above**:

- ◆ 1. **Slip** on sun-protective clothing - that covers as much skin as possible
- ◆ 2. **Slop** on SPF30+ sunscreen - make sure it is broad spectrum and water resistant. Put it on 20 minutes before you go outdoors and every two hours afterwards. Sunscreen should never be used to extend the time you spend in the sun.
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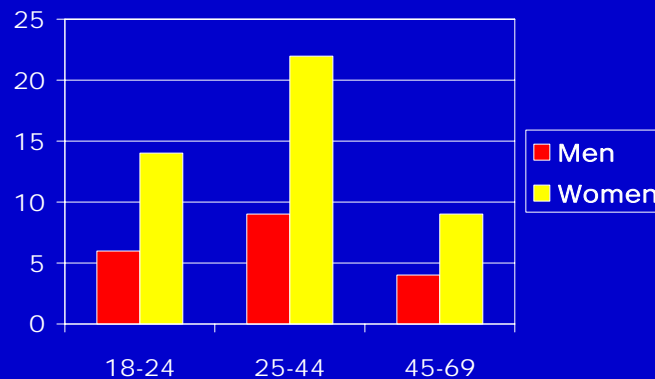


Local governments supplying personal sun protection items for their outdoor staff

	1990 n=158	1993 n=136	1998 Council ¹ workers n=60	1998 Contract ² workers n=44
Broad-brimmed or legionnaire hats	61%	86%	97%	66%
Other type of hat	42%	33%	53%	46%
Sunscreen	59%	96%	95%	64%
Long-sleeved shirts	-	-	83%	61%
Trousers	-	-	88%	59%

1. Of councils with at least some council employed
2. Of councils with at least some contract employed

**Have you ever been to a solarium?
Ever-use 10% men, 22% women, Australian
national survey, 2003**



**Key requirements of the voluntary
Standard (AS/NZS 2635:2002) for
Solaria for cosmetic purposes**

- ◆ **Age Limit**
 - not allowed <18 unless permission
- ◆ **Promotion**
 - No claims of non-cosmetic health claims
- ◆ **Client Information**
 - Warning Notice (every cubicle)
 - Client Consent Form (records kept for 2 years)

Key requirements of the voluntary Standard (AS/NZS 2635:2002) for Solaria for cosmetic purposes - cont

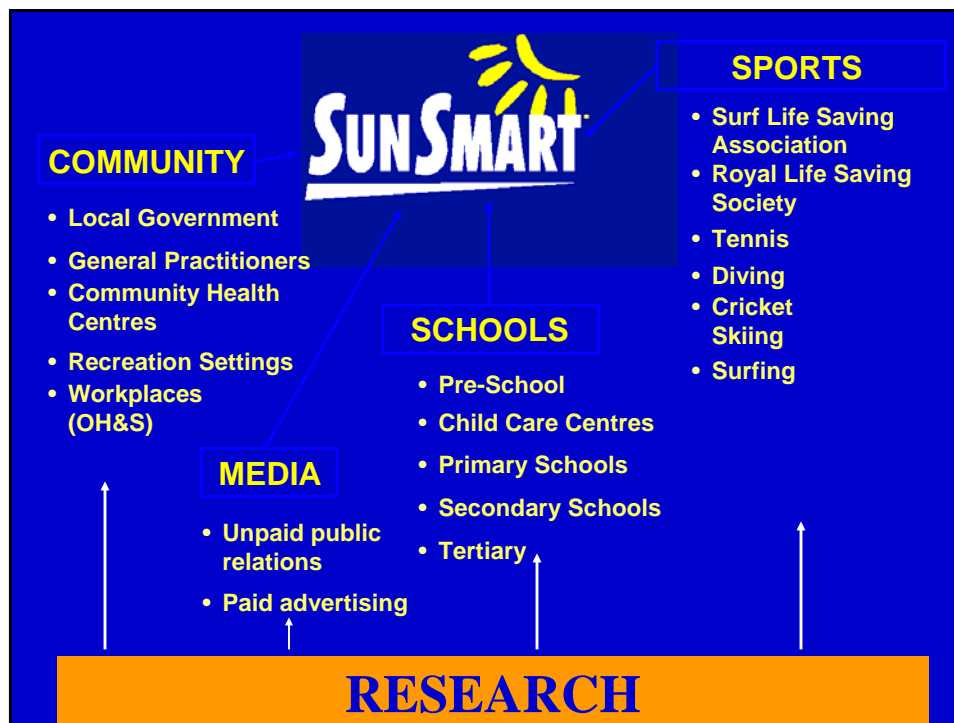
- ◆ Supervisor training
- ◆ No unsupervised solariums
- ◆ Skin Type 1 exclusion
- ◆ Maximum output 1.5 watts/m²

Ultraviolet radiation



Responses to the threat from high UV levels

- ◆ Macro – efforts in ozone depletion control, Montreal protocol
- ◆ Environmental changes
- ◆ Behaviour changes



Responses – detection and treatment

- ◆ Treatment services
- ◆ Early diagnosis efforts
- ◆ ?? Value of screening for melanoma

Testing and labelling clothing - Ultraviolet protection factor

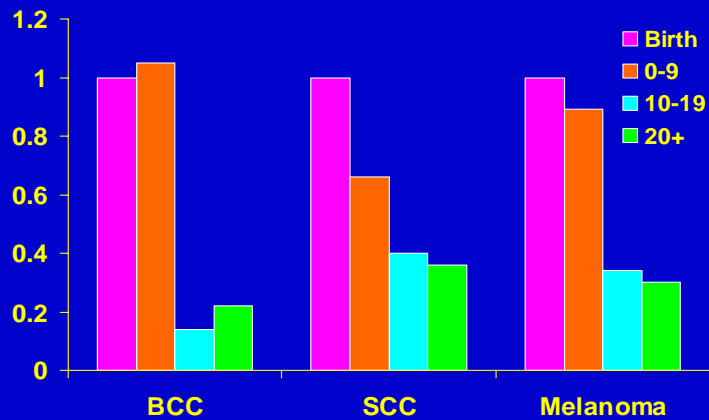
- ◆ A material's UPF rating is based on the percentage of UV radiation transmitted through the material.

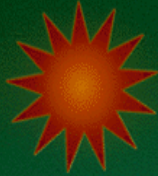


Our children's swimwear is made from chlorine-resistant fabric that blocks 98% UV. Our short-sleeve swim shirts are the most popular sun protective swimwear items in Australia.



Relative risk of skin cancer in migrants from Europe, by age at arrival in Australia





Sun Survey Features

- Random sample aged 14 - 69 years
- Telephone interviews each Monday evening of summer
- Demographic details
- Occurrence, severity, site of weekend sunburn
- Saturday, Sunday, between 11am and 3pm:
 - location
 - activities
 - sunscreen use
 - clothing and hat coverage
 - time outside
 - (body exposure index)
- Health and sun-related beliefs
- Linked to UVR data
- Linked to 3pm temperature

Responses

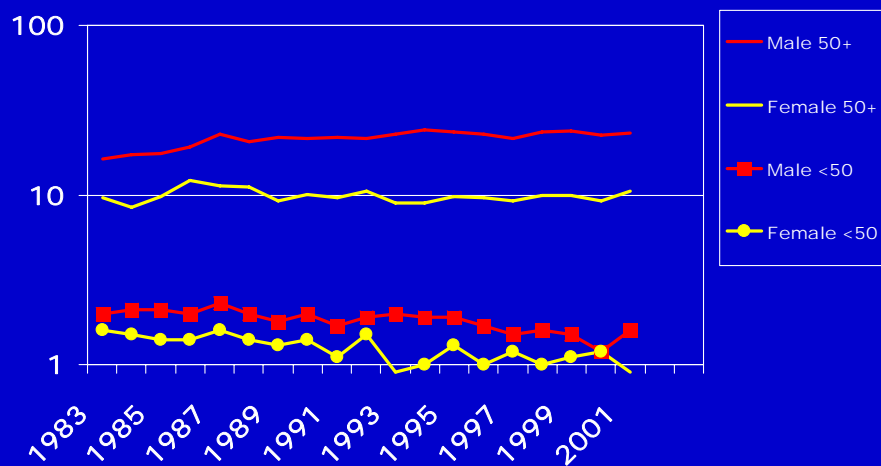
- ◆ Regulation of solariums

SunSmart's success can be mostly attributed to

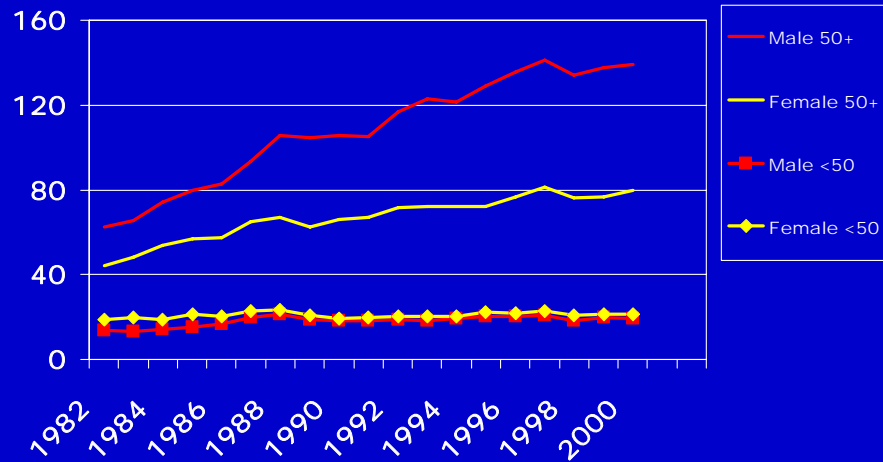
Montague, Borland & Sinclair (2001)

- ◆ broad multi-faceted intervention program
- ◆ history of mass media underpinning program
- ◆ having access to adequate & consistent resources
- ◆ growing out of a strong home base
- ◆ integration of research and evaluation into program planning

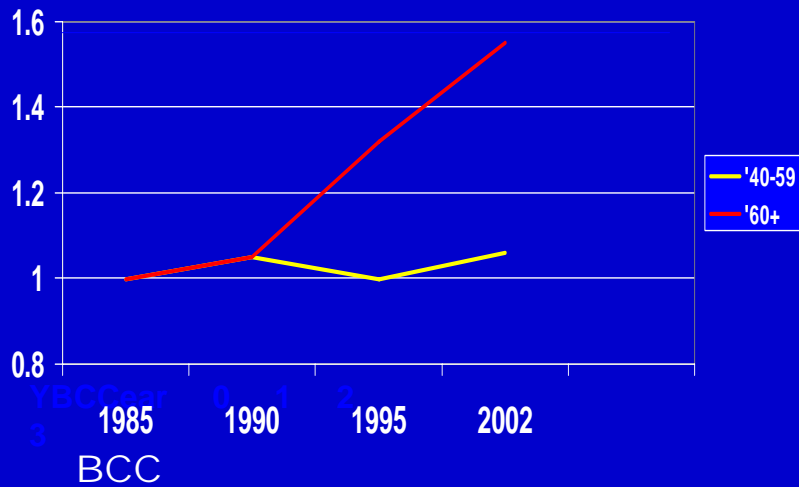
Melanoma mortality, Australia, per 100,000 age standardised within age groups (log scale)



Melanoma incidence per 100,000 age standardised within age groups



Trends in treated BCC by age, adjusted for other factors. Rates relative to 1985.



Responses

- ◆ **Early diagnosis and good treatment of skin cancers**
- ◆ **--- but not population screening, as evidence for benefit is unclear**

CHALLENGES TO THE SOLARIUM INDUSTRY

- ◆ **Legal action through the Australian Competition and Consumer Commission (ACCC), 2001**
- ◆ **New Australian Standard - Voluntary Code - New Guidelines for Operators**
- ◆ **Government letter to all solariums (Victoria)**
- ◆ **Cancer Council counter-publicity**