PROVIDING PUBLIC HEALTH INFORMATION TO PREVENT SKIN CANCER

Review of effectiveness and cost-effectiveness

Appendices

Kinga Malottki, Dechao Wang, Lazaros Andronis, Pelham Barton, Anne Fry-Smith, Wendy Greenheld, Mary Pennant, David Moore

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West Midlands Health Technology Assessment Collaboration
Public Health, Epidemiology and Biostatistics
University of Birmingham
Edgbaston
Birmingham, B15 2TT
UK
Tel. + 44 (0) 121 414 6852
Fax + 44 (0) 121 414 7878
http://www.wmhtac.bham.ac.uk

West Midlands Health Technology Assessment Collaboration

The West Midlands Health Technology Assessment Collaboration (WMHTAC) is an organisation involving several universities and academic groups who collaboratively undertake research synthesis to produce health technology assessments. Most of our members are based in the Department of Public Health, Epidemiology & Biostatistics, University of Birmingham, however other members are drawn from a wide field of expertise including economists and mathematical modellers from the Health Economics Facility, University of Birmingham.

WMHTAC produce systematic reviews, health technology assessments and economic evaluations for NHS R&D HTA programme (NCCHTA), the National Institute for Health and Clinical Excellence (NICE), and for the health service in the West Midlands. WMHTAC also undertakes methodological research on research synthesis, and provides training in systematic reviews and health technology assessment.

Name of other institution(s) involved

WMHTAC work in close collaboration with the Peninsula Technology Appraisal Group (PenTAG) with respect to providing support to the CPHE.

Appendix 1: Search Strategies

Primary Studies

Database: Ovid MEDLINE(R) 1950 to August Week 4 2008

1 skin cancer.mp.
2 exp skin neoplasms/
3 non melanoma.mp.
4 malignant melanoma.mp.
5 exp melanoma/
6 basal cell carcinoma.mp.
7 squamous cell carcinoma.mp.
8 exp carcinoma basal cell/
9 exp carcinoma squamous cell/
10 sunburn/
11 (sunburn or sun bed$ or sunbed$ or sunlamp$ or sun lamp$ or tanning or sun tan$ or suntan$).mp.
12 (sun expose or sun exposed or sun exposure).mp.
13 ultraviolet rays/
14 (utraviolet radiation or ultraviolet rays or ultraviolet exposure or uv rays or uv radiation or uv expos$).mp.
15 or/1-14
16 (prevent or prevents or prevention).mp.
17 exp primary prevention/
18 health education.mp.
19 health education/
20 health promotion.mp.
21 exp health promotion/
22 exp public health/
23 public health.mp.
24 exp preventive medicine/
25 health behavior/
26 campaign$.mp.
27 media.mp.
28 exp mass media/
29 program$.mp.
30 poster$.mp.
31 pamphlet$.mp.

32 publication$.mp.
33 leaflet$.mp.
34 pamphlets/ or publications/
35 internet/ or internet.mp.
36 computer communication networks/
37 cellular phone/
38 mobile phone$.mp.
39 ((health or lifestyle) adj3 (information or social marketing or advice or knowledge or attitudes or awareness or behavior or behaviour)).tw.
40 or/16-39
41 randomized controlled trial.pt.
42 randomized.mp.
43 placebo.mp.
44 exp epidemiological studies/
45 (before and after study).ti,ab.
46 (before and after studies).ti,ab.
47 interrupted time series.ti,ab.
48 or/41-47
49 15 and 40 and 48
50 limit 49 to (english language and yr="1990 - 2008")

Database: Cochrane Library (CENTRAL) 2008 Issue 3

1 skin next cancer
2 MeSH descriptor Skin Neoplasms explode all trees
3 non next melanoma
4 malignant next melanoma
5 MeSH descriptor Melanoma explode all trees
6 basal next cell next carcinoma
7 squamous next cell next carcinoma
8 MeSH descriptor Carcinoma, Basal Cell explode all trees
9 MeSH descriptor Carcinoma, Squamous Cell explode all trees
10 MeSH descriptor Sunburn, this term only
11 ((sunburn or (sun next bed*) or sunbed* or sunlamp* or (sun next lamp*) or tanning or (sun next tan*) or suntan*))
12 ((sun next expose) or (sun next exposed) or (sun next exposure))
13 MeSH descriptor Ultraviolet Rays, this term only
14 ((ultraviolet next radiation) or (ultraviolet next rays) or (ultraviolet next exposure) or (uv next rays) or (uv next radiation) or (uv next expos$))
15 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14)
16 (prevent or prevents or prevention)
17 MeSH descriptor Primary Prevention, this term only
18 health next education
19 MeSH descriptor Health Education, this term only
20 health next promotion
21 MeSH descriptor Health Promotion explode all trees
22 MeSH descriptor Public Health explode all trees
23 public next health

24 MeSH descriptor Preventive Medicine explode all trees
25 MeSH descriptor Health Behavior explode all trees
26 campaign*
27 media
28 MeSH descriptor Mass Media explode all trees
29 program*
30 poster*
31 pamphlet*
32 publication*
33 leaflet*
34 MeSH descriptor Pamphlets, this term only
35 MeSH descriptor Publications, this term only
36 internet
37 MeSH descriptor Internet, this term only
38 MeSH descriptor Computer Communication Networks, this term only
39 MeSH descriptor Cellular Phone, this term only
40 mobile next phone*
41 ((health or lifestyle) next (information or (social next marketing) or advice or knowledge or attitudes or awareness or behavior or behaviour))
42 (#16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31 OR #32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41)
43 (#15 AND #42)
44 (#43), from 1990 to 2008

Database: EMBASE (Ovid) 1980 to 2008 Week 36

1 skin cancer.mp.
2 exp skin cancer/
3 non melanoma.mp.
4 malignant melanoma.mp.
5 exp melanoma/
6 basal cell carcinoma.mp.
7 squamous cell carcinoma.mp.
8 Squamous Cell Carcinoma/
9 sunburn/
10 (sunburn or sun bed$ or sunbed$ or sunlamp$ or sun lamp$ or tanning or sun tan$ or suntan$).mp.
11 (sun expose or sun exposure or sun exposed).mp.
12 ultraviolet radiation/
13 (ultraviolet radiation or ultraviolet rays or ultraviolet exposure or uv rays or uv radiation or uv expos$).mp.
14 or/1-13
15 (prevent or prevents or prevention).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name]
16 primary prevention/
17 health education.mp.
18 health education/

19 health promotion.mp.
20 health promotion/
21 public health/
22 public health.mp.
23 preventive medicine/
24 health behavior/
25 campaign$.mp.
26 media.mp.
27 mass medium/
28 program$.mp.
29 poster$.mp.
30 pamphlet$.mp.
31 publication$.mp.
32 leaflet$.mp.
33 publication/
34 internet/
35 internet.mp.
36 mobile phone/
37 mobile phone$.mp.
38 ((health or lifestyle) adj3 (information or social marketing or advice or knowledge or attitudes or awareness or behavior or behaviour)).tw.
39 or/15-38
40 39 and 14 (
41 limit 40 to (english language and yr="1990 - 2008")

Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations September 05, 2008

1 skin cancer.mp.
2 non melanoma.mp.
3 malignant melanoma.mp.
4 melanoma.mp.
5 basal cell carcinoma.mp.
6 squamous cell carcinoma.mp.
7 (sunburn or sun bed$ or sunbed$ or sunlamp$ or sun lamp$ or tanning or sun tan$ or suntan$).mp.
8 (sun expose or sun exposed or sun exposure).mp.
9 (ultraviolet radiation or ultraviolet rays or ultraviolet exposure or uv rays or uv radiation or uv expos$).mp.
10 or/1-9
11 (prevent or prevents or prevention).mp.
12 health education.mp.
13 health promotion.mp.
14 public health.mp.
15 campaign$.mp.
16 media.mp.
17 (program or poster$ or pamphlet$ or publication$ or leaflet$ or internet or mobile phone$).mp.

18 ((health or lifestyle) adj3 (information or social marketing or advice or knowledge or attitudes or awareness or behavior or behaviour)).mp.
19 or/11-18
20 19 and 10

Database: PsycINFO (Ovid) 1985 to September Week 1 2008

1 skin cancer.mp.
2 non melanoma.mp.
3 malignant melanoma.mp.
4 melanoma.mp.
5 neoplasms/
6 "skin (anatomy".mp. [mp=title, abstract, heading word, table of contents, key concepts]
7 5 and 6
8 basal cell carcinoma.mp.
9 squamous cell carcinoma.mp.
10 (sunburn or sun bed$ or sunbed$ or sunlamp$ or sun lamp$ or tanning or sun tan$ or suntan$).mp.
11 (sun expose or sun exposed or sun exposure).mp.
12 (ultraviolet radiation or ultraviolet rays or ultraviolet exposure or uv rays or uv radiation or uv expos$).mp.
13 or/1-12
14 (prevent or prevents or prevention).mp.
15 health education.mp.
16 health promotion.mp.
17 public health.mp.
18 campaign$.mp.
19 media.mp.
20 (program or poster$ or pamphlet$ or publication$ or leaflet$ or internet or mobile phone$).mp.
21 ((health or lifestyle) adj3 (information or social marketing or advice or knowledge or attitudes or awareness or behavior or behaviour)).mp.
22 exp health behavior/
23 exp mass media/
24 exp internet/
25 or/14-24
26 13 and 25
27 double blind.mp.
28 (random or control).mp. [mp=title, abstract, heading word, table of contents, key concepts]
29 cohort.mp.
30 case control.mp.
31 retrospective.mp.
32 longitudinal.mp.
33 prospective.mp.
34 quasi experimental.mp.
35 (before and after studies).ti,ab.
36 (before and after study).ti,ab.

37 interrupted time series.mp.
38 or/27-37
39 38 and 26)
40 limit 39 to (english language and yr="1990 - 2008")

Database: ASSIA (Applied Social Sciences Index and Abstracts) (CSA)1990-2008

((skin cancer) or melanoma or (non melanoma)) or ((basal cell carcinoma) or (squamous cell carcinoma) or sunburn) or ((sun burn) or sunbed* or (sun bed*)) or (sunlamp* or (sun lamp*) or tanning) or ((sun tan*) or suntan* or (sun expose)) or ((sun exposed) or (sun exposure) or ultraviolet) or (uv or (malignant melanoma))

Database: HMIC Health Management Information Consortium (Ovid) September 2008

1 skin cancer.mp.
2 non melanoma.mp.
3 malignant melanoma.mp.
4 melanoma.mp.
5 basal cell carcinoma.mp.
6 squamous cell carcinoma.mp.
7 (sunburn or sun bed$ or sunbed$ or sunlamp$ or sun lamp$ or tanning or sun tan$ or suntan$).mp.
8 (sun expose or sun exposed or sun exposure).mp.
9 (ultraviolet radiation or ultraviolet rays or ultraviolet exposure or uv rays or uv radiation or uv expos$).mp.)
10 or/1-9

Database: CINAHL (Cumulative Index of Nursing and Allied Health Literature)(EBSCO)

S1 ((MH "Skin Neoplasms+") or (MH "Carcinoma, Basal Cell") or (MH "Carcinoma, Squamous Cell")) or melanoma or malignant melanoma or non melanoma or "skin cancer" or "basal cell carcinoma" or "squamous cell carcinoma"
S2 (MH "Sunburn") or sunburn or sunbed* or "sun bed*" or "sun lamp*" or sunlamp* or tanning or "sun tan*" or suntan* or "sun expose" or "sun exposed" or "sun exposure"
S3 (MH "Ultraviolet Rays") or "ultraviolet radiation" or "ultraviolet rays" or "ultraviolet exposure" or "uv rays" or "uv radiation" or "uv exposure"
S4 (S3 or S2 or S1)
S5 (MH "Health Education") or prevent* or "health education" or "health promotion" or "public health" or campaign* or media*
S6 (MH "Health Promotion")
S7 (MH "Public Health")
S8 (MH "Preventive Health Care")
S9 (MH "Health Behavior")
S10 (MH "Communications Media")

S11 (MH "Pamphlets")
S12 program* or poster* or pamphlet* or publication* or leaflet* or internet* or "mobile phone*"
S13 (MH "Internet")
S14 (MH "Computer Communication Networks")
S15 health or lifestyle
S16 information or "social marketing" or advice or knowledge or attitudes or awareness or behavior or behaviour
S17 S16 and S15
S18 S17 or S14 or S13 or S12 or S11 or S10 or S9 or S8 or S7 or S6 or S5
S19 S18 and S4
S20 S19 Limiters - Clinical Queries: Therapy - Best Balance
S21 cohort or "case control" or retrospective or longitudinal or prospective or ("before and after study") or ("before and after studies") or epidemiolgical and "interrupted time series"
S22 S19 and S21
S23 S20 OR S22
S24 S23 Limiters - Publication Year from: 1990-2008; Language: English

Economic evaluations

Database: Cochrane Library (EED) 2008 Issue 3

1 skin next cancer
2 MeSH descriptor Skin Neoplasms explode all trees
3 non next melanoma
4 malignant next melanoma
5 MeSH descriptor Melanoma explode all trees
6 basal next cell next carcinoma
7 squamous next cell next carcinoma
8 MeSH descriptor Carcinoma, Basal Cell explode all trees
9 MeSH descriptor Carcinoma, Squamous Cell explode all trees
10 MeSH descriptor Sunburn, this term only
11 ((sunburn or (sun next bed*) or sunbed* or sunlamp* or (sun next lamp*) or tanning or (sun next tan*) or suntan*))
12 ((sun next expose) or (sun next exposed) or (sun next exposure))
13 MeSH descriptor Ultraviolet Rays, this term only
14 ((ultraviolet next radiation) or (ultraviolet next rays) or (ultraviolet next exposure) or (uv next rays) or (uv next radiation) or (uv next expos$))
15 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14)
16 (prevent or prevents or prevention)
17 MeSH descriptor Primary Prevention, this term only
18 health next education
19 MeSH descriptor Health Education, this term only
20 health next promotion
21 MeSH descriptor Health Promotion explode all trees
22 MeSH descriptor Public Health explode all trees
23 public next health

24 MeSH descriptor Preventive Medicine explode all trees
25 MeSH descriptor Health Behavior explode all trees
26 campaign*
27 media
28 MeSH descriptor Mass Media explode all trees
29 program*
30 poster*
31 pamphlet*
32 publication*
33 leaflet*
34 MeSH descriptor Pamphlets, this term only
35 MeSH descriptor Publications, this term only
36 internet
37 MeSH descriptor Internet, this term only
38 MeSH descriptor Computer Communication Networks, this term only
39 MeSH descriptor Cellular Phone, this term only
40 mobile next phone*
41 ((health or lifestyle) next (information or (social next marketing) or advice or knowledge or attitudes or awareness or behavior or behaviour))
42 (#16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31 OR #32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41)
43 (#15 AND #42)
44 (#43), from 1990 to 2008

Database: Econlit (Ovid) 1969 to September 2008

1 skin cancer.mp. [mp=heading words, abstract, title, country as subject]
2 skin neoplasms.mp. [mp=heading words, abstract, title, country as subject]
3 melanoma.mp. [mp=heading words, abstract, title, country as subject]
4 basal cell carcinoma.mp. [mp=heading words, abstract, title, country as subject]
5 squamous cell carcinoma.mp.
6 (sunburn or sun bed$ or sunbed$ or sun burn or sunlamp$ or sun lamp$ or tanning or sun tan$ or suntan$).mp.
7 (sun expose or sun exposure or sun exposed).mp.
8 ultraviolet.mp.
9 or/1-8
10 limit 9 to (yr="1990 - 2008" and english)

Database: Ovid MEDLINE(R) 1950 to September Week 2 2008

1 skin cancer.mp.
2 exp skin neoplasms/
3 non melanoma.mp.
4 malignant melanoma.mp.
5 exp melanoma/
6 basal cell carcinoma.mp.
7 squamous cell carcinoma.mp.
8 exp carcinoma basal cell/

9 exp carcinoma squamous cell/
10 sunburn/
11 (sunburn or sun bed$ or sunbed$ or sunlamp$ or sun lamp$ or tanning or sun tan$ or suntan$).mp.
12 (sun expose or sun exposed or sun exposure).mp.
13 ultraviolet rays/
14 (utraviolet radiation or ultraviolet rays or ultraviolet exposure or uv rays or uv radiation or uv expos$).mp.
15 or/1-14
16 (prevent or prevents or prevention).mp.
17 exp primary prevention/
18 health education.mp.
19 health education/
20 health promotion.mp.
21 exp health promotion/
22 exp public health/
23 public health.mp.
24 exp preventive medicine/
25 health behavior/
26 campaign$.mp.
27 media.mp.
28 exp mass media/
29 program$.mp.
30 poster$.mp.
31 pamphlet$.mp.
32 publication$.mp.
33 leaflet$.mp.
34 pamphlets/ or publications/
35 internet/ or internet.mp.
36 computer communication networks/
37 cellular phone/
38 mobile phone$.mp.
39 ((health or lifestyle) adj3 (information or social marketing or advice or knowledge or attitudes or awareness or behavior or behaviour)).tw.
40 or/16-39
41 economics/
42 exp "costs and cost analysis"/
43 cost of illness/
44 exp health care costs/
45 economic value of life/
46 exp economics medical/
47 exp economics hospital/
48 economics pharmaceutical/
49 exp "fees and charges"/
50 (econom$ or cost or costs or costly or costing or price or pricing or pharmacoeconomic$).tw.
51 (expenditure$ not energy).tw.
52 (value adj1 money).tw.
53 budget$.tw.

54 50 or 53 or 51 or 41 or 48 or 47 or 52 or 42 or 49 or 46 or 45 or 43 or 44
55 40 and 54 and 15
56 limit 55 to (english language and yr="1990 - 2008")

Database: EMBASE (Ovid)1980 to 2008 Week 38

1 skin cancer.mp.
2 exp skin cancer/
3 non melanoma.mp.
4 malignant melanoma.mp.
5 exp melanoma/
6 basal cell carcinoma.mp.
7 squamous cell carcinoma.mp.
8 Squamous Cell Carcinoma/
9 sunburn/
10 (sunburn or sun bed$ or sunbed$ or sunlamp$ or sun lamp$ or tanning or sun tan$ or suntan$).mp.
11 (sun expose or sun exposure or sun exposed).mp.
12 ultraviolet radiation/
13 (ultraviolet radiation or ultraviolet rays or ultraviolet exposure or uv rays or uv radiation or uv expos$).mp.
14 or/1-13
15 (prevent or prevents or prevention).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name]
16 primary prevention/
17 health education.mp.
18 health education/
19 health promotion.mp.
20 health promotion/
21 public health/
22 public health.mp.
23 preventive medicine/
24 health behavior/
25 campaign$.mp.
26 media.mp.
27 mass medium/
28 program$.mp.
29 poster$.mp.
30 pamphlet$.mp.
31 publication$.mp.
32 leaflet$.mp.
33 publication/
34 internet/
35 internet.mp.
36 mobile phone/
37 mobile phone$.mp.
38 ((health or lifestyle) adj3 (information or social marketing or advice or knowledge or attitudes or awareness or behavior or behaviour)).tw.

39 or/15-38
40 39 and 14
41 cost benefit analysis/
42 cost effectiveness analysis/
43 cost minimization analysis/
44 cost utility analysis/
45 economic evaluation/
46 (cost or costs or costed or costly or costing).tw.
47 (economic$ or pharmacoeconomic$ or price$ or pricing).tw.
48 (technology adj assessment$).tw.
49 or/41-48
50 49 and 40
51 limit 50 to (english language and yr="1990 - 2008")

Reviews

Database: Ovid MEDLINE(R) 1950 to September Week 2 2008

1 skin cancer.mp.
2 exp skin neoplasms/
3 non melanoma.mp.
4 malignant melanoma.mp.
5 exp melanoma/
6 basal cell carcinoma.mp.
7 squamous cell carcinoma.mp.
8 exp carcinoma basal cell/
9 exp carcinoma squamous cell/
10 sunburn/
11 (sunburn or sun bed$ or sunbed$ or sunlamp$ or sun lamp$ or tanning or sun tan$ or suntan$).mp.
12 (sun expose or sun exposed or sun exposure).mp.
13 ultraviolet rays/
14 (utraviolet radiation or ultraviolet rays or ultraviolet exposure or uv rays or uv radiation or uv expos$).mp.
15 or/1-14
16 (prevent or prevents or prevention).mp.
17 exp primary prevention/
18 health education.mp.
19 health education/
20 health promotion.mp.
21 exp health promotion/
22 exp public health/
23 public health.mp.
24 exp preventive medicine/
25 health behavior/
26 campaign$.mp.
27 media.mp.
28 exp mass media/
29 program$.mp.

30 poster$.mp.
31 pamphlet$.mp.
32 publication$.mp.
33 leaflet$.mp.
34 pamphlets/ or publications/
35 internet/ or internet.mp.
36 computer communication networks/
37 cellular phone/
38 mobile phone$.mp.
39 ((health or lifestyle) adj3 (information or social marketing or advice or knowledge or attitudes or awareness or behavior or behaviour)).tw.
40 or/16-39
41 40 and 15
42 meta-analysis.mp,pt.
43 review.pt.
44 search.tw.
45 42 or 43 or 44
46 45 and 41
47 limit 46 to (english language and yr="1990 - 2008"

Database: Cochrane Library (CDSR, DARE, HTA database) 2008 Issue 3

1 skin next cancer
2 MeSH descriptor Skin Neoplasms explode all trees
3 non next melanoma
4 malignant next melanoma
5 MeSH descriptor Melanoma explode all trees
6 basal next cell next carcinoma
7 squamous next cell next carcinoma
8 MeSH descriptor Carcinoma, Basal Cell explode all trees
9 MeSH descriptor Carcinoma, Squamous Cell explode all trees
10 MeSH descriptor Sunburn, this term only
11 ((sunburn or (sun next bed*) or sunbed* or sunlamp* or (sun next lamp*) or tanning or (sun next tan*) or suntan*))
12 ((sun next expose) or (sun next exposed) or (sun next exposure))
13 MeSH descriptor Ultraviolet Rays, this term only
14 ((ultraviolet next radiation) or (ultraviolet next rays) or (ultraviolet next exposure) or (uv next rays) or (uv next radiation) or (uv next expos$))
15 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14)
16 (prevent or prevents or prevention)
17 MeSH descriptor Primary Prevention, this term only
18 health next education
19 MeSH descriptor Health Education, this term only
20 health next promotion
21 MeSH descriptor Health Promotion explode all trees
22 MeSH descriptor Public Health explode all trees
23 public next health
24 MeSH descriptor Preventive Medicine explode all trees

25 MeSH descriptor Health Behavior explode all trees
26 campaign*
27 media
28 MeSH descriptor Mass Media explode all trees
29 program*
30 poster*
31 pamphlet*
32 publication*
33 leaflet*
34 MeSH descriptor Pamphlets, this term only
35 MeSH descriptor Publications, this term only
36 internet
37 MeSH descriptor Internet, this term only
38 MeSH descriptor Computer Communication Networks, this term only
39 MeSH descriptor Cellular Phone, this term only
40 mobile next phone*
41 ((health or lifestyle) next (information or (social next marketing) or advice or knowledge or attitudes or awareness or behavior or behaviour))
42 (#16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31 OR #32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41)
43 (#15 AND #42)
44 (#43), from 1990 to 2008

Database: EMBASE (Ovid) 1980 to 2008 Week 38

1 skin cancer.mp.
2 exp skin cancer/
3 non melanoma.mp.
4 malignant melanoma.mp.
5 exp melanoma/
6 basal cell carcinoma.mp.
7 squamous cell carcinoma.mp.
8 Squamous Cell Carcinoma/
9 sunburn/
10 (sunburn or sun bed$ or sunbed$ or sunlamp$ or sun lamp$ or tanning or sun tan$ or suntan$).mp.
11 (sun expose or sun exposure or sun exposed).mp.
12 ultraviolet radiation/
13 (ultraviolet radiation or ultraviolet rays or ultraviolet exposure or uv rays or uv radiation or uv expos$).mp.
14 or/1-13
15 (prevent or prevents or prevention).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name]
16 primary prevention/
17 health education.mp.
18 health education/
19 health promotion.mp.

20 health promotion/
21 public health/
22 public health.mp.
23 preventive medicine/
24 health behavior/
25 campaign$.mp.
26 media.mp.
27 mass medium/
28 program$.mp.
29 poster$.mp.
30 pamphlet$.mp.
31 publication$.mp.
32 leaflet$.mp.
33 publication/
34 internet/
35 internet.mp.
36 mobile phone/
37 mobile phone$.mp.
38 ((health or lifestyle) adj3 (information or social marketing or advice or knowledge or attitudes or awareness or behavior or behaviour)).tw.
39 or/15-38
40 39 and 14
41 meta-analysis.mp.
42 search.tw.
43 review.pt.
44 42 or 43 or 41
45 40 and 44
46 limit 45 to (english language and yr="1990 - 2008")

Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations September 05, 2008

1 skin cancer.mp.
2 non melanoma.mp.
3 malignant melanoma.mp.
4 melanoma.mp.
5 basal cell carcinoma.mp.
6 squamous cell carcinoma.mp.
7 (sunburn or sun bed$ or sunbed$ or sunlamp$ or sun lamp$ or tanning or sun tan$ or suntan$).mp.
8 (sun expose or sun exposed or sun exposure).mp.
9 (ultraviolet radiation or ultraviolet rays or ultraviolet exposure or uv rays or uv radiation or uv expos$).mp.
10 or/1-9
11 (prevent or prevents or prevention).mp.
12 health education.mp.
13 health promotion.mp.
14 public health.mp.
15 campaign$.mp.

16 media.mp.
17 (program or poster$ or pamphlet$ or publication$ or leaflet$ or internet or mobile phone$).mp.
18 ((health or lifestyle) adj3 (information or social marketing or advice or knowledge or attitudes or awareness or behavior or behaviour)).mp.
19 or/11-18
20 19 and 10

Database: PsycINFO (Ovid) 1985 to September Week 3 2008

1 skin cancer.mp.
2 non melanoma.mp.
3 malignant melanoma.mp.
4 melanoma.mp.
5 neoplasms/
6 "skin (anatomy".mp. [mp=title, abstract, heading word, table of contents, key concepts]
7 5 and 6
8 basal cell carcinoma.mp.)
9 squamous cell carcinoma.mp.
10 (sunburn or sun bed$ or sunbed$ or sunlamp$ or sun lamp$ or tanning or sun tan$ or suntan$).mp.
11 (sun expose or sun exposed or sun exposure).mp.
12 (ultraviolet radiation or ultraviolet rays or ultraviolet exposure or uv rays or uv radiation or uv expos$).mp.
13 or/1-12
14 (prevent or prevents or prevention).mp.
15 health education.mp.
16 health promotion.mp.
17 public health.mp.
18 campaign$.mp.
19 media.mp.
20 (program or poster$ or pamphlet$ or publication$ or leaflet$ or internet or mobile phone$).mp.
21 ((health or lifestyle) adj3 (information or social marketing or advice or knowledge or attitudes or awareness or behavior or behaviour)).mp.
22 exp health behavior/
23 exp mass media/
24 exp internet/
25 or/14-24
26 13 and 25
27 (meta-analysis or search).tw.
28 27 and 26
29 limit 28 to (english language and yr="1990 - 2008")

Database: ASSIA (Applied Social Sciences Index and Abstracts) (CSA)1990-2008

((skin cancer) or melanoma or (non melanoma)) or

((basal cell carcinoma) or (squamous cell carcinoma) or sunburn) or ((sun burn) or sunbed* or (sun bed*)) or (sunlamp* or (sun lamp*) or tanning) or ((sun tan*) or suntan* or (sun expose)) or ((sun exposed) or (sun exposure) or ultraviolet) or (uv or (malignant melanoma))

Database: HMIC Health Management Information Consortium (Ovid) September 2008

1 skin cancer.mp.
2 non melanoma.mp.
3 malignant melanoma.mp.
4 melanoma.mp.
5 basal cell carcinoma.mp.
6 squamous cell carcinoma.mp.
7 (sunburn or sun bed$ or sunbed$ or sunlamp$ or sun lamp$ or tanning or sun tan$ or suntan$).mp.
8 (sun expose or sun exposed or sun exposure).mp.
9 (ultraviolet radiation or ultraviolet rays or ultraviolet exposure or uv rays or uv radiation or uv expos$).mp.
10 or/1-9

Database: CINAHL (Cumulative Index of Nursing and Allied Health Literature)(EBSCO)

S1 ((MH "Skin Neoplasms+") or (MH "Carcinoma, Basal Cell") or (MH "Carcinoma, Squamous Cell")) or melanoma or malignant melanoma or non melanoma or "skin cancer" or "basal cell carcinoma" or "squamous cell carcinoma"
S2 (MH "Sunburn") or sunburn or sunbed* or "sun bed*" or "sun lamp*" or sunlamp* or tanning or "sun tan*" or suntan* or "sun expose" or "sun exposed" or "sun exposure"
S3 (MH "Ultraviolet Rays") or "ultraviolet radiation" or "ultraviolet rays" or "ultraviolet exposure" or "uv rays" or "uv radiation" or "uv exposure"
S4 (S3 or S2 or S1)
S5 (MH "Health Education") or prevent* or "health education" or "health promotion" or "public health" or campaign* or media*
S6 (MH "Health Promotion")
S7 (MH "Public Health")
S8 (MH "Preventive Health Care")
S9 (MH "Health Behavior")
S10 (MH "Communications Media")
S11 (MH "Pamphlets")

S12 program* or poster* or pamphlet* or publication* or leaflet* or internet* or "mobile phone*"
S13 (MH "Internet")
S14 (MH "Computer Communication Networks")
S15 health or lifestyle
S16 information or "social marketing" or advice or knowledge or attitudes or awareness or behavior or behaviour

S17 S16 and S15
S18 S17 or S14 or S13 or S12 or S11 or S10 or S9 or S8 or S7 or S6 or S5
S19 S18 and S4
S20 “meta analysis” or “systematic review” or review
S21 S19 and S20
S22 S21 Limiters – Publication Year from: 1990-2008; Language: English

Appendix 2: Reference screening checklists

Skin cancer sift criteria – applied to title and abstract of primary studies effectiveness search results. Items under "First round" were applied to all references and under "Second round" only to the ones that were considered relevant after the first stage of sifting.

First round				
Q1	Is the full paper in English and published from 1990 onwards?	YES / UNCLEAR	Go to Q2	**Reference Manager labelling**
		NO	Exclude	
Q2	Does the study address skin cancer prevention?	YES / UNCLEAR	Go to Q3	
		NO	Exclude	
Q3	Was the study carried out in an OECD country?	YES / UNCLEAR	Go to Q4	
		NO	Exclude	
Q4	Is the intervention provision of information?	YES / UNCLEAR	Go to Q5	
		NO	Exclude	
Q5	Is this a primary study?	YES / UNCLEAR	Relevant Go to Q6	UD 2 = yes
		NO	Exclude	
Second round				
Q6	Any of the following is true? • Secondary prevention only • Provision of sun protection only • Screening programmes only • Only for clinical diagnosis, treatment and management of skin cancer	YES	Exclude	UD 2 = yes no[††]

[††] The study was marked as relevant when the initial title/abstract checklist was used, but marked as excluded when the second round screening checklist is used.

	• Dissertations/thesis, book and chapters			

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Skin cancer sift criteria – applied to title and abstract of systematic review search results

Q1	Is the full paper in English and published from 1990 onwards?	YES / UNCLEAR	Go to Q2
		NO	Exclude
Q2	Does the review address skin cancer prevention?	YES / UNCLEAR	Go to Q3
		NO	Exclude
Q3	Is provision of information an intervention investigated in the review?	YES / UNCLEAR	Go to Q4
		NO	Exclude
Q4	Is this a systematic review[‡‡]?	YES / UNCLEAR	Relevant
		NO	Exclude

[‡‡] At this stage, reviews where there was a described/determinable aim and where there has been a documented (mention of at least one term) search of at least one database were considered relevant

Skin cancer sift criteria – applied to title and abstract of primary studies of cost-effectiveness search results

Q1	Is the full paper in English and published from 1990 onwards?	YES / UNCLEAR	Go to Q2
		NO	Exclude
Q2	Does the study address skin cancer prevention?	YES / UNCLEAR	Go to Q3
		NO	Exclude
Q3	Was the study carried out in an OECD country?	YES / UNCLEAR	Go to Q4
		NO	Exclude
Q4	Is the intervention provision of information?	YES / UNCLEAR	Go to Q5
		NO	Exclude
Q5	Does the study report economic/cost data for the assessed intervention(s)?	YES / UNCLEAR	Relevant
		NO	Exclude

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Appendix 3: Full paper screening checklists

Full paper checklist for Effectiveness Review – primary studies

				Reference Manager labeling
Q1	Is the full text **in English**?	Yes	go to Q2	
		No	Exclude	UD[§§] 2 = EXCLUDED UD 3 = LANGUAGE
Q2	Was the paper published **1990 onwards**?	Yes	go to Q3	
		No	Exclude	UD 2 = EXCLUDED UD 3 = DATE
Q3	Was the location an **OECD[***] country**?	Yes	go to Q4	
		Unclear[†††]	go to Q4	UD 4 = LOC
		No	Exclude	UD 2 = EXCLUDED UD 3 = LOC
Q4	**Population:** does the study address primary prevention of skin cancer attributable to UV exposure?	Yes, only primary	go to Q5	
		Yes, primary AND secondary[‡‡‡]	go to Q5	UD 5 = POP
		Unclear[3]	go to Q5	UD 4 = POP
		No	Exclude	UD 2 = EXCLUDED UD 3 = POP
Q5	The **intervention** included one or more of the following: • One-to-one or group-based verbal advice (with or without use of information resources), • Mass-media campaigns, • Leaflets, other information or teaching	only listed	go to Q6	
		listed AND unlisted[4]	go to Q6	UD 5 = INT
		Unclear[3]	go to Q6	UD 4 = INT
		only unlisted	Exclude	UD 2 = EXCLUDED UD 3 = INT

[§§] UD – User Defined field

[***] The list provided with the title and abstract screening checklist also applies here

[†††] If a study meets all inclusion criteria except that information is unclear for one or more criteria, the study will be provisionally included and further information obtained

[‡‡‡] If a study meets all inclusion criteria except that it is unclear if the mixed population, intervention and/or comparator can be disaggregated, the study will be provisionally included and further assessed

	resources or printed material including posters, • New media: the Internet (including social networking sites), emedia and text messaging.			
Q6	The **comparator** included one or more of the following: • Current information provision, • Do nothing, • One-to-one or group-based verbal advice (with or without use of information resources), • Mass-media campaigns, • Leaflets, other information or teaching resources or printed material including posters, • New media: the Internet (including social networking sites), emedia and text messaging.	only listed	go to Q7	
		listed AND unlisted[4]	go to Q7	UD 5 = COM
		Unclear[3]	go to Q7	UD 4 = COM
		only unlisted	Exclude	UD 2 = EXCLUDED UD 3 = COM
Q7	**Study type**	RCT	Include	UD 2 = INCLUDED UD 3 = RCT
		controlled before and after	Include	UD 2 = INCLUDED UD 3 = CONTROLLED BA
		before and after	Include	UD 2 = INCLUDED UD 3 = BEFORE AFTER
		cohort study	Include	UD 2 = INCLUDED UD 3 = COHORT
		case control	Include	UD 2 = INCLUDED UD 3 = CASE CONTROL
		interrupted time series	Include	UD 2 = INCLUDED UD 3 = INTERRUPTED TS
		other longitudinal[§§§]: _____	Include	UD 2 = INCLUDED UD 3 = OTHER
		systematic review	Tag for reviews	UD 2 = TAG UD 3 = SR
		economic	Tag for economics	UD 2 = TAG UD 3 = ECON
		qualitative	Tag for Review 2	UD 2 = TAG UD 3 = QUALITATIVE
		unclear[3]	Include	UD 2 = INCLUDED UD 4 = DES
		other	Exclude	UD 2 = EXCLUDED UD 3 = DES

[§§§] There is at least one follow up measure after baseline and not covered by any of the designs above

Full paper checklist for systematic reviews

				Reference Manager labeling
Q1	Is the full text **in English**?	Yes	go to Q2	
		No	Exclude	UD[****] 2 = EXCLUDED UD 3 = LANGUAGE
Q2	Was the paper published **1990 onwards**?	Yes	go to Q3	
		No	Exclude	UD 2 = EXCLUDED UD 3 = DATE
Q3	Was the location an **OECD[††††] country**?	Yes/ Unclear	go to Q4	
		No	Exclude	UD 2 = EXCLUDED UD 3 = LOC
Q4	**Population:** does the study address primary prevention of skin cancer attributable to UV exposure?	Yes / Unclear	go to Q5	
		No	Exclude	UD 2 = EXCLUDED UD 3 = POP
Q5	The **intervention** included one or more of the following: • One-to-one or group-based verbal advice (with or without use of information resources), • Mass-media campaigns, • Leaflets, other information or teaching resources or printed material including posters, • New media: the Internet (including social networking sites), emedia and text messaging.	At least one of the listed / Unclear	go to Q6	
		only unlisted	Exclude	UD 2 = EXCLUDED UD 3 = INT
Q6	The **comparator** included one or more of the following: • Current information provision, • Do nothing, • One-to-one or group-based verbal advice (with or without use of information resources), • Mass-media campaigns, • Leaflets, other information or teaching resources or printed material including posters, • New media: the Internet (including social networking sites), emedia and text messaging.	At least one of the listed / Unclear	go to Q7	
		only unlisted	Exclude	UD 2 = EXCLUDED UD 3 = COM
Q7	**Study type**	Systematic review / Unclear	Include	UD 2 = INCLUDED UD 3 = SR

[****] UD – User Defined field

[††††] The list provided with the title and abstract screening checklist also applies here

		Economic	Tag for economics	UD 2 = TAG UD 3 = ECON
		Qualitative	Tag for Review 2	UD 2 = TAG UD 3 = QUALITATIVE
		Other	Exclude	UD 2 = EXCLUDED UD 3 = DES

Full paper checklist for Economic Evaluations

				Reference Manager labeling
Q1	Is the full text **in English**?	Yes	go to Q2	
		No	Exclude	UD‡‡‡‡ 2 = EXCLUDED UD 3 = LANGUAGE
Q2	Was the paper published **1990 onwards**?	Yes	go to Q3	
		No	Exclude	UD 2 = EXCLUDED UD 3 = DATE
Q3	Was the location an **OECD§§§§ country**?	Yes	go to Q4	
		Unclear*****	go to Q4	UD 4 = LOC
		No	Exclude	UD 2 = EXCLUDED UD 3 = LOC
Q4	**Population:** does the study address primary prevention of skin cancer attributable to UV exposure?	Yes, only primary	go to Q5	
		Yes, primary AND secondary†††††	go to Q5	UD 5 = POP
		Unclear[3]	go to Q5	UD 4 = POP
		No	Exclude	UD 2 = EXCLUDED UD 3 = POP
Q5	The **intervention** included one or more of the following: • One-to-one or group-based verbal advice (with or without use of information resources), • Mass-media campaigns, • Leaflets, other information or teaching resources or printed material including posters, • New media: the Internet (including social networking sites), emedia and text messaging.	only listed	go to Q6	
		listed AND unlisted[4]	go to Q6	UD 5 = INT
		Unclear[3]	go to Q6	UD 4 = INT
		only unlisted	Exclude	UD 2 = EXCLUDED UD 3 = INT
Q6	The **comparator** included one or more of the following: • Current information provision, • Do nothing,	only listed	go to Q7	
		listed AND unlisted[4]	go to Q7	UD 5 = COM
		Unclear[3]	go to Q7	UD 4 = COM

‡‡‡‡ UD – User Defined field

§§§§ The list provided with the title and abstract screening checklist also applies here

***** If a study meets all inclusion criteria except that information is unclear for one or more criteria, the study will be provisionally included and further information obtained

††††† If a study meets all inclusion criteria except that it is unclear if the mixed population, intervention and/or comparator can be disaggregated, the study will be provisionally included and further assessed

	• One-to-one or group-based verbal advice (with or without use of information resources), • Mass-media campaigns, • Leaflets, other information or teaching resources or printed material including posters, • New media: the Internet (including social networking sites), emedia and text messaging.	only unlisted	Exclude	UD 2 = EXCLUDED UD 3 = COM
Q7	**Study type**	Full economic evaluation‡‡‡‡‡ (Cost-effectiveness or cost-benefit or cost-utility or cost-consequence or cost-minimisation analysis)	Include	UD 2 = INCLUDED
		Partial evaluation (cost analysis or cost description studies)	Tag	UD 2 = TAG UD3 = COST
		Systematic review	Tag	UD 2 = TAG UD3 = SR
		Qualitative	Tag for Review 2	UD 2 = TAG UD3 = QUALITATIVE
		Effectiveness	Tag for effectiveness (Review 1)	UD 2 = TAG UD3 = EFFECTIVENESS
		Other	Exclude	UD 2 = EXCLUDED

‡‡‡‡‡ Including economic evaluations alongside RCTs or longitudinal intervention studies, and decision analytic models, other econometric and/or epidemiological models that contain relevant effectiveness and or economic data or methods of analysis.

Appendix 4 Identification and Utilisation of Systematic Reviews

Systematic reviews were identified and included in this report to facilitate the identification of primary studies in addition to those found through targeted searches on the effectiveness of interventions providing information to change people's knowledge and behaviour and so prevent the first occurrence of skin cancer attributable to UV exposure. Specific searches for systematic reviews were undertaken (section 2.3 and Appendix 1: Search Strategies) and from the identified articles, relevant reviews were selected using predefined criteria (Appendix 2: Reference screening checklists and Appendix 3: Full paper screening checklists) the same way as described for selection of primary studies (see 2.1) The primary studies included in selected systematic reviewers were then checked against those studies identified through the specific searches for primary studies. Any additional studies identified were then assessed for eligibility to the review of effectiveness.

From the reviews searches 9480 articles were identified and of these 56 were deemed relevant. Hard copies of these were obtained (three were unobtainable – see Table 15) and ten of these articles met the inclusion criteria (see Table 16). A flow diagram depicting the above process can be found in Figure 3. The main reason for exclusion of the 43 other articles was the design not being a systematic review, not addressing primary prevention of skin cancer or the intervention not being the methods of providing information to change knowledge, awareness or behaviour. A list of excluded studies is presented in Table 14.

None of the 56 articles obtained in hard copy were deemed relevant to the cost-effectiveness review or the qualitative review on the barriers and facilitators to

conveying information to prevent the first occurrence of skin cancer attributable to UV exposure.

With regard to the review of effectiveness, from examination of the ten included reviews, 124 primary studies were identified. Of these 97 were already identified by the primary searches undertaken for effectiveness studies. 85 of these had previously been deemed as potentially relevant on screening using title and abstract. Of the 12 that were not considered relevant on such screening, reassessment suggested that five might be relevant and full copies were ordered. Four papers met the inclusion criteria for primary studies and were included in the review of effectiveness.[25,69,79,93] One paper was excluded based on the full paper.[80]

27 of the 124 studies in previous reviews were not identified by searches undertaken for primary studies for this project. On screening of title and abstract 23 were considered as potentially relevant and hard copies ordered and four were considered not relevant. Formal application of inclusion/exclusion criteria to the relevant studies resulted in 11 of these being included in the effectiveness review of primary studies[8,12,13,27,36,56,61,67,81,84,88] and nine were excluded. For three studies the full paper was unobtainable.[1,59,89] A flow diagram depicting the above process can be found in Figure 4.

Figure 3 Flow diagram of identification and selection of reviews

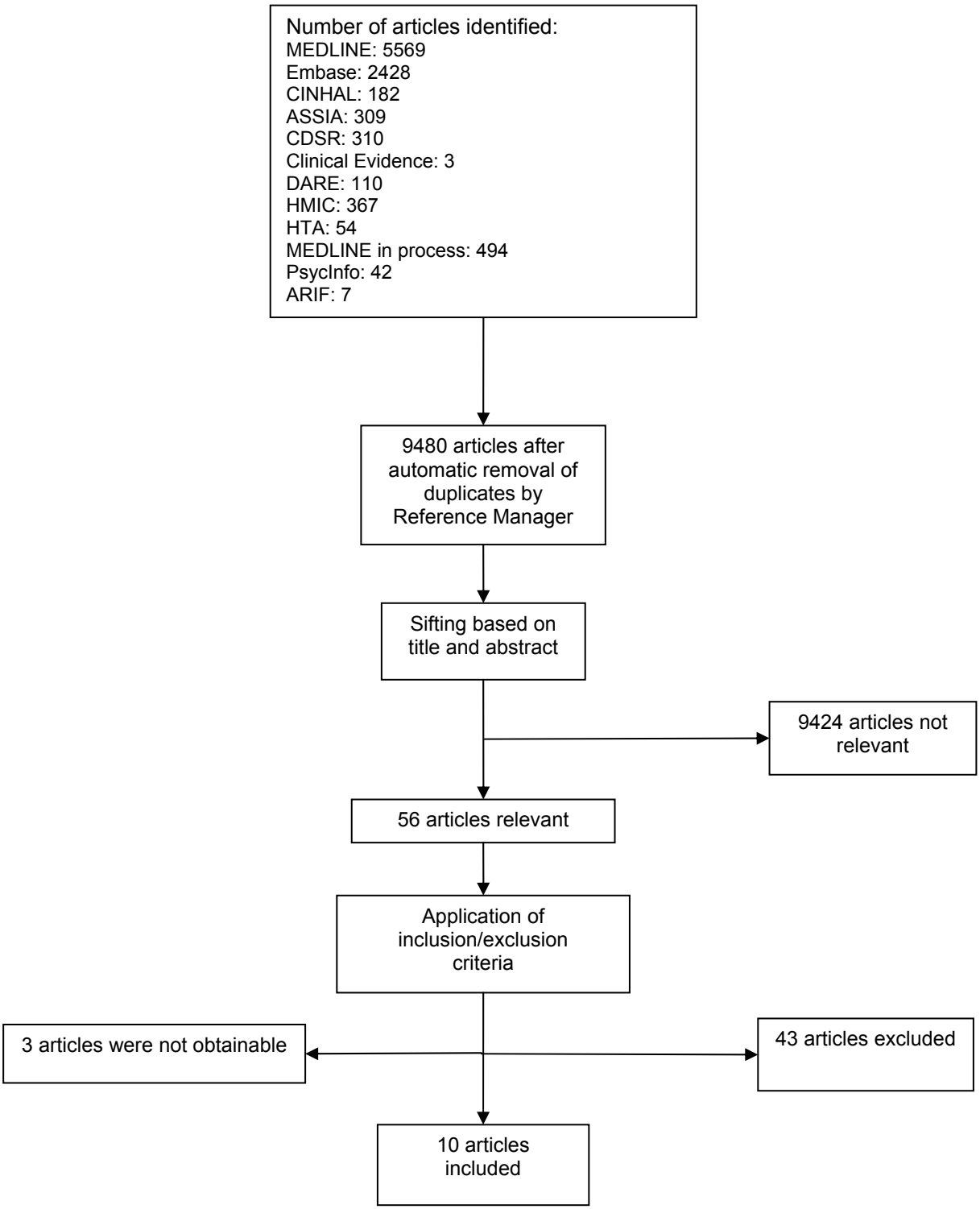


Table 14 Identification of systematic reviews: List of excluded articles

Article	Primary Reason for Exclusion
Arthey S, Clarke VA. Suntanning and sun protection: a review of the psychological literature. Social Science & Medicine 1995; 40(2: 265-74 ,(71 ref):265-274.	DES
Ashbury FD, Rootman I, Ashbury FD, Rootman I. Workshop report: research, policy and program planning on sun protective behaviours. [Review] [12 refs]. Cancer Prevention & Control 1998; 2(3):129-132.	DES
Autier P, Autier P. Cutaneous malignant melanoma: facts about sunbeds and sunscreen. [Review] [81 refs]. Expert Review of Anticancer Therapy 2005; 5(5):821-833.	DES INT
Autier P, Boyle P, Autier P, Boyle P. Artificial ultraviolet sources and skin cancers: rationale for restricting access to sunbed use before 18 years of age. [Review] [16 refs]. Nature Clinical Practice Oncology 2008; 5(4):178-179.	DES
Bath-Hextall F, Leonardi-Bee J, Somchand N, Webster A, Delitt J, Perkins W, et al. Interventions for preventing non-melanoma skin cancers in high-risk groups. [Review] [92 refs]. Cochrane Database of Systematic Reviews 2007;(4):CD005414.	POP INT
Baum A, Cohen L. Successful behavioral interventions to prevent cancer: The example of skin cancer. Annual Review of Public Health 1998; 19(pp 319-333).	DES
Bishop JN, Bataille V, Gavin A, Lens M, Marsden J, Mathews T, et al. The prevention, diagnosis, referral and management of melanoma of the skin: concise guidelines. [Review] [9 refs]. Clinical Medicine 2007; 7(3):283-290.	DES POP
Boe K, Tillotson EA, Boe K, Tillotson EA. Encouraging sun safety for children and adolescents. [Review] [24 refs]. Journal of School Nursing 2006; 22(3):136-141.	DES
Bordeaux JS, Lu KQ, Cooper KD, Bordeaux JS, Lu KQ, Cooper KD. Melanoma: prevention and early detection. [Review] [73 refs]. Seminars in Oncology 2007; 34(6):460-466.	INT DES
Breitbart EW, Greinert R, Volkmer B, Breitbart EW, Greinert R, Volkmer B. Effectiveness of information campaigns. [Review] [13 refs]. Progress in Biophysics & Molecular Biology 2006; 92(1):167-172.	DES
Buchanan PJ, Buchanan PJ. Skin cancer. [Review] [49 refs]. Nursing Standard 2001; 15(45):45-52.	DES POP
Buller DB, Borland R. Public education projects in skin cancer prevention: Child care, school, and college-based. Clinics in Dermatology 1998; 16(4):447-459.	DES
Burke CC, Burke CC. Sins of the sun. Tools for skin cancer prevention and early detection. [Review] [17 refs]. Advance for Nurse Practitioners 1938; 8(5):32-36.	DES
Cordova KB, Weinstock MA, Cordova KB, Weinstock MA. Skin cancer prevention and detection--melanoma and beyond. [Review] [32 refs]. Medicine & Health, Rhode Island 2005; 88(3):92-95.	INT DES
Cummings SR, Tripp MK, Herrmann NB, Cummings SR, Tripp MK, Herrmann NB. Approaches to the prevention and control of skin cancer. [Review] [92 refs]. Cancer & Metastasis Reviews 1997; 16(3-4):309-327.	DES
Diffey B, Diffey B. Do we need a revised public health policy on sun exposure?[see comment]. [Review] [52 refs]. British Journal of Dermatology 2006; 154(6):1046-1051.	POP DES
Drozdowski P, Matkowski R, Szynglarewicz B, Kornafel J. Is cutaneous malignant melanoma preventable? Advances in Clinical and Experimental Medicine 2006; 15(6):1099-1105.	INT

Edman RL, Wolfe JT, Edman RL, Wolfe JT. Prevention and early detection of malignant melanoma. [Review] [25 refs]. American Family Physician 2000; 62(10):2277-2285.	DES INT
Eide MJ, Weinstock MA, Eide MJ, Weinstock MA. Public health challenges in sun protection. [Review] [38 refs]. Dermatologic Clinics 2006; 24(1):119-124.	DES INT
Freak J, Freak J. Promoting knowledge and awareness of skin cancer. [Review] [42 refs]. Nursing Standard 2004; 18(35):45-53.	DES POP
Garvin T, Eyles J. Public health resonses for skin cancer prevention: the policy framing of Sun Safety in Australia, Canada and England. Social Science and Medicine 1950;1175-1189.	DES POP
Glanz K, Saraiya M, Wechsler H. Guidelines for school programs to prevent skin cancer. MMWR: Morbidity & Mortality Weekly Report 2002; 51(RR-4: 1-18 ,(145 ref):1-18.	DES
Greinert R, Breitbart EW, Mohar P, Volkmer B, Greinert R, Breitbart EW, et al. Health initiatives for the prevention of skin cancer. [Review] [65 refs]. Advances in Experimental Medicine & Biology 2008; 624:125-136.	DES INT
Grilli R, Ramsay C, Minozzi S. Mass media interventions: effects on health services utilisation. Cochrane Database of Systematic Reviews: Reviews. Cochrane Database of Systematic Reviews 2002 Issue 1. Chichester (UK): John Wiley & Sons, Ltd; 2002.	POP
Harris RB, Alberts DS, Harris RB, Alberts DS. Strategies for skin cancer prevention. [Review] [113 refs]. International Journal of Dermatology 2004; 43(4):243-251.	DES
Hill D, Marks R, Boulter J, Hill D, Marks R, Boulter J. Public health approaches to skin cancer control. [Review] [63 refs]. Australasian Journal of Dermatology 1997; 38 Suppl 1:S73-S78.	DES
Hiom S, Hiom S. Public awareness regarding UV risks and vitamin D--the challenges for UK skin cancer prevention campaigns. [Review] [14 refs]. Progress in Biophysics & Molecular Biology 2006; 92(1):161-166.	DES POP
Johnson N, Mant D, Newton J, Yudkin PL, Johnson N, Mant D, et al. Role of primary care in the prevention of malignant melanoma. [Review] [28 refs]. British Journal of General Practice 1994; 44(388):523-526.	DES POP
Koh HK, Geller AC, Miller DR, Grossbart TA, Lew RA, Koh HK, et al. Prevention and early detection strategies for melanoma and skin cancer. Current status. [Review] [88 refs]. Archives of Dermatology 1996; 132(4):436-443.	DES
Koh HK, Geller AC, Koh HK, Geller AC. Public health interventions for melanoma. Prevention, early detection, and education. [Review] [126 refs]. Hematology - Oncology Clinics of North America 1998; 12(4):903-928.	DES
Mahon SM, Mahon SM. Skin cancer prevention: education and public health issues. [Review] [74 refs]. Seminars in Oncology Nursing 2003; 19(1):52-61.	DES
Marks R, Hill D, Marks R, Hill D. Primary prevention of skin cancer: where to now in reducing sunlight exposure?. [Review] [11 refs]. Medical Journal of Australia 1997; 167(10):515-516.	DES
Marks R, Marks R. Two decades of the public health approach to skin cancer control in Australia: why, how and where are we now?. [Review] [28 refs]. Australasian Journal of Dermatology 1999; 40(1):1-5.	DES
McCarthy WH. The Australian experience in sun protection and screening for melanoma. Journal of Surgical Oncology 2004; 86(4):236-245.	DES
McKinlay A, Breitbart EW, Ringborg U, Greinert R, McKinlay A, Breitbart EW, et al. 'Children under the Sun'-- UV radiation and children's skin. WHO Workshop -- Children's sun protection education. [Review] [0 refs]. European Journal of Cancer Prevention 2002; 11(4):397-405.	DES INT
Melia J, Pendry L, Eiser JR, Harland C, Moss S, Melia J, et al. Evaluation of primary prevention initiatives for skin cancer: a review from a UK perspective. [Review] [36 refs]. British Journal of Dermatology 2000; 143(4):701-708.	DES
O'Keefe DJ, Jensen JD. The relative persuasiveness of gain-framed and loss-framed messages for encouraging disease prevention behaviors: A meta-analytic review. Journal of Health Communication 2007; 12(7):623-644.	DES

Poochareon VN, Federman DG, Kirsner RS, Poochareon VN, Federman DG, Kirsner RS. Primary prevention efforts for melanoma. [Review] [90 refs]. Journal of Drugs in Dermatology: JDD 2004; 3(5):506-519.	DES
Stanton WR, Janda M, Baade PD, Anderson P, Stanton WR, Janda M, et al. Primary prevention of skin cancer: a review of sun protection in Australia and internationally. [Review] [106 refs]. Health Promotion International 2004; 19(3):369-378.	POP INT
Stratton SP, Stratton SP. Prevention of non-melanoma skin cancer. [Review] [50 refs]. Current Oncology Reports 2001; 3(4):295-300.	DES POP
Swetter SM, Geller AC. Prevention and detection of melanoma in the primary care setting. Journal of Clinical Outcomes Management 2005; 12(10):523-534.	DES POP INT
Weinstock MA, Weinstock MA. Public health messages regarding skin cancer.[comment]. [Review] [30 refs]. Journal of Investigative Dermatology 2004; 123(6):xvii-xxix.	DES
Wesson KM, Silverberg NB, Wesson KM, Silverberg NB. Sun protection education in the United States: what we know and what needs to be taught. [Review] [42 refs]. Cutis 1977; 71(1):71-74.	DES

Reasons for exclusion: DES – design not a systematic review; POP – not primary prevention of skin cancer; INT – intervention not appropriate. Not all possible reasons for exclusion are listed for each study.

Table 15 Identification of systematic reviews: List of unobtainable articles

Guidelines for school programs to prevent skin cancer. NASN Newsletter 2006; 21(3: 6-8):6-8.

Anderson P, Baade PD, Janda M, Stanton WR. Primary prevention of skin cancer: a review of sun protection in Australia and internationally. Health Promotion International 1950;364-378.

Harvey I. Prevention of skin cancer: a review of available strategies (DARE structured abstract). 1995;31.

Table 16 Identification of systematic reviews: List of included reviews

Bellamy R, Bellamy R. A systematic review of educational interventions for promoting sun protection knowledge, attitudes and behaviour following the QUESTS approach. [Review] [78 refs]. Medical Teacher 2005; 27(3):269-275.

Buller DB, Borland R. Skin cancer prevention for children: a critical review. Health Education & Behavior 1999; 26(3: 317-43, 418 ,(52 ref):317-343.

Campbell M, Buckeridge D, Dwyer J, Fong S, Mann V, Sanchez-Sweatman O, et al. A systematic review of the effectiveness of environmental awareness interventions. Canadian Journal of Public Health 2000; 91(2):137-143.

Glanz K, Buller DB, Saraiya M, Glanz K, Buller DB, Saraiya M. Reducing ultraviolet radiation exposure among outdoor workers: state of the evidence and recommendations. [Review] [53 refs]. Environmental Health: A Global Access Science Source 2007; 6:22.

Hart KM, Demarco RF, Hart KM, Demarco RF. Primary prevention of skin cancer in children and adolescents: a review of the literature. [Review] [48 refs]. Journal of Pediatric Oncology Nursing 2008; 25(2):67-78.

Lynagh M, Schofield MJ, Sanson-Fisher RW. School health promotion programs over the past decade: A review of the smoking, alcohol and solar protection literature. Health Promotion International 1997; 12(1):43-60.

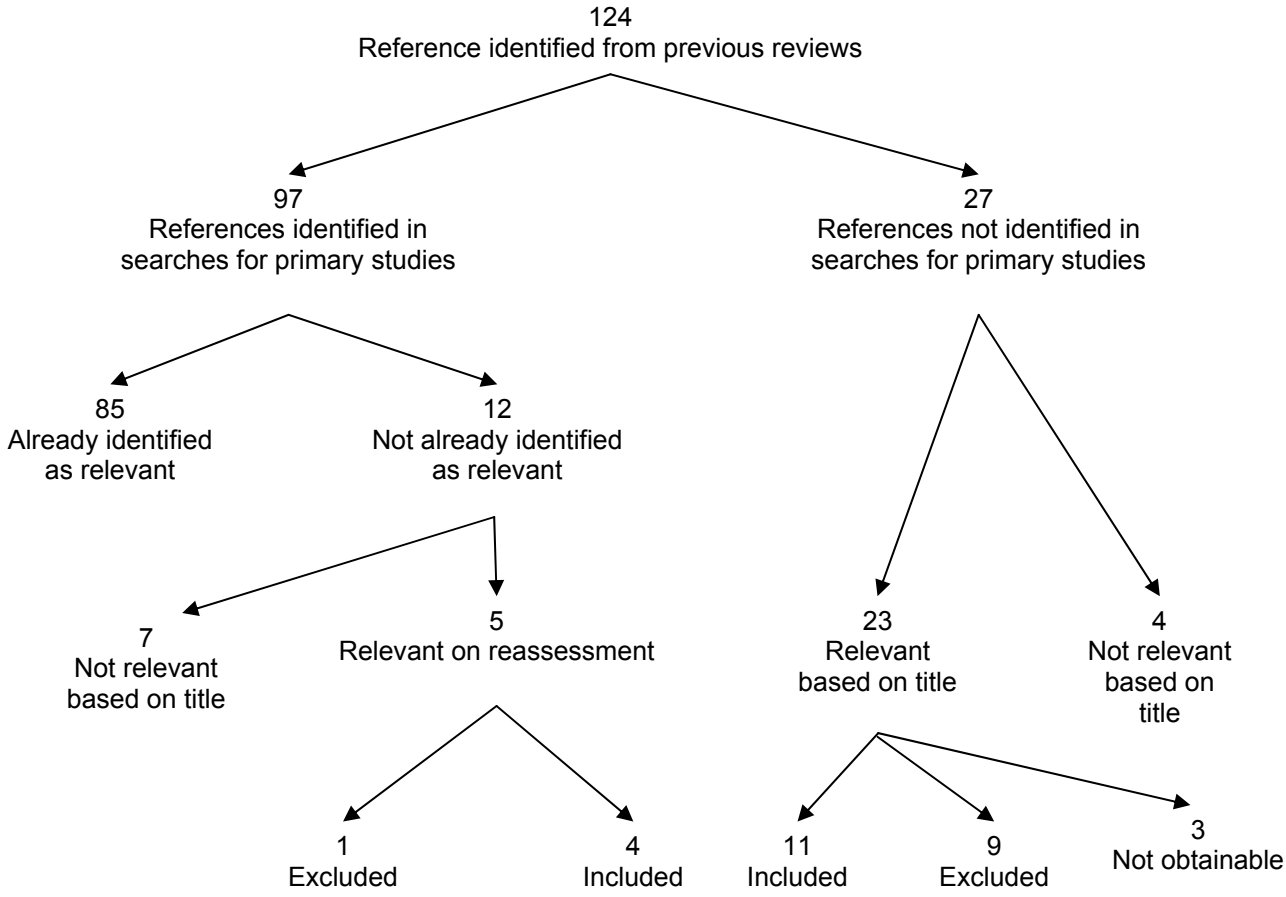
Morris J, Elwood M. Sun exposure modification programmes and their evaluation: A review of the literature. Health Promotion International 1996; 11(4):321-332.

Naldi L, Buzzetti R, Cecchi C, Baldwin L, Battistutta D, Benvenuto C, et al. Educational programmes for skin cancer prevention. Cochrane Database of Systematic Reviews: Protocols. Cochrane Database of Systematic Reviews 2004 Issue 1. Chichester (UK): John Wiley & Sons, Ltd; 2004.

Saraiya M, Glanz K, Briss P, Nichols P, White C, Das D. Preventing skin cancer: findings of the Task Force on Community Preventive Services on reducing exposure to ultraviolet light. MMWR: Morbidity & Mortality Weekly Report 2003; 52(RR-15: 1-12 ,(28 ref):1-12.

Saraiya M, Glanz K, Briss PA, Nichols P, White C, Das D, et al. Interventions to prevent skin cancer by reducing exposure to ultraviolet radiation: a systematic review.[see comment]. [Review] [253 refs]. American Journal of Preventive Medicine 2004; 27(5):422-466.

Figure 4 Flow Chart Showing Identification of Primary Studies From Reviews



Appendix 5: Effectiveness studies - Quality Assessment

Table 17 Quality assessment - RCTs

Study	Appropriate and clearly focused question	Randomised assignment	An adequate concealment method¥	Blind subjects and investigators about intervention allocation.	Groups are similar at baseline	The only difference between groups is the intervention	All relevant outcomes are measured in a standard, valid and reliable way.	Drop out rate less than 20% in every group ?	Intention-to-treat analysis	Where the study is carried out at more than one site, results are comparable for all sites.	Total no. Y (%)	Quality rating§
Bauer[4]	Y	Y	CT	NA	Y	Y	Y	N	CT	Y	6 (75%)	+
Benjes[5]	Y	Y	CT	NA	N	Y	Y	Y	N	NA	5 (71%)	+
Bernhardt[6]	Y	Y	CT	Y	Y	Y	Y	N	CT	NA	6 (75%)	+
Boer[7]	Y	Y	CT	NA	Y	Y	Y	Y	CT	NA	6 (86%)	++
Borland[9]	Y	Y	CT	NA	N	CT	Y	NA	NA	CT	3 (60%)	+
Brändström[10]	Y	Y	CT	CT	Y	Y	Y	N	CT	NA	5 (63%)	+

Study	Appropriate and clearly focused question	Randomised assignment	An adequate concealment method[¥]	Blind subjects and investigators about intervention allocation.	Groups are similar at baseline	The only difference between groups is the intervention	All relevant outcomes are measured in a standard, valid and reliable way.	Drop out rate less than 20% in every group ?	Intention-to-treat analysis	Where the study is carried out at more than one site, results are comparable for all sites.	Total no. Y (%)	Quality rating[§]
Buller 1994[18]	Y	Y	CT	NA	CT	Y	Y	CT	N	CT	4 (50%)	-
Buller 1997[17]	Y	Y	CT	NA	CT	Y	Y	N	CT	CT	4 (44%)	-
Buller 1998[12-14]	Y	Y	CT	CT	CT	N	Y	CT	N	CT	3 (33%)	-
Buller 2006a[16]	Y	Y	CT	NA	CT	Y	N	Y	CT	CT	4 (50%)	-
Buller 2006b[15,85]	Y	Y	CT	NA	N	Y	Y	CT	Y	CT	5 (63%)	+
Castle[22]	Y	Y	CT	NA	N	Y	Y	Y	N	NA	5 (71%)	+
Cho[23]	Y	Y	CT	CT	CT	Y	Y	CT	CT	NA	4 (50%)	-
Clowers-Webb[24]	Y	Y	CT	NA	Y	Y	Y	N	N	NA	5 (71%)	+
Cody[25]	Y	Y	CT	CT	N	Y	Y	CT	CT	NA	4 (50%)	-
Dey[28]	Y	Y	CT	NA	CT	CT	Y	NA	NA	CT	3 50%)	-
Dixon[32]	Y	Y	CT	NA	CT	Y	Y	CT	CT	CT	4 (50%	-

Study	Appropriate and clearly focused question	Randomised assignment	An adequate concealment method[¥]	Blind subjects and investigators about intervention allocation.	Groups are similar at baseline	The only difference between groups is the intervention	All relevant outcomes are measured in a standard, valid and reliable way.	Drop out rate less than 20% in every group ?	Intention-to-treat analysis	Where the study is carried out at more than one site, results are comparable for all sites.	Total no. Y (%)	Quality rating[§]
											)	
Geller 2006[35,38]	Y	Y	CT	NA	N	Y	Y	N	N	NA	4 (57%)	-
Gerbert[40]	Y	Y	CT	CT	CT	Y	Y	N	N	NA	4 (50%)	-
Girgis[41]	Y	Y	CT	NA	N	Y	Y	CT	N	CT	4 (50%)	-
Glanz[42]	Y	Y	CT	NA	N	Y	Y	N	N	CT	4 (50%)	-
Glazebrook[44]	Y	Y	CT	NA	Y	Y	Y	N	Y	CT	6 (75%)	+
Hanrahan[46]	Y	Y	CT	NA	Y	Y	Y	CT	N	NA	5 (71%)	+
Hornung[50]	Y	Y	CT	NA	N	Y	Y	Y	N	CT	5 (63%)	+
Hughes[51]	Y	Y	CT	NA	CT	Y	Y	CT	N	CT	4 (50%)	-
Jackson[52]	Y	Y	CT	NA	Y	Y	Y	Y	CT	NA	6 (86%)	++
Jones 1994[54]	Y	Y	CT	CT	CT	Y	Y	CT	CT	NA	4 (50%)	-

Study	Appropriate and clearly focused question	Randomised assignment	An adequate concealment method[¥]	Blind subjects and investigators about intervention allocation.	Groups are similar at baseline	The only difference between groups is the intervention	All relevant outcomes are measured in a standard, valid and reliable way.	Drop out rate less than 20% in every group?	Intention-to-treat analysis	Where the study is carried out at more than one site, results are comparable for all sites.	Total no. Y (%)	Quality rating[§]
Katz[55]	CT	Y	CT	NA	CT	CT	Y	CT	CT	NA	2 29%)	-
Kristjánsson[57]	Y	Y	CT	NA	Y	Y	Y	N	N	CT	5 (63%)	+
Loescher[60]	Y	Y	CT	NA	Y	Y	Y	N	N	CT	5 (63%)	+
Mahler 2005[62]	Y	Y	CT	NA	N	Y	Y	Y	N	NA	5 (71%)	+
Mahler 2007[63]	Y	Y	CT	NA	CT	Y	Y	Y	CT	NA	5 (71%)	+
Mayer[64]	Y	Y	CT	NA	Y	Y	Y	N	N	Y	6 (75%)	+
McClendon[65]	Y	Y	CT	NA	Y	Y	Y	Y	N	NA	6 (86%)	++
McMath[66]	Y	Y	CT	CT	CT	Y	Y	CT	N	NA	4 (50%)	-
Mermelstein[67]	Y	Y	CT	NA	CT	Y	Y	CT	CT	CT	4 (50%)	-
Mickler[68]	Y	Y	CT	NA	Y	Y	Y	Y	N	NA	6 (86%)	++
Naldi[75,76]	Y	Y	CT	NA	Y	Y	Y	N	N	CT	5 (63%	+

Study	Appropriate and clearly focused question	Randomised assignment	An adequate concealment method[¥]	Blind subjects and investigators about intervention allocation.	Groups are similar at baseline	The only difference between groups is the intervention	All relevant outcomes are measured in a standard, valid and reliable way.	Drop out rate less than 20% in every group?	Intention-to-treat analysis	Where the study is carried out at more than one site, results are comparable for all sites.	Total no. Y (%)	Quality rating[§]
											)	
Parrott[79]	Y	Y	CT	NA	CT	CT	CT	N	N	CT	2 (25%)	-
Prentice-Dunn[81]	Y	Y	CT	CT	CT	Y	Y	CT	CT	NA	4 (50%)	-
Prochaska[82]	Y	Y	CT	NA	CT	N	Y	N	Y	CT	4 (50%)	-
Ramussen[83]	Y	Y	CT	NA	N	N	Y	CT	CT	CT	3 (38%)	-
Richard[86]	Y	Y	CT	CT	CT	N	Y	CT	N	NA	3 (38%)	-
Rothman[88]	Y	Y	CT	CT	CT	Y	Y	Y	CT	NA	5 (63%)	+
Segan[92]	Y	Y	CT	NA	N	CT	Y	Y	N	CT	4 50%)	-
Stephenson[93]	Y	Y	CT	CT	CT	Y	Y	CT	CT	NA	4 (50%)	-
Syson-Nibbs[94]	Y	Y	CT	NA	CT	Y	Y	N	N	NA	4 (57%)	-
Turrisi[95,96]	Y	Y	CT	NA	Y	Y	Y	CT	CT	CT	5 (63%)	+
Walkosz[97]	Y	Y	CT	NA	Y	Y	Y	NA	NA	CT	5	++

Study	Appropriate and clearly focused question	Randomised assignment	An adequate concealment method¥	Blind subjects and investigators about intervention allocation.	Groups are similar at baseline	The only difference between groups is the intervention	All relevant outcomes are measured in a standard, valid and reliable way.	Drop out rate less than 20% in every group ?	Intention-to-treat analysis	Where the study is carried out at more than one site, results are comparable for all sites.	Total no. Y (%)	Quality rating§
											(83%)	

Y: yes
N: no
NA: not applicable
CT: cannot tell

§ The internal validity score of a study may vary depending on the reliability and validity of the outcome measures of interest, score ++ if the quality assessment score is greater than 80%, score + if the quality assessment score is greater than or equal to 60% and less than or equal to 80%, and score - if the quality assessment score is less than 60%.
¥ An RCT would not be downgraded for failure to use complex concealment designs

Table 18 Quality assessment – controlled before and after studies

Study	Contemporaneous data collection	Appropriate choice of control site (if 2nd site used)	Similarity of baseline measures	Similarity of study/ control providers	Blinded outcome assessment	Protection against contamination	Reliability of outcome measures	Follow-up of individuals	Total no. Y (%)	Quality rating§
Barankin[3]	Y	Y	CT	Y	CT	CT	CT	N	3 (38)	-
Bolognia[8]	Y	NA	CT	Y	CT	N	CT	Y	3 (43)	-
Buller 2006a[16]	Y	Y	Y	Y	CT	CT	CT	CT	4 (50)	-
Geller 2003[36,37,39]	N	Y	CT	Y	CT	CT	CT	CT	2 (25)	-
Greene[45]	Y	NA	CT	Y	CT	N	CT	Y	3 (43)	-
Hewitt[47]	Y	Y	Y	Y	N	CT	CT	CT	4 (50)	-
Jones 2007[53]	Y	NA	Y	Y	CT	N	CT	N	3 (43)	-

Study	Contemporaneous data collection	Appropriate choice of control site (if 2nd site used)	Similarity of baseline measures	Similarity of study/ control providers	Blinded outcome assessment	Protection against contamination	Reliability of outcome measures	Follow-up of individuals	Total no. Y (%)	Quality rating§
Reding[84]	CT	Y	CT	Y	CT	CT	CT	CT	2 (25)	-
Rodrigue[87]	Y	NA	Y	Y	CT	CT	CT	Y	4 (57)	-
Kidskin[72] §§§§§	Y	Y	CT	CT	Y	CT	Y	N	4 (50)	-
Kidskin[34,69-71,73]	Y	Y	Y	CT	Y	CT	Y	Y	6 (75)	+
Kidskin[33]	Y	Y	Y	CT	Y	CT	Y	N	5 (63)	+

Y: yes
N: no
CT: cannot tell
NA: not applicable

§ The internal validity score of a study may vary depending on the reliability and validity of the outcome measures of interest, score ++ if the quality assessment score is greater than 80%, score + if the quality assessment score is greater than or equal to 60% and less than or equal to 80%, and score - if the quality assessment score is less than 60%.

§§§§§ Quality assessed for reporting of different outcomes at different follow-up times in publications on Kidskin study; non-shaded assessment was relevant to the study's primary outcome and therefore is included in the main text

Appendix 6: Economic studies - Quality Assessment

Table 19 Quality assessment of Hocking 1991

Study identification:		Hocking B. Economic aspects of skin cancer prevention. J Occup Health Safety 7(6): 473-476
Evaluation criterion		**Comments**
1	**Was a well-defined question posed in answerable form?**	Yes
1.1	Did the study examine both costs and effects of the service(s) or programme(s)?	Yes
1.2	Did the study involve a comparison of alternatives?	Yes
1.3	Was a viewpoint for the analysis stated and was the study placed in any particular decision-making context?	Yes
2	**Was a comprehensive description of the competing alternatives given (that is, can you tell who? did what? to whom? where? and how often?)?**	No (the intervention was not described in detail)
2.1	Were any important alternatives omitted?	No
2.2	Was (should) a do-nothing alternative (be) considered?	Yes
3	**Was the effectiveness of the programmes or services established?**	Partially

3.1	Was this done through a randomised, controlled clinical trial? If so, did the trial protocol reflect what would happen in regular practice?	No/No
3.2	Was effectiveness established through an overview of clinical studies?	No
3.3	Were observational data or assumptions used to established effectiveness? If so, what are the potential biases in results?	Yes- significant potential bias as effectiveness was guessed
4	**Were all the important and relevant costs and consequences for each alternative identified?**	No
4.1	Was the range wide enough for the research question at hand?	Yes
4.2	Did it cover all relevant viewpoints? (Possible viewpoints include the community or social viewpoint, and those of patients and third-party payers.)	No
4.3	Were capital costs, as well as operating costs, included?	No
5	**Were costs and consequences measured accurately in appropriate physical units (for example, hours of nursing time, number of physician visits, lost work-days, gained life-years)?**	No
5.1	Were any of the identified items omitted from measurement? If so, does this mean that they carried no weight in the subsequent analysis?	Yes –benefits other than reduced risk of skin cancer accruing from protection; productivity cost due to an outdoor worker experiencing skin cancer
5.2	Were there any special circumstances (for example, joint use of resources) that made measurement difficult? Were these circumstances handled appropriately?	No
6	**Were costs and consequences valued credibly?**	No
6.1	Were the sources of all values clearly identified? (Possible sources include market values, patient or client preferences and views, policy-makers' views and health professionals' judgements.)	Yes
6.2	Were market values employed for changes involving resources gained or	Yes

	depleted?	
6.3	Where market values were absent (for example, volunteer labour), or did not reflect actual values (for example, clinic space donated at reduced rate), were adjustments made to approximate market values?	No
6.4	Was the valuation of consequences appropriate for the question posed (that is, has the appropriate type or types of analysis – cost-effectiveness, cost-benefit, cost-utility – been selected)?	No
7	**Were costs and consequences adjusted for differential timing?**	Yes
7.1	Were costs and consequences which occur in the future 'discounted' to their present values?	Yes
7.2	Was any justification given for the discount rate used?	No
8	**Was an incremental analysis of costs and consequences of alternatives performed?**	Yes
8.1	Were the additional (incremental) costs	
	generated by one alternative over another compared to the additional effects, benefits or utilities generated?	Yes
9	**Was allowance made for uncertainty in the estimates of costs and consequences?**	No
9.1	If data on costs or consequences were stochastic, were appropriate statistical analyses performed?	No
9.2	Were study results sensitive to changes in the values (within the assumed range for sensitivity analysis, or within the confidence interval around the ratio of costs to consequences)?	NA- sensitivity analysis not conducted
10	**Did the presentation and discussion of study results include all issues of concern to users?**	No
10.1	Were the conclusions of the analysis based on some overall index or ratio of costs to consequences (for example, cost-effectiveness ratio)? If so, was the index interpreted intelligently or in a mechanistic fashion?	Yes
10.2	Were the results compared with those of others who have investigated the	No

	same question? If so, were allowances made for potential differences in study methodology?	
10.3	Did the study discuss the generalisability of the results to other settings and patient/client groups?	Yes
10.4	Did the study allude to, or take account of, other important factors in the choice or decision under consideration (for example, distribution of costs and consequences, or relevant ethical issues)?	No
10.5	Did the study discuss issues of implementation, such as the feasibility of adopting the 'preferred' programme given existing financial or other constraints, and whether any freed resources could be redeployed to other worthwhile programmes?	No
OVERALL ASSESSMENT OF THE STUDY		
How well was the study conducted? *Code ++, + or –*		-
Are the results of this study directly applicable to the patient group targeted by this guideline?		Not applicable

Table 20 Quality assessment of Kyle 2008

Study identification		Kyle et al. Economic evaluation of the US Environmental Protection Agency's SunWise Program: sun protection education for young children. Pediatrics 2008 Vol. 121 No. 5, pp. e1074-e1084
Checklist completed by:		
Evaluation criterion		**Comments**
1	**Was a well-defined question posed in answerable form?**	Yes
1.1	Did the study examine both costs and effects of the service(s) or programme(s)?	Yes
1.2	Did the study involve a comparison of alternatives?	Yes

1.3	Was a viewpoint for the analysis stated and was the study placed in any particular decision-making context?	Yes
2	**Was a comprehensive description of the competing alternatives given (that is, can you tell who? did what? to whom? where? and how often?)?**	Yes
2.1	Were any important alternatives omitted?	No
2.2	Was (should) a do-nothing alternative (be) considered?	Yes- “do nothing” was included
3	**Was the effectiveness of the programmes or services established?**	Yes
3.1	Was this done through a randomised, controlled clinical trial? If so, did the trial protocol reflect what would happen in regular practice?	No
3.2	Was effectiveness established through an overview of clinical studies?	No
3.3	Were observational data or assumptions used to established effectiveness? If so, what are the potential biases in results?	Yes
4	**Were all the important and relevant costs and consequences for each alternative identified?**	Unclear- additional outcomes associated with reduced UV exposure (e.g. keratosis, photoaging) were not considered
4.1	Was the range wide enough for the research question at hand?	Yes
4.2	Did it cover all relevant viewpoints? (Possible viewpoints include the community or social viewpoint, and those of patients and third-party payers.)	Only US government perspective taken
4.3	Were capital costs, as well as operating costs, included?	N/A
5	**Were costs and consequences measured accurately in appropriate physical units (for example, hours of nursing time, number of physician visits, lost work-days, gained life-years)?**	Yes
5.1	Were any of the identified items	No

	omitted from measurement? If so, does this mean that they carried no weight in the subsequent analysis?	
5.2	Were there any special circumstances (for example, joint use of resources) that made measurement difficult? Were these circumstances handled appropriately?	Yes- need to predict number of participating schools Yes- handled appropriately
6	**Were costs and consequences valued credibly?**	Yes
6.1	Were the sources of all values clearly identified? (Possible sources include market values, patient or client preferences and views, policy-makers' views and health professionals' judgements.)	Yes
6.2	Were market values employed for changes involving resources gained or depleted?	Yes
6.3	Where market values were absent (for example, volunteer labour), or did not reflect actual values (for example, clinic space donated at reduced rate), were adjustments made to approximate market values?	N/A
6.4	Was the valuation of consequences appropriate for the question posed (that is, has the appropriate type or types of analysis – cost-effectiveness, cost-benefit, cost-utility – been selected)?	Yes
7	**Were costs and consequences adjusted for differential timing?**	Yes
7.1	Were costs and consequences which occur in the future 'discounted' to their present values?	Yes
7.2	Was any justification given for the discount rate used?	Yes
8	**Was an incremental analysis of costs and consequences of alternatives performed?**	N/A – Incremental Cost-Effectiveness Ratios were not reported as dominance relationship was established
8.1	Were the additional (incremental) costs generated by one alternative over another compared to the additional effects, benefits or utilities generated?	N/A
9	**Was allowance made for uncertainty in the estimates of costs and consequences?**	Yes

9.1	If data on costs or consequences were stochastic, were appropriate statistical analyses performed?	Yes
9.2	Were study results sensitive to changes in the values (within the assumed range for sensitivity analysis, or within the confidence interval around the ratio of costs to consequences)?	No
10	**Did the presentation and discussion of study results include all issues of concern to users?**	Yes
10.1	Were the conclusions of the analysis based on some overall index or ratio of costs to consequences (for example, cost-effectiveness ratio)? If so, was the index interpreted intelligently or in a mechanistic fashion?	Yes- intelligently
10.2	Were the results compared with those of others who have investigated the same question? If so, were allowances made for potential differences in study methodology?	Yes
10.3	Did the study discuss the generalisability of the results to other settings and patient/client groups?	No
10.4	Did the study allude to, or take account of, other important factors in the choice or decision under consideration (for example, distribution of costs and consequences, or relevant ethical issues)?	No
10.5	Did the study discuss issues of implementation, such as the feasibility of adopting the 'preferred' programme given existing financial or other constraints, and whether any freed resources could be redeployed to other worthwhile programmes?	No
OVERALL ASSESSMENT OF THE STUDY		
How well was the study conducted? Code ++, + or –		+
Are the results of this study directly applicable to the patient group targeted by this guideline?		Partially applicable

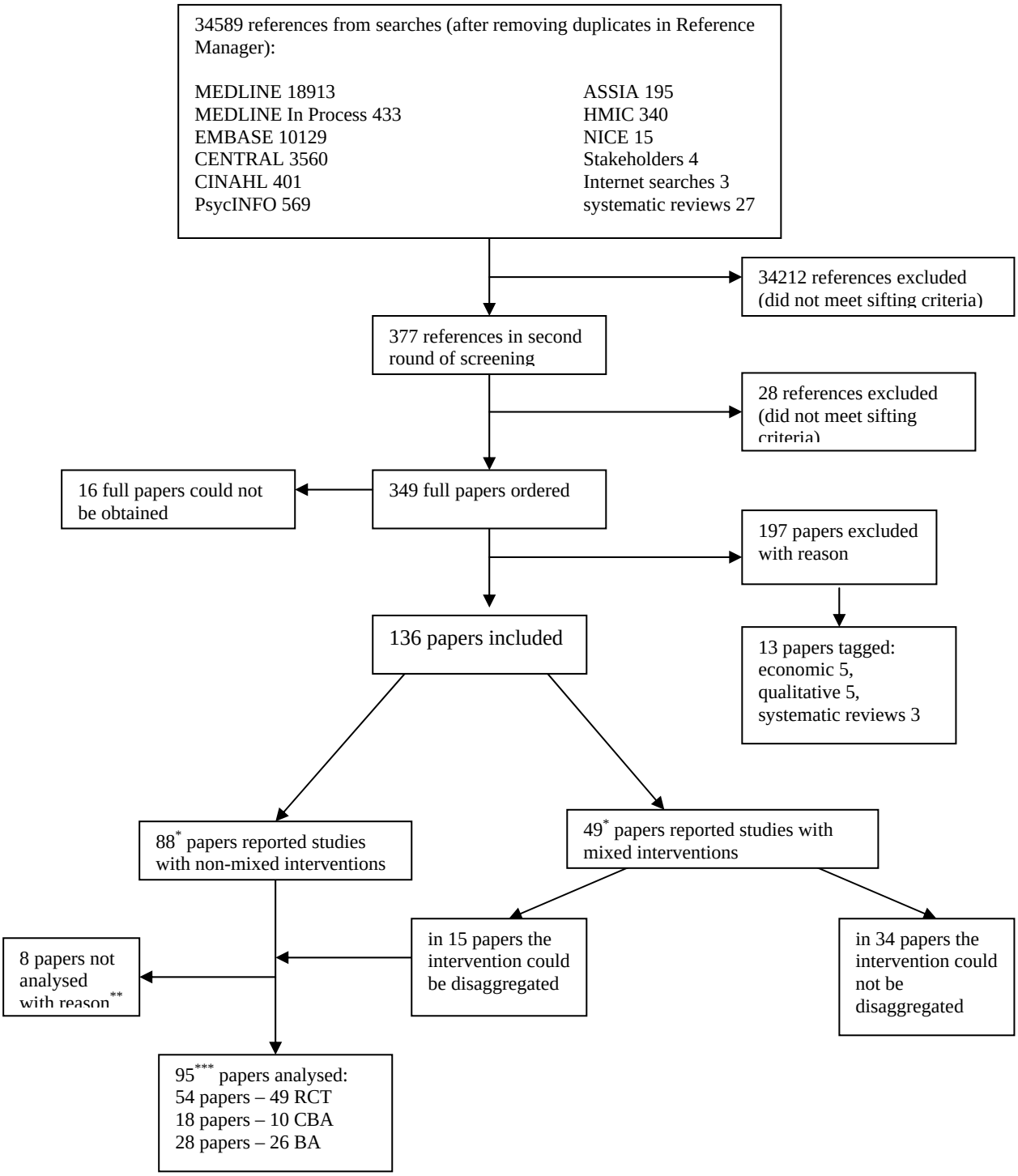
Criteria used for overall assessment of study quality:

++ All or most of the criteria have been fulfilled. Where they have not been fulfilled the conclusions of the study or review are thought very unlikely to alter.

+ Some of the criteria have been fulfilled. Those criteria that have not been fulfilled or not adequately described are thought unlikely to alter the conclusions.

– Few or no criteria fulfilled The conclusions of the study are thought likely or very likely to alter.

Appendix 7: Effectiveness study flow diagram



* One paper described three studies: two were mixed intervention and were not analysed, one was a controlled before and after study that was analysed (Reding)

** controlled before and after studies that describe an intervention, comparator, population and setting combination that was investigated in a randomised trial with a longer follow-up

***one study (reported in one paper) was utilised both as an RCT and a controlled before and after study; one study (reported in three papers) was utilised both as a CBA and BA; one study (reported in one paper) was utilised both as an RCT and a before and after study

Appendix 8: Effectiveness articles excluded with reason and unobtainable

Articles excluded based on design

(the article did not describe an RCT or a longitudinal non-randomised study)

1 Marks R. Australian sunlight: a health hazard for the outdoor worker. *Medical Journal of Australia* 1986; **17**(145):490-491.

2 Borland R, Hill D, Noy S. Being SunSmart: Changes in community awareness and reported behaviour following a primary prevention program for skin cancer control. *Behaviour Change* 1990; **7**(3):126-135.

3 Marks R. Prevention of skin cancer: Being sunsmart in the 1990s. *Journal of Dermatological Treatment* 1990; **1**(5):271-274.

4 Cameron,IH, McGuire,C. 'Are you dying to get a suntan?' - the pre and post-campaign survey results. *Health Education Journal* [49], 166-170.1990

5 Boldeman C, Jansson B, Holm L-E. Primary prevention of malignant melanoma in a Swedish urban preschool sector. *Journal of Cancer Education* 1991; **6**(4):247-253.

6 Marks R. Public health evaluation of skin cancer campaigns. *Journal of Occupational Health and Safety - Australia and New Zealand* 1991; **7**(5):425-430.

7 Theobald T, Marks R, Hill D, Dorevitch A, Theobald T, Marks R, *et al*. "Goodbye Sunshine": effects of a television program about melanoma on beliefs, behavior, and melanoma thickness.[see comment]. *Journal of the American Academy of Dermatology* 1991; **25**(4):717-723.

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9 Apelgren J. Pale is beautiful. *Nursing Times* 1992;24-26.

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11 Hatmaker G. Development of a Skin Cancer Prevention Program. [References]. *The Journal of School Nursing* 1992; **19**(2):Apr-92.

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13 Shenefelt PD. Skin cancer prevention and screening. *Primary Care - Clinics in Office Practice* 1992; **19**(3):557-574.

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16 Boutwell WB, Cummings SR, Ward JAD, Watson KD, Riedel T. Under Cover Skin Cancer Prevention Project: A community-based initiative in three Texas cities. *Skin Cancer* 1993; **8**(1):67-73.
17 Boutwell WB. Under cover: A community-based skin cancer prevention initiative. *Cancer Bulletin* 1993; **45**(3):279-281.
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20 Anderson PJ, Lowe JB, Stanton WR, Balanda KP. Skin cancer prevention: A link between primary prevention and early detection? *Australian Journal of Public Health* 1994; **18**(4):417-420.
21 Boutwell WB. The Under Cover Skin Cancer Prevention Project. A community-based program in four Texas cities. *Cancer* 1994; **75**(2 SUPPL.):657-660.
22 Hughes AS. Sun protection and younger children: lessons from the Living With Sunshine Program. *Journal of School Health* 1994; **64**(5: 201-4 ,(6 ref):201-204.
23 Johnson JA. Prevention of skin cancer in xeroderma pigmentosum [6]. *Journal of the American Academy of Dermatology* 1994; **31**(6):1078.
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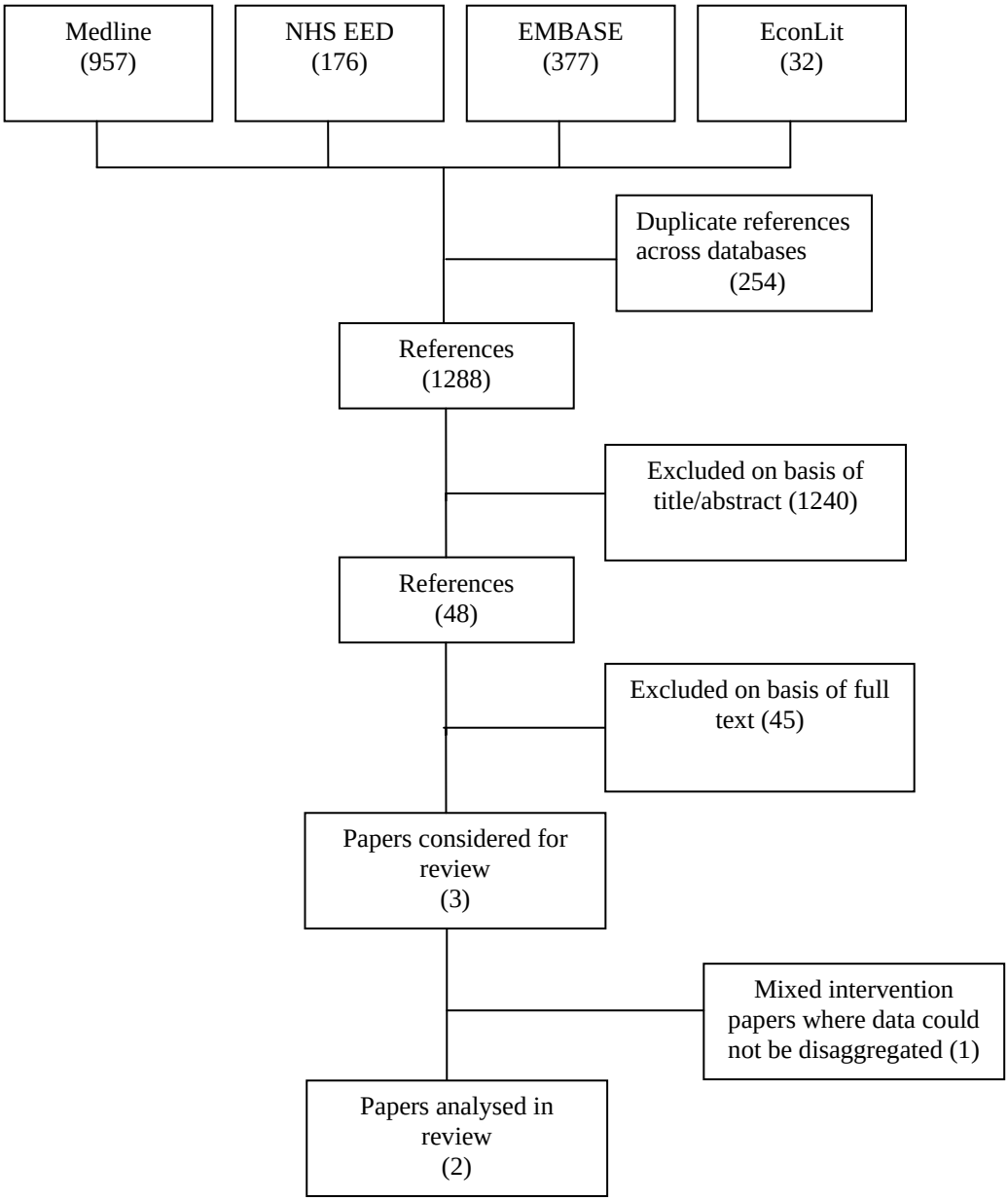
Appendix 9: Economic study flow diagram



Appendix 10: Economic articles excluded with reason and unobtainable

Articles excluded based on location

(i.e. not an OECD country)

1. N. Trainin and M. Ziv. Primary and secondary prevention of cancer in Israel. *Israel Journal of Medical Sciences* 28 (1 SUPPL.):2-3, 1992.

Articles excluded based on population

(i.e. does not address primary prevention of skin cancer attributed to UV exposure)

2. O. Axelson. Occupational and environmental health policy: Some historical notes and remarks on prevention in environmental and occupational health. *International Journal of Occupational Medicine and Environmental Health* 10 (4):339-347, 1997.
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Articles excluded based on intervention

(i.e. the study did not include one or more of the relevant interventions)

1. P. J. Anderson, J. B. Lowe, W. R. Stanton, and K. P. Balanda. Skin cancer prevention: A link between primary prevention and early detection? *Australian Journal of Public Health* 18 (4):417-420, 1994.
2. Ian J. Bateman. A 'Natural Experiment' Approach to Contingent Valuation of Private and Public UV Health Risk Reduction Strategies in Low and High Risk Countries. *Environmental and Resource Economics* . 31 (1), 2005.
3. I. A. Pion, A. W. Kopf, B. R. Hughes, N. M. Wetton, M. Collins, J. A. Newton Bishop, I. A. Pion, A. W. Kopf, B. R. Hughes, N. M. Wetton, M. Collins, and J. A. Newton Bishop. Teaching children about skin cancer: the draw-and-write technique as an evaluation tool. *Pediatric Dermatology* 14 (1):6-12, 1997.
4. A. R. Rhodes. Public education and cancer of the skin. What do people need to know about melanoma and nonmelanoma skin cancer? *Cancer* 75 (2 SUPPL.):613-636, 1994.
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Articles excluded based on design

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the cancer action in rural towns (CART) project, Australia. *Health Promotion International* 11 (4):277-290, 1996.
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Unobtainable articles:

1. D. B. Buller, J. R. Hall, P. J. Powers, R. Ellsworth, B. H. Beach, C. A. Frank, J. A. Maloy, and M. K. Buller. Evaluation of the "Sunny Days, Healthy Ways" sun safety CD-ROM program for children in grades 4 and 5. *Cancer Prevention & Control* 3 (3):188-195, 1999.

Appendix 11: Effectiveness evidence tables

For all evidence tables:
¥

I. One-to-one or group-based verbal advice (with or without use of information resources).
II. Mass-media campaigns.
III. Leaflets, other information or teaching resources or printed material including posters.
IV. New media: the Internet (including social networking sites), emedia and text messaging.

§ The internal validity score of a study may vary depending on the reliability and validity of the outcome measures of interest, score ++ if the quality assessment score is greater than 80%, score + if the quality assessment score is greater than or equal to 60% and less than or equal to 80%, and score - if the quality assessment score is less than 60%.

†

1. Likely to be applicable across a broad range of populations and settings.
2. Likely to be applicable across a broad range of populations and settings, assuming it is appropriately adapted.
3. Applicable only to populations or settings included in the studies – the success of broader application is uncertain.
4. Applicable only to settings or populations included in the studies.

Table 21 Barankin

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Barankin et al [3] **Year:** 2001 **Aim of study:** to assess the benefits of involving parents at home in the sun protection programme received by their children at school **Study design:** controlled before & after **Internal validity[§]:** - **External validity[†]:** 3	**Source population/s:** Public schools in the Thames Valley District School Board in London, Ontario, Canada. **Country:** Canada **Study year:** 1999 **Eligible population:** Grade 4 students at public schools in the Thames Valley District School Board in London, Ontario, Canada whose teachers responded to an email sent to all public schools in the area. **Selected population:** 23 classes in 16 schools participated in the study. Schools were allocated to one of three groups: control, 'standard' treatment, and 'enhanced' treatment. NB: as the 'enhanced' treatment group were provided with sunscreen the results for this arm of the study do not meet the inclusion criteria for this	**Method of allocation:** The groups were chosen on a first-come-first-served basis determined by the teachers response to an email sent out to all public schools in the Thames Valley District School Board. The authors state that the first 16 schools were randomised with 8 in the enhanced group and 8 in the standard group, and the next 8 classes that responded after the quota had been met were placed in the control group. Thus the study did not totally adhere to a RCT design. **Measures to minimise confounding:** not reported **Intervention/s** 1. The 'standard' intervention group received a 'Sun and the Skin' presentation from medical students that comprised a one-hour interactive slide presentation that included discussion of UV light, the harmful effects of the sun, and skin cancer risks and	**Primary Outcomes:** Changes in knowledge, attitudes and behaviour relating to sun-protection following the intervention. Both parents and children were surveyed in May before the presentations, and again in June after the presentations. Modified surveys were used in September to assess behaviour and sun damage outcomes. Teachers were also surveyed about their student's knowledge, attitudes and behaviours in May & June. Details of the appraisal tools used were not reported. **Adverse events:** none reported **Secondary outcomes:** Changes in attitudes relating to sun-protection following the intervention.	As the 'enhanced' treatment group were provided with sunscreen, a component that could not be disaggregated, we have only included the results reported for the control group and 'standard' intervention group. **Primary outcomes:** ***Knowledge*** Teachers surveyed: In May all teachers except one in the standard group characterised their students as 'somewhat' aware of the consequences of excessive sun exposure. In June, 75% (3/4) of the control group and 100% (4/4) of the standard group characterised their students as being very aware of the consequences of too much sun. ***Behaviours*** <u>Sunburns</u>: Children surveyed: The number of children reporting no sunburns improved between May and September for the standard group (non-statistically significant trend). Percentages without sunburn were as follows: standard: 39.9% (May), 47.2% (September); control: 36.5% (May), 36.8% (September). Parents surveyed: Parental reports of the number of children without sunburns showed an improvement	**Limitations identified by author:** There may be some bias in the June and September surveys in that there was a noticeably lower response rate than there was in May. **Limitations identified by review team:** The methods used to obtain information and analyse the results were poorly reported. It was not clear how the data for the different groups were compared and some of the charts were poorly labelled. **Evidence gaps and/or recommendations for future research:** Higher quality studies (preferably in the form of a well conducted RCT) would be beneficial. **Source of funding:** The Canadian Dermatology Association supplied

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	systematic review. **Age:** 9–10 years **Female:** not reported **Race/ethnicity:** not reported **Socioeconomic status:** not reported **(annual income)** not reported **Excluded population:** not reported **Setting:** school	prevention. Sun protection strategies including sunscreen, clothing, hats, sunglasses, avoiding midday sun, and seeking shade were emphasised. Additional materials including the Rayguard activity booklet were provided before and during the presentation. 2. The 'enhanced' group differed from the 'standard' group in two respects. Principally each student was sent home with a letter that advised their parents about the presentations they had received and informed them of the importance and relevance of sun protection behaviours. The letter encouraged parents to ensure that their child had appropriate sun protection and included a fact sheet. Secondly children were provided with sunscreen in June 1999, prior to the start of the summer vacation. **Intervention category[¥]:** I **Intervention period:** May 1999 **Comparator/s:** A control group which did	**Follow-up periods:** 4 months **Method of analysis:** not reported	between May and September for the standard (non-statistically significant trend). Percentages without sunburn were as follows: standard: 43.6% (May), 54.2% (September); control: 43.1% (May), 42.7% (September). There was no significant difference in September in the number of multiple sunburns (≥2) amongst the groups: standard 12.5%; control 10.7%. Teachers surveyed: In May and June, all but two teachers indicated that 0-25% of their students had a sunburn during the year; the other two teachers responded that 25-50% of their students had a sunburn during the year. <u>Sun protection behaviours</u>: Children surveyed: In all three survey periods, a large proportion of children reported using sunscreen with SPF ≥ 30, and more than 90% used sunscreen with SPF ≥ 15. No differences were observed amongst the groups or time periods. Parents surveyed: In May parents reported that their children were already practicing many sun protective behaviours to a high degree. 75-78.6% of parents reported that their children used an SPF ≥ 30 and 96% of parents reported that their children used an SPF ≥ 15. Trends amongst the standard and control groups were similar. Between 90-95% of parents reported that their children 'sometimes' to 'usually' applied sunscreen 15-30 minutes before going out in the sun, reapplied sunscreen	Sun Facts information; the Canadian Cancer Society supplied Rayguard activity books and T shirts for the Sun in the Skin presentations; and Cosmair, La Roche-Posay, and Westwood-Squibb supplied sunscreen for the enhanced groups.

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		not receive the presentation or its enhancements but received Rayguard activity books. **Sample sizes:** 509 **Total n =** 509 **'Standard' intervention n =** 191 **'Enhanced' intervention n =** 170 **Control n =** 148 **Baseline comparisons:** not reported **Study sufficiently powered?:** power calculation not reported		after swimming or sweating, and avoided activities during the midday sun. The use of long pants and long-sleeved shirts to protect the skin from the sun were not popular options for children. Most parents reported that their children either 'never' or 'sometimes' wore this type of clothing in the May surveys. There was no improvement in the September survey with no differences amongst the groups. Teachers surveyed: Most teachers listed 0-24% of students as wearing long pants and long-sleeved shirts in the warm weather. All teachers but one indicated that <50% of their class usually wore a hat outdoors; the hats worn were all baseball caps rather than wide-brimmed hats. In most classrooms teachers observed that <25% of students wore sunglasses outdoors, and <25% of students applied sunscreen at least once during the day. These reported behaviours were similar in May and June and there were no significant differences between the groups. **Secondary outcomes:** ***Attitudes*** Attitudes to having a tan: Children surveyed: The standard group showed a reduction in the percentage of students who wanted a tan: 31.4% (May), 15.5% (September), statistical significance not stated. The control group showed no improvement: 23.3% (May), 21.1% (September). Teachers surveyed:	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				No teachers at either time period believed their students thought that tans were 'cool' and that they believed they would want to have a tan. **Attrition details:** 23 classes in 16 schools participated (standard=8; enhanced=8; control=7). The reason for the apparent loss of one of the control group classes was not reported. Survey participation rates were as follows: May: 509 children and 430 parents; June: 366 children and 152 parents; September: 259 children and 232 parents. In addition teachers were surveyed about the knowledge, attitudes and behaviours of their students in May (n=19) and June (n=12).	

Table 22 Bauer

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Bauer et al.[4] **Year:** 2005 **Aim of study:**	**Source population/s:** 242 public nursery schools in Stuttgart and 169 in Bochum in different suburbs of both cities	**Method of allocation:** entire day-care centres were randomised to interventions to avoid contamination **Measures to minimise**	**Primary Outcomes:** *"the number of newly developing (incident) melanocytic nevi"* – assessed in a physical examination by two	**Primary outcomes:** Incident melanocytic naevi developed (median (IQR)): 26 (16, 41) intervention; 27 (17, 40) control; difference between groups not significant; at baseline all children had a median of 8 naevi (IQR: 5,	**Limitations identified by author:** ▪ Unexpectedly high % of using sunscreen (98%) and almost always

****** Data for this mixed arm not extracted

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
to investigate "*if children receiving education or education and free sunscreen would develop significantly less incident melanocytic nevi during three years of follow up when compared to a control group*;" a secondary question was "*if significantly reduced levels of sun protection habits could be achieved in the intervention groups compared to the control group"* **Study design:** RCT	**Country:** Germany **Study year:** 1998 - 2001 **Eligible population:** children 2-7 years old with I-IV Fitzpatrick skin type from randomly selected "*49 public nursery schools in Stuttgart and 29 public nursery schools in Bochum";* 3 additional schools were approached, but refused to participate **Selected population:** children whose parents consented (>80% of parents) **Age:** range 2-7 years **Female:** 48.6% of children with a complete follow up **Race/ethnicity:** 100% children Caucasian (non-Caucasian excluded) **Socioeconomic status: (annual income)** not reported **Excluded population:**	**confounding:** *"multivariate linear regression analysis was used to assess the impact of the interventions on the number of incident melanocytic nevi adjusted for confounding variables"* **Intervention/s** Parents in all groups were given an initial educational session. Educational group: "*parents received an educational letter 3 times yearly (Easter, Pentecost, and summer holidays) with more detailed information on proper sunscreen use and sun protection than the educational session provided at study commencement; they also received information brochures from public melanoma prevention campaigns with detailed information"* **Education and sunscreen group:** the same educational material and additionally "*800ml of free broad-spectrum sunscreen*	dermatologists **Adverse events:** not reported **Secondary outcomes:** parental interview about "*sun exposure of their child playing at home, duration and destination of holiday, history of sunburns, sunscreen use and education and ethnicity of parents"* weeks on holidays in sunny climates score of country of holiday (0-16, higher score indicating higher risk from UVR) home activity score (0-7, higher score indicating more outdoor activities) sunburn experience use of sunscreen use of sun protective clothing while on beach or at swimming pool **Follow-up periods:** 3 years	14) **Secondary outcomes:** Median weeks on holidays in sunny climates (IQR): 6 (2, 8) intervention; 5 (2, 8) control; Median score of country of holiday (IQR): 4 (3, 6) intervention; 4 (3, 6) control; Median difference in hr/day in the sun during holidays in sunny climates (IQR): 0 (-1, 1) intervention, 0 (-1, 1) control; Median difference in home activity score (IQR): 0 (-1, 1) intervention; 0 (-1, 1) control; Median difference in hr/day outside at home (SD): 0.14 (1.3) intervention, 0.24 (1.09) control; % with sunburn experience between 1998-2001: 21.5% intervention; 23.2% control; Median number of newly experienced sunburns (IQR): 0 (0, 1) intervention, 0 (0, 1) control; % use of sunscreen since 1998: 99.7%	using sunscreen when in the sun (79%) at baseline ▪ An educational session conducted with all parents before randomization could have reduced the effect of later interventions ▪ All outcomes apart form melanocytic naevi count were self reported – could have been influenced by social desirability ▪ High number of children lost to follow-up ▪ The scoring system used to quantify holiday sun exposure might have been too simplified **Limitations identified by review team:** no additional limitations identified **Evidence gaps and/or**

†††††† Numbers after applying exclusion criteria

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Internal validity[§]: + **External validity[†]:** 2	children whose parents did not attend the first educational session, did not consent, children who were "*ill or on holidays at the time of the baseline examination (…), children with skin type V or VI (non-Caucasian, n=40), with missing age information (n=4), with immunosuppression after organ transplantation or due to chemotherapy of cancer or who did not allow physical examination (n=31)"* **Setting:** place of domicile	*with sun protection factor 25 yearly"* [*****] **Intervention category[¥]:** III **Intervention period:** 3 years **Comparator/s:** *"after the initial educational session no more information or educational sessions were provided";* do nothing **Sample sizes[††††††]:** **Total n =** 1210 **Intervention n =** 593 from 26 schools **Control n =** 617 from 27 schools **Baseline comparisons:** *"at baseline there were no statistically significant differences between intervention and control groups"* **Study sufficiently powered?:** power calculation not reported	**Method of analysis:** not reported if ITT	intervention, 98% control; % almost always using sunscreen since 1998: 84.8% intervention, 83.1% control; Changes in use of sun protective clothing while on beach or at swimming pool between 1998-2001: Use T-shirt: 10.1% intervention, 13.1% control; Use shorts: 13.0% intervention, 11.8% control; Use trunks and T-shirt and shorts: 12.0% intervention, 10.8% control; Use hat: 7.3% intervention, 7.0% control Authors observed that differences between groups (including education + sunscreen) were significant, but did not follow a uniform pattern. **Attrition details:** Intervention: 624 children randomised, 31 excluded based on exclusion criteria, 224 lost to follow-up Control: 367 children randomised, 20 excluded based on exclusion criteria, 219 lost to follow-up Children lost to follow up: were less likely to have a fair complexion ($p<0.0001$)	**recommendations for future research:** Obtaining more objective data on sunscreen use in participants **Source of funding:** not reported

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				had fewer melanocytic naevi (p=0.0002) had spent fewer holidays in sunny climates (p<0.0001) had previously experienced less sunburns (p=0086) had used sunscreen less often (p<0.0001) were less likely to wear at least 2 pieces of protective clothing on the beach or at the swimming pool (p<0.0001) Loss to follow-up was different for the 3 intervention arms (p<0.0001) Parents of the children lost to follow-up: were on average less educated (p<0.0001) were less likely to be both German descent (p<0.0001) had fewer melanocytic naevi on their arms (p<0.0001) The authors conclude that children lost to follow-up were on average at a lower risk to develop melanocytic naevi.	

Table 23 Benjes

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Benjes et al.[5] **Year:** 2004 **Aim of study:** "*To determine if an intensive intervention directed to mothers of newborns would increase levels of sun protection practice and lower rates of sunburning for their children; and to examine changes in sun protection practices and burning rates experienced before the first and second summers of life.*" **Study design:** RCT **Internal validity[§]:** + **External validity[†]:** 2	**Source population/s:** mothers of newborn children in Falmouth Hospital **Country:** USA **Study year:** 1998-1999 **Eligible population:** mothers of newborn children in Falmouth Hospital who were counselled by maternity nurse to protect their children from the sun in 24 to 48 hours after delivery **Selected population:** mothers who agreed to participate in a study testing an additional "booster" doses of sun protection education during the following 12 months **Age:** 17-24: 7, 16% (intervention), 7, 15% (control); 25-34: 28, 62% (intervention), 26, 55% (control) 35-45: 10, 22%	**Method of allocation:** families were randomised to intervention and control groups after completion of the baseline survey **Measures to minimise confounding:** none reported **Intervention/s** *"beginning in the spring of 1999, mothers received a telephone call of at least 15 minutes and two 4-page "RayBuster" newsletters; highlights of the telephone call and materials included health benefits of sun protection, specific instructions for use of sunscreen and protective clothing, solutions to mothers' specific difficulties with sun protection, and personalised sun protection suggestions from the study director; materials were created based on needs identified in the baseline survey and were tested with five mothers of young children who were not involved in the study"* **Intervention category[¥]:** I+III **Intervention period:** spring 1999	**Primary Outcomes:** 1. mothers' practice of a series of sun protection behaviours for their child (wearing a hat, wearing a long sleeve shirt, staying in the shade, and using sunscreen) 2. mothers' reporting of their child's sun burning and tanning **Adverse events:** not reported **Secondary outcomes:** 1. mothers' own protective behaviours for themselves 2. their knowledge and attitudes regarding protection for themselves and for their child 3. mothers' vigilance in protecting their child from the sun **Follow-up periods:** 12 months; starting with baseline	**Primary outcomes:** % child wears a hat: Baseline: 73 (intervention), 84 (control); Post-test: 64 (intervention), 64 (control) % child wears a shirt: Baseline: 73 (intervention), 80 (control) Post-test: 62 (intervention), 67 (control) % child stays in the shade: Baseline: 89 (intervention), 83 (control) Post-test: 56 (intervention), 57 (control) % mother applies sunscreen: Baseline: 36 (intervention), 33 (control) Post-test: 98 (intervention), 89 (control) % any skin damage (child): Baseline: 20 (intervention), 20 (control) Post-test: 52 (intervention), 63 (control)	**Limitations identified by author:** Parental vigilance assessed only post-test. The effects of the intervention are likely to be limited due to the earlier community-wide education efforts. **Limitations identified by review team:** Relatively short follow up which does not enable the measurement of outcomes such as development of skin cancer, naevi, etc. **Evidence gaps and/or recommendations for future research:** A trial with a larger sample size and in different settings seems warranted. Future studies should focus on parents' beliefs about the need for, and practice of, vigilant sun protection as child grows from infancy to toddlerhood. Randomised studies of various behavioural interventions are also needed. **Source of funding:** not

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	(intervention), 14, 30% (control) **Female:** 100% **Race/ethnicity:** not reported **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported **Setting:** place of domicile	**Comparator/s** No additional information beyond that provided by the maternity nurse **Sample sizes:** The sizes of samples included at baseline are provided in brackets. The analysis included only mothers who responded to both surveys – provided below. **Total n =** 92 (108) **Intervention n =** 45 (54) **Control n =** 47 (54) **Baseline comparisons:** ▪ age ▪ education ▪ mother's having other children ▪ skin colour ▪ child's sex ▪ mother's response to sun exposure ▪ skin colour believed to be attractive in children and themselves ▪ recollection of receiving materials at hospital and reading them ▪ mean age of children at baseline differences between intervention	questionnaire (children aged 6 months) and finishing with follow up questionnaire (children aged 18 months) **Method of analysis:** not ITT (only mothers who completed both baseline and follow-up survey)	% any burn (child): Baseline: 7 (intervention), 7 (control) Post-test: 14 (intervention), 28 (control) Test for percentage change in intervention group minus change in control group gave a p>0.05 for every variable. Pooled analysis for both groups showed a change from baseline to post-test: % children wearing a hat - from 79 to 64 (p=0.02); % children wearing a shirt - from 77 to 64 (p=0.055); % children staying in the shade: from 86 to 56 (p<0.001); % mothers apply sunscreen: from 34 to 93 (p<0.001) Skin damage (p<0.001 for all): Never burned, never tanned – from 78 to 46; Never burned, ever tanned – from 15 to 34; Ever burned, ever tanned – from 0 to 8; Ever burned, never tanned – from 7 to 13	reported

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		and control groups were reported as generally moderate **Study sufficiently powered?:** sample size calculated for 80% power		Rates of tanning increased from 14% to 45% in the intervention group and from 17% to 37% in the control group **Secondary outcomes:** No overall difference between groups in mothers' sun protection. Routine sunscreen use among intervention mothers increased by 11% compared with 3% in controls. No difference between groups in mothers' reporting of personal sunburns or tanned skin (data not shown). Vigilant sun protection (measured only at follow up) – 82% (intervention), 61% control (p=0.02) **Attrition details:** Of the 108 (54 in each group) mothers who completed the baseline survey, 45 in the intervention and 47 in the	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				control group completed the follow up questionnaire	

Table 24 Bernhardt

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Bernhardt[6] **Year:** 2001 **Aim of study:** to test a hypothesis that "*people who receive a skin cancer prevention web page with tailored messages and design will pay greater attention to the information, which will lead to more healthy skin cancer*	**Source population/s:** *"eight undergraduate classes at a large south eastern university"* **Country:** USA **Study year:** 2000 **Eligible population:** *"at least 18 years old, being able to read English and having access to the Internet at home or at school"* **Selected population:** 83 participants who: consented (110), participated in the baseline survey (102) and completed the post-test survey (84); one participant was	**Method of allocation:** *"a program that allowed participants to log into the site with their student number, randomly assigned them to the treatment or comparison group"* **Measures to minimise confounding:** not reported **Intervention/s:** *"Webpage composed of more than 20 tailored messages that were derived from more than 30 pieces of data from each participant (…). The tailored messages were based on the constructs and principles of Social Cognitive Theory and focused on participants' expected outcomes of regularly using or not using sunscreen and their perceived self-efficacy to regularly use sunscreen during the high risk sun exposure behaviours.*	**Primary Outcomes:** Outcomes, which related to behaviours during outdoor sunbathing, outdoor swimming activities, outdoor sports and recreation, outdoor exercising, yard work and gardening and other activities outdoor: o Sunscreen wearing behaviours combined in a sunscreen behaviour index o Self-efficacy to wear sunscreen o Expected outcomes of wearing or not wearing	**Primary outcomes:** Sunscreen wearing behaviours: no significant differences; Self-efficacy to wear sunscreen: no significant differences; Expected outcomes of wearing or not wearing sunscreen: no significant differences; Barriers to wearing sunscreen: no significant differences for three; participants in the treatment group were less likely to report that it is very important for them to tan ($p<0.01$) and that they feel more attractive when they are tan ($p<0.05$) Perceived involvement in protecting one's skin: not reported **Secondary outcomes:** Reading information on the web	**Limitations identified by author:** o Outcome measurement based on self-reported questionnaires o Small *dose* of intervention o Small sample size **Limitations identified by review team:** o Baseline outcome measurements not reported o Assessed effect is the difference between groups at follow up, not the change from baseline; o Sample selected from university students – possibly more educated than an average www

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
prevention beliefs, than people who receive a non-tailored (i.e. generic) skin cancer prevention web page." **Study design:** RCT **Internal validity[§]:** + **External validity[†]:** 3	removed as an outlier (35 years old) **Age:** mean 21.6, SD 2.02; range 19 - 30 **Female:** 59% **Race/ethnicity:** White 86% African American 8% Asian and Pacific Islander 2% Hispanic 1% Other 2% **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported **Setting:** university	*Additional tailored messages addressed participants' skin cancer risk based on their self identified skin tone, their specific high risk sun exposure behaviours, barriers to wearing sunscreen, perceived risk of skin cancer, and perceived personal involvement with the issue of skin cancer. In addition, all messages were written from the point of view of a source that participants selected from a number of choices at baseline, and a gender-matched photo of the source was included on the web page adjacent to the messages. Furthermore, participants selected the headline fonts and colours that appeared on the tailored web page"* (based on findings from formative research). **Intervention category[¥]:** IV **Intervention period:** not applicable **Comparator/s** *A web page with generic sun protection intervention* **Sample sizes:** **Total n =** 83 **Intervention n =** 47 **Control n =** 36	sunscreen This study also measured: o Barriers to wearing sunscreen o Perceived involvement in protecting one's skin **Adverse events:** not reported **Secondary outcomes:** o Reading information on the web page o Time spent reading the information on the web page o Level of liking the information source o Following links from the page o Perceived degree of personalization o Perceived degree of	page: 81% treatment, 61% control; $p<0.05$; Time spent reading the information on the web page: no significant group difference; Level of liking the information source: higher in the intervention group; $p<0.055$ Following links from the page: 29% treatment, 13% controls; Perceived degree of personalization: higher in treatment group; $p<0.05$; Perceived degree of relevance: higher in control group; $p<0.01$ **Attrition details:** 110 consented 102 completed the baseline survey 84 completed the post-test survey one participant was removed as an outlier (35 years old)	user **Evidence gaps and/or recommendations for future research:** o Assessment of the effectiveness of tailored messages based on participant preferences versus expert selections o Determining which factors are most important in tailoring interventions o Replicate and expand findings on the two barriers for which differences were found significant **Source of funding:** the Office of the Vice President of Research and the College of Education at the University of Georgia

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Baseline comparisons: *"there were no statistically significant differences between the groups by participant sex, race, age, skin tone, or personal involvement in skin protection."* **Study sufficiently powered?:** power calculation not reported	relevance **Follow-up periods:** 4-5 weeks **Method of analysis:** not reported if ITT; no specific methods reported		

Table 25 Boer

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Boer et al.[7] **Year:** 2006 **Aim of study:** to provide "*insight into both pictures' and textual arguments' beneficial contribution to judgement, gained knowledge, and perceived advantages of sun protection measures in public service announcements"*	**Source population/s:** not reported **Country:** Netherlands **Study year:** not reported **Eligible population:** probably students of University of Twente and a college, located in Enschede **Selected population:** 159 participants (probably students)	**Method of allocation:** *"allocated to one of four experimental conditions according to a random list"* **Measures to minimise confounding:** testing for equal distribution of some of the baseline characteristics **Intervention/s** public service announcements that contained a logo, slogan ("Practice safe sun tanning"), and a concrete sun protection advice, which was supported by different	**Primary Outcomes:** Judgement of public service announcements (attractiveness, credibility, comprehensibility, required amount of cognitive processing) – measured on a 5-point Likert scale (1 "strongly agree" to 5 "strongly disagree") Knowledge – recall of one of four negative consequences of sun exposure (score 0-4) and pieces sun protection advice (score 0-4) Perceived advantages of sun protection measures:	**Primary outcomes:** Judgement of public service announcements (mean (SD)): - attractiveness: A 2.5 (0.5), B 2.6 (0.5), C 2.3 (0.6), D 1.8 (0.5); statistical testing indicated a significant main effect of pictures and textual argument; a significant interaction between both was also observed; - credibility: A 3.1 (0.5), B 2.8 (0.5), C 3.3 (0.6), D 2.8 (0.6); statistical testing indicated a significant main effect of textual argument - comprehensibility: A 3.4 (0.5), B 3.2 (0.6), C 3.7 (0.5), D 3.4	**Limitations identified by author:** The experimental method might have limited external validity; The booklet did not mimic real life exposure to public service announcements; The study population had a higher educational background than the target

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Study design: RCT **Internal validity[§]:** ++ **External validity[†]:** 3	recruited from the University of Twente and a college, both located in Enschede **Age:** mean 21.5 (range 17 to 27) **Female:** 35% **Race/ethnicity:** not reported **Socioeconomic status: (annual income)** Not reported **Excluded population:** not reported **Setting:** university	combinations: A picture + textual arguments, B picture + no textual arguments, C no picture + textual arguments, D no picture + no textual arguments. Each participant received a booklet with twelve different announcements ("*three for each of the four sun protection measures, i.e., staying out of the midday sun, wearing protective clothing, using sun screen, and wearing sun glasses").* The announcements were presented "*in a fixed random order within each condition."* **Intervention category[¥]:** III **Intervention period:** not reported **Comparator/s** interventions were compared with each other **Sample sizes:** **Total n =** 159 **Intervention A n =** 39 **Intervention B n =** 40	- Sunscreen use - Protective clothing - Avoiding fierce sun - Wearing sun glasses measured on a 5-point Likert scale (1 "strongly agree" to 5 "strongly disagree") Perceived disadvantages of sun protection measures: - Sunscreen use - Protective clothing - Avoiding fierce sun - Wearing sun glasses measured on a 5-point Likert scale (1 "strongly agree" to 5 "strongly disagree") Intended sun protection behaviour: - Sunscreen use - Protective clothing - Avoiding fierce sun - Wearing sun glasses measured on a 5-point Likert scale (1 "strongly agree" to 5 "strongly disagree") **Adverse events:** not reported **Secondary outcomes:** not reported	(0.5); statistical testing indicated a significant main effect of pictures and textual argument - reflection about announcements: A 2.6 (0.6), B 2.6 (0.6), C 2.3 (0.7), D 1.9 (0.6); statistical testing indicated a significant main effect of pictures and textual argument; a significant interaction between both was also observed; Knowledge - sun exposure consequences (mean (SD)): A 3.1 (1.0), B: 3.1 (0.9), C 3.2 (0.7), D 1.8 (0.8); statistical testing indicated a significant main effect of pictures and textual argument; a significant interaction between both was also observed; - sun protection advice: A 2.9 (0.9), B 3.1 (0.9), C 3.1 (0.8), D 2.8 (0.9); a significant interaction between the pictures and textual argument was observed; Perceived advantages of sun protection measures (mean (SD)): - Sunscreen use: A 3.8 (0.6), B 4.0 (0.6), C 3.9 (0.6), D 3.7 (0.6); - Protective clothing: A 3.8 (0.6), B 3.9 (0.8), C 4.0 (0.6), D 3.6 (0.6); a significant interaction between the pictures and textual argument was observed;	population of public service announcements Single item measures were used for opinion about the announcements; multiple item scales could provide a better indication of internal consistency; **Limitations identified by review team:** Short-term effects of booklets were measured **Evidence gaps and/or recommendations for future research:** Use of simpler pictures Study in a sample more representative of a target population of public service

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Intervention C n = 40 **Intervention D n =** 40 **Baseline comparisons:** the groups did not significantly differ on age, gender and baseline knowledge **Study sufficiently powered?:** power calculation not reported	**Follow-up periods:** not reported (probably less than a day) **Method of analysis:** not reported if ITT; "*intended to determine both main and interactive effects of textual arguments and pictures in public service announcements…"*	- Avoiding fierce sun: A 3.8 (0.6), B 3.8 (0.7), C 4.0 (0.5), D 3.6 (0.7); statistical testing indicated a significant main effect of textual argument; a significant interaction between the pictures and textual argument was also observed; - Wearing sun glasses: A 3.8 (0.8), B 3.9 (0.9), C 4.0 (0.8), D 3.4 (0.7); a significant interaction between the pictures and textual argument was observed; Perceived disadvantages of sun protection measures (mean (SD)): - Sunscreen use: A 2.7 (0.8), B 2.6 (0.8), C 2.9 (0.9), D 2.8 (0.9) - Protective clothing: A 3.5 (0.8), B 3.2 (0.9), C 3.6 (0.8), D 3.5 (0.9) - Avoiding fierce sun: A 3.2 (0.8), B 3.0 (0.8), C 3.2 (0.8), D 3.2 (0.9) - Wearing sun glasses: A 2.6 (0.8), B 2.2 (0.7), C 2.7 (1.2), D 2.6 (0.9) Intended sun protection behaviour (mean (SD)): - Sunscreen use: A 3.0 (0.8), B 3.4 (0.8), C 3.0 (1.0), D 2.9 (0.9) - Protective clothing: A 2.6 (0.8), B 2.6 (0.9), C 2.7 (1.0), D 2.9 (1.0)	announcements Impact on real life behaviour **Source of funding:** not reported

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				- Avoiding fierce sun: A 2.3 (0.8), B 2.2 (0.8), C 2.3 (0.9), D 2.2 (0.8) - Wearing sun glasses: A 3.2 (1.0), B 3.4 (1.0), C 3.7 (1.2), D 2.9 (1.0); a significant interaction between the pictures and textual argument was observed; **Secondary outcomes:** not reported **Attrition details:** not reported; probably no losses to follow-up	

Table 26 Bolognia

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Bolognia et al[8] **Year:** 1991 **Aim of study:** to assess the effect of	**Source population/s:** Mothers of infants born at Yale-New Haven, Hospital (Connecticut, USA). **Country:** USA	**Method of allocation:** Mothers were assigned to one of three groups: a control group, a low-level intervention group, and a high-level intervention group. The assignment methods were not reported.	**Primary Outcomes:** Differences at follow-up between the low-level intervention group and the control group in: 1. the amount of exposure to direct sunlight for the newborn and	As the high-level intervention group were offered sunscreen samples and sun protective clothing, components which could not be disaggregated, we have only included the results reported for the control group and low-level intervention group. **Primary outcomes:** Parental reports of behavioural practices	**Limitations identified by author:** The data were collected via a survey and based on recall that may be inaccurate. The possibility of social acceptability bias should be considered given the

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
education on the sun exposure of newborns **Study design:** controlled before & after **Internal validity[§]:** - **External validity[†]:** 3	**Study year:** 1989 **Eligible population:** Mothers of infants born at Yale-New Haven, Hospital between March & June 1989 were eligible if their infants were born full term, apparently healthy, and weighed at least 2.27kg. **Selected population:** Verbal permission to participate in the study was obtained. Blacks and Hispanics were limited to 10% of the sample population due to their significantly lower risk of sunburn and skin cancer. The numbers approached/selected were not reported. Mothers were assigned to one of three groups: a control group, a low-level intervention group, and a high-level intervention group. NB: as the high-level intervention group received sunscreen samples and sun protective clothing, the results for this arm of the study do not meet the inclusion criteria for this	**Measures to minimise confounding:** not reported **Intervention/s** <u>Low-level intervention</u> The low-level intervention group received at enrolment a sheet of simple guidelines on minimising sun exposure making the following points: 1. Prevent sunburns in your children. Begin using sunscreens at age 6 months and allow sun exposure with moderation. Before the age of 6 months, use bonnets and sun umbrellas or put your baby in the shade when outdoors for a long time. 2. Teach children sun protection early. Sun damage adds up over the years and the majority of sun exposure occurs by age 20 years. 3. Decrease sun exposure during the hours 11am to 3pm when the sun is strongest. Try to plan outdoor activities for the early morning or the late afternoon. 4. Both children and adults	mother during summer weekdays and weekends; 2. the amount of time spent outdoors in the shade; 3. sunscreen use by the mother; 4. use of physical barriers to the sun for the newborn. Participants were interviewed by telephone by two of the authors from September to December 1989 when a standard questionnaire was used to elicit the aforementioned information. **Adverse events:** none reported **Secondary outcomes:** The mother's recollections at follow-up of advice given to them by their paediatricians with regard to sun exposure for their newborns. **Follow-up periods:** approximately 7 months	in the low-level and control groups at follow-up (approximately 7 months) were as follows: 1. Compared with the control group, the infants and their mothers spent significantly less time in direct sunlight (hours/week): ***Infants:*** Controls: none (0%), ≥ 5 hrs (99%) Low-level: none (75%), ≥ 5 hrs (22%) P<0.001 ***Mothers:*** Controls: none (0%), ≥ 5 hrs (85%) Low-level: none (15%), ≥ 5 hrs (42%) P<0.001 2. In comparison with the control group the low-level intervention group spent less time in direct sunlight, less time in the shade, and significantly less time outdoors altogether (direct sunlight plus shade), p<0.001. 3. The number of mothers who used sunscreen was similar in both groups. But, when the groups were controlled for sunscreen use, the low-level intervention group spent significantly less 'unprotected' time (hours/week) in the sun (p<0.05): Controls: none (0%), ≥ 5 hrs (35%) Low-level: none (8%), ≥ 5 hrs (18%) P<0.001 4. There were no significant differences between the control vs. low-level intervention groups in the use of hats (96% vs. 90%), stroller hoods (49%	method used to obtain parental reports of sun-protective practices (telephone interviews) at follow-up. **Limitations identified by review team:** The non-random allocation of the groups raises the possibility of selection bias. **Evidence gaps and/or recommendations for future research:** Larger, higher quality studies (ideally RCTs) assessing the impact of this type of intervention in the longer term would beneficial. **Source of funding:** The study was supported in part by the Yale New Haven Hospital Auxiliary, awarded by the Biomedical Research Support Grant Programme, the Division of Research Resources, National Institutes of Health, and a grant from the National Cancer

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	systematic review and have not been reported. **Age:** newborn infants **Female infants:** 46% **Race/ethnicity:** 94% white **Socioeconomic status: (annual income)** not reported **Excluded population:** Blacks and Hispanics were limited to 10% of the sample population. **Setting:** hospital	should put on sunscreen before sun exposure, and again at least every 2 hours, as long as you stay in the sun. The sunscreen should be applied again after swimming or perspiring heavily. A sunscreen with an SPF of 15 is recommended. 5. Don't forget to use your sunscreen on cloudy days. The sun's rays can be as strong on cloudy, hazy days as they are on sunny days. 6. If you have a reaction to your sunscreen, change sunscreens. 7. Beware of things that reflect! Sand, snow, concrete, and water can reflect as much as half the sun's rays onto your skin. 8. Avoid tanning parlours. In addition, during August the participants received a postcard with the message: 'Just a reminder from the Yale Newborn Skin study… Keep your baby's skin healthy! A SUNBURN HURTS IN MORE THAN ONE WAY!'	**Method of analysis:** Data were analysed by Chi squared analysis comparing each intervention group separately with the control group. The groups were also stratified by sunscreen use, paternal occupation, and family size.	vs. 42%), umbrellas (5% vs. 8%), and loose fitting clothing (2% vs. 3%). **Secondary outcomes:** The mother's recollections at follow-up of advice given to them by their paediatricians with regard to sun exposure for their newborns were similar in the low-level intervention and control groups (p=0.45). **Attrition details:** Of the 300 mothers invited to participate 275 (92%) were followed up for the entire period.	Institute.

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		<u>High-level intervention</u> In addition to the simple guidelines this group received the pamphlets 'For Every Child Under the Sun', prepared by the Skin Cancer Foundation, and 'The Sun and Your Skin', prepared by the American Academy of Dermatology, sunscreen samples for the mother and other members of the family, a baby hat, and a sun umbrella. They also received the postcard during August. **Intervention category[¥]:** III **Intervention period:** 3-7 months approximately **Comparator/s:** Control group/ standard care. *"Prior to the start of enrolment, attending paediatricians at the hospital were sent a letter informing them of the study and requesting they not change their routine advice on sun exposure."* **Sample sizes:** **Total n= 275** **Low-level intervention=** 96			

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		High-level intervention= 94 **Control=** 85 **Baseline comparisons:** The three groups were similar in terms of hair colour, eye colour, paternal occupation, day-care attendance (22%), family size (for 46% of parents, the child was their first), and parental age. **Study sufficiently powered?:** power calculation not reported			

Table 27 Borland

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Borland et al.[9] **Year:** 1991 **Aim of study:** "*to assess the impact of Telecom's "Cover yourself against skin*	**Source population/s:** not reported **Country:** Australia **Study year:** 1989-1990 **Eligible population:** outdoor staff in Telecom	**Method of allocation:** districts randomly allocated to intervention or control group **Measures to minimise confounding:** assessment of the effect of weather conditions on the results	**Primary Outcomes:** *"Senior line staff under the supervision of occupational health nurses were designated to act as observers using a checklist."* Observations were made between 11 a.m. and 3 p.m. The unit of	**Primary outcomes:** <u>Hat use:</u> The intervention group had a higher hat use before and after the intervention (0.39 vs. 0.28, F=26.3, df=1, p<0.0001); this results did not change after the intervention in any of the groups. <u>Shirt use:</u> Reported that intervention group	**Limitations identified by author:** o Groups were not equivalent at baseline (intervention group had a significantly higher level of sun protection). o Telecom had an ongoing sun

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
cancer" campaign, which used marketing techniques to promote sun protection behaviour" **Study design:** RCT **Internal validity[§]:** + **External validity[†]:** 4	**Selected population:** teams of outdoor staff from six Telecom districts covering the Melbourne metropolitan area and Geelong **Age:** not reported **Female:** not reported **Race/ethnicity:** not reported **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported **Setting:** workplace	**Intervention/s** *"The (…) programme was titled "Cover yourself against skin cancer" and used a well known Australian (Olympic gold medallist Dawn Fraser) as a role model.* *The resources consisted of a set of materials for each depot, and a folder of materials for each worker. The depot materials comprised a set of four posters encouraging key sun protection and early detection activities; a video of a segment called "Goodbye sunshine", about a young man dying of melanoma (courtesy of Channel 9's "60 minutes"); and instructions for distribution of the folders and display of the posters. The depot posters were put up in a predetermined pattern, with different posters or combinations of posters being displayed each week.* *The individual folder contained a brochure introducing the campaign and a supportive letter from management, four lapel buttons urging protective activities (…) and several Anti-Cancer Council of*	observation was a work team (one to four people). The following outcomes were measured: 1. Hat use – mean level for the whole team, taking into account the protective properties of different types of hats (score ranged from 1 – total protection to 0 – no protection) 2. Shirt use - mean level for the whole team, taking into account the protective properties of different types of shirts (score ranged from 1 – total protection to 0 – no protection) *3. "Shade use – a categorical variable with three levels defined across the team as a whole (total shade, partial shade, minimal shade)* *4. Protection overall – includes weighing*	increased shirt cover relative to the controls after the campaign; the interaction between group and time of survey was significant (F=6.0, df=1, =0.02); no further data reported <u>Shade use:</u> *"There was no significant change in use of shade as a function of experimental condition."* <u>Overall index:</u> *"Before the campaign the intervention group had a significantly higher protection index than the control group (t=2.32, df=523, p<0.05) (…); the intervention group significantly increased their superiority in protection after the campaign as compared with the control group."* There was a 6% increase in the intervention group. If a non-significant decrease in the control group is taken into account – the difference would be 11%. **Secondary outcomes:** N/A **Attrition details:** not reported if all the districts were followed-up; follow-up of individual participants is not relevant to this design	protection campaign – this one was just added to it o There was also an ongoing SunSmart community-based campaign o Weather differences between both surveys (average temperatures during the second slightly lower) o Observers were not blinded – possible bias **Limitations identified by review team:** o Results poorly reported o Method of analysis unclear o Participants not followed-up o Clustering effect not reported as taken into account o No demographic characteristics recorded

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Victoria brochures dealing with sun protection and early detection of skin cancer. Staff were encouraged to use protective hats and clothing, to use maximum protection sunscreen and to avoid the sun when possible between 11 a.m. and 3 p.m. The resources were complemented by input from occupational health nurses who were also provided with extra information on skin cancer. *At the start of the campaign, staff were given their individual folder, were told about the video, and the first posters were put up at strategic points at their depot."* **Intervention category[¥]:** II+III **Intervention period:** *"From early December 1989 to early March 1990; about three months."* **Comparator/s:** *"normal occupational health and safety care"*	*for the use of shade. Total shade gives a score of 1.0 regardless. Partial shade adds 0.33 to the protection measure, or takes it to 1.0 whichever the lesser. No shade leaves the index unchanged."* The observers also recorded: time and place of observation, weather conditions, subjective temperature and availability of shade (including both availability and use by team). **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** about three months **Method of analysis:** not reported		**Evidence gaps and/or recommendations for future research:** Studies with a more detailed reporting of outcomes **Source of funding:** a grant from Telecom Australia

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Sample sizes: **Total n =** 6 districts **Intervention n =** 3 districts; 266 teams (baseline); 259 teams (follow-up) **Control n =** 3 districts; 333 teams (baseline); 368 teams (follow-up) **Baseline comparisons:** not reported **Study sufficiently powered?:** no information on power calculation			

Table 28 Bränström

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Bränström et al.[10] **Year:** 2003 **Aim of study:** *"to examine the*	**Source population/s:** Stockholm country population **Country:** Sweden **Study year:** 2001	**Method of allocation:** packages sent by mail after randomisation **Measures to minimise confounding:** some baseline variables were taken into	**Primary Outcomes:** o Included questions (47 items) about o Sun exposure (possible	**Primary outcomes:** Mean sunbathing frequency score (range 3-15) Pre‡‡‡‡‡‡ = 10.65 (A), 10.61 (B), 10.69 (C), 10.70 (D) Post§§§§§§ = 9.84 (A), 9.87 (B), 9.86 (C), 9.96 (D)	**Limitations identified by author:** The study did not investigate the potential effects of widespread media broadcasting of the UV index. Moreover

‡‡‡‡‡‡ Baseline measurement

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
effects of the UV Index and personal ultraviolet radiation (UVR) intensity indicator on tanning behaviour compared with general, written information about sun protection." **Study design:** RCT **Internal validity[§]:** + **External validity[†]:** 2	**Eligible population:** individuals in census registry **Selected population:** 3200 randomly selected individuals were sent a baseline survey and an invitation to participate in the study; those who agreed (1743 persons) were included in the study **Age:** not reported; the initially contacted 3200 individuals were 18-37 **Female:** 57% **Race/ethnicity:** not reported **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported, probably age below 18 and above 37	account when calculating the total mean difference **Intervention/s** A both brochures and UVR intensity indicator B brochure 1 and UVR intensity indicator C both brochures Brochures similar in size, shape and layout: brochure 1 – information about UVR and sun protection (produced by Apoteksbolaget AB, Sweden); brochure 2 – information about UVR and the UV index and recommendations on how to protect oneself from the sun; description of the daily UV forecast and illustrative descriptions of variations in UVR intensity, depending on the latitude and time of the year; (developed for the study) UVR intensity indicator – *"credit card sized, commercially available product (Teraco, Inc., USA) which gives a rough*	score 3-15) o Sunburn (possible score 1-25) o Use of sun protection (possible score 6-20) o Intention to change sunbathing behaviour (possible score 3-18) o Knowledge (possible score 0-9) o Beliefs and perception of risk related to sun exposure (on 1-6 or 1-4 scales) o Use of information packages (possible score not reported) Based on these questions scores relating to different	Total difference[*******] = -0.76 (SE 0.061), p<0.001 Mean sunburn frequency score (range 1-25) Pre = 4.73 (A), 5.04 (B), 4.73 (C), 4.71 (D) Post = 3.32 (A), 3.49 (B), 3.40 (C), 3.47 (D) Total difference = -1.37 (SE 0.11), p<0.001 Mean sun protection frequency score (range 6-24) Pre = 15.58 (A), 15.83 (B), 15.54 (C), 15.59 (D) Post = 15.99 (A), 16.34 (B), 16.21 (C), 16.13 (D) Total difference = 0.56 (SE 0.079), p<0.001 Mean intention to change (range 3-18) Pre = 8.67 (A), 8.69 (B), 8.68 (C), 8.66 (D) Post = 8.84 (A), 9.14 (B), 9.12 (C), 9.02 (D) Total difference = 0.34 (SE 0.070), p<0.001	the response rate suggests a possibility that non-responders were less interested in health issues (results might be difficult to generalise). It is also possible that responders might have given answers that they thought would please the researchers (minimised by using mailed questionnaires). **Limitations identified by review team:** Probably age limitations in inclusion criteria. **Evidence gaps and/or recommendations for future research:** Need to develop information with a higher impact among older adults and men. **Source of funding:** Swedish Cancer Society and Konung

[§§§§§§] Measurement after the intervention

[*******] Average of the difference between pretest and posttest scores in groups

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Setting: place of domicile	*indication of the UVR intensity after a few seconds exposure to sunlight*;" it indicates by colour change if the UVR levels are moderate, high, or extreme; instructions of use are printed on the card **Intervention category¥:** III **Intervention period:** not applicable **Comparator/s:** D. brochure 1 only **Sample sizes:** **Total n =** 1743 Unclear numbers in intervention groups – maximum numbers reported on outcomes: **Intervention A n =** 320 **Intervention B n =** 321 **Intervention C n =** 329 **Control D n =** 317 **Baseline comparisons:** Authors claim there were no significant differences between the study groups at baseline for any of the variables (data not reported)	areas were derived **Adverse events:** not reported **Secondary outcomes:** analysis of non-responders **Follow-up periods:** around 4-7 months (reported May 2001 to autumn 2001) **Method of analysis:** ITT used (data on individual questions reported only for responders to both questionnaires)	Mean knowledge score (range 0-9) Pre = 7.05 (A), 6.95 (B), 6.89 (C), 6.96 (D) Post = 7.53 (A), 7.36 (B), 7.42 (C), 7.35 (D) Total difference = 0.46 (SE 0.039), p<0.001 Mean score for positive attitude towards having a tan (range 4-16) Pre = 11.13 (A), 10.91 (B), 11.14 (C), 11.18 (D) Post = 10.84 (A), 10.57 (B), 10.77 (C), 10.83 (D) Total difference = -0.33 (SE 0.052), p<0.001 Mean score for positive attitude towards being in the sun (range 8-32) Pre = 23.04 (A), 22.87 (B), 23.25 (C), 23.03 (D) Post = 22.72 (A), 22.30 (B), 22.50 (C), 22.49 (D) Total difference = -0.53 (SE 0.091), p<0.001 Mean score for risk perception (range 3-18) Pre = 10.02 (A), 10.19 (B), 10.16 (C), 10.11 (D) Post = 9.96 (A), 10.09 (B), 10.18 (C), 10.06 (D) Total difference = -0.047 (SE 0.046),	Gustaf V:s Jubileumsfond; Apoteksbolaget AB supplied one of the brochures used in the study

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Study sufficiently powered?: no information on power calculation		n.s. Mean score for behavioural control (range 1-6) Pre = 4.42 (A), 4.44 (B), 4.35 (C), 4.43 (D) Post = 4.52 (A), 4.49 (B), 4.45 (C), 4.50 (D) Total difference = -0.075 (SE 0.025), p<0.01 Respondents use of information packages 70% read brochure 1 48% read brochure 2 42% used the UVR intensity indicator 12% used UV index prognosis in the media **Secondary outcomes:** non-responders were less educated (p<0.001), had less knowledge (p<0.001), scored lower on risk perception (p<0.001), were more likely to use sun protection (p<0.001), and reported a lower degree of behavioural control (p<0.001); there were no statistically significant differences in the frequency of sunbathing, sunburn, attitudes toward being in the sun, having a tan or intention to change sunbathing behaviour;	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				Attrition details: Out of 1743 persons included at baseline, 1301 returned the second questionnaire. No information on how many participants were randomised to groups	

Table 29 Buller 1994

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Buller et al.[18] **Year:** 1994 **Aim of study:** *"to determine the feasibility of administering Sunshine and Skin Health, a five-unit curriculum designed to positively influence the sun safety knowledge, attitudes, and behaviours (KAB) of fourth, fifth,*	**Source population/s:** elementary school children **Country:** USA **Study year:** 1992 **Eligible population:** children in grades four, five, and six in Mesa (Arizona) Public Schools **Selected population:** 139 children in grades four, five, and six from a convenience sample of two elementary schools **Age:** not reported **Female:** not reported	**Method of allocation:** schools randomly assigned to intervention or control **Measures to minimise confounding:** not reported **Intervention/s** Sunshine and Skin Health [based on a later publication - an earlier version of Sunny Days Healthy Ways[15]] consists of "*five multidisciplinary units that synthesise material from science, history, social studies, health and geography into a comprehensive cause and-and-consequence presentation about man's relationship with the sun.*	**Primary Outcomes:** An 84-item questionnaire "*designed to quantify measures of:* 1) *student learning of the relationship between exposure to sunlight, preventive behaviour, and skin cancer"* (35 items); 2) *favourable attitudes towards preventive behaviour* (11 items); 3) implementation of favourable behaviour (14 child-behaviour	**Primary outcomes:** (authors report only statistically significant results for data not grouped by grade; p<0.05) <u>Knowledge test</u> (35 items), mean number correct: o Post-test 1: 28.94 intervention, 19.37 control o Post-test 2: 28.86 intervention, 20.32 control o Post-test 2 (by grade): 4th grade: 29.44 intervention; 17.40 control; 5th grade: 27.39 intervention, 23.69 control; 6th grade: 29.60 intervention; 20.33 control <u>Recognition of terms</u> (10 items), mean	**Limitations identified by author:** o Use of self-reported measures o Small sample size o Clustering effect not taken into account **Limitations identified by review team:** o Baseline data not reported o No characteristics of children o Numbers of participants in study arms not reported o Only 2 schools

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
and sixth grade students" **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 3	**Race/ethnicity:** not reported **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported **Setting:** school	*The properties of the sun, the composition of human skin, historical attitudes toward tanning, skin cancer, and sunlight awareness strategies (skin cancer prevention) are covered in an interactive lesson/activity format. Each unit contains lesson material, in-class activities, take-home activities, a glossary of key terms, a quick review, and a student-parent newsletter. Suggestions for spreading the sun-safety message throughout the school are presented. The time needed to present the lesson material and in-class activities for each unit is approximately one hour. The times to complete take-home activities and school projects vary according to the activities."* *"The comprehensive and academically-oriented curriculum was developed through the collaboration of health communication experts, dermatologists, teachers, and curriculum consultants. Sunshine and Skin Health complements existing informal skin cancer prevention information resources available for children throughout Arizona*	and 8 parent-behaviour items); 4) vocabulary recognition (10 items). 7 items concerned demographic characteristics. Completion of the instrument took approximately 20 minutes. **Adverse events:** not reported **Secondary outcomes:** interviews with teachers on the age-appropriateness of the curriculum and ease of implementation **Follow-up periods:** January through May 1992 One week before the intervention – first pre-test At the end of the intervention – first post-test 8 weeks later – second post-test	number correct: o Post-test 1: 9.70 intervention; 7.66 control o Post-test 1 (by grade): 4th grade: 9.64 intervention; 6.80 control; 5th grade: 9.79 intervention, 7.67 control; 6th grade: 9.68 intervention; 8.10 control o Post-test 2: 9.68 intervention; 8.11 control <u>Attitudes</u> (2 items, range 2-4), mean: Tan makes me look and feel better: o Post-test 1: 2.68 intervention, 2.87 control o Post-test 2: 2.66 intervention; 2.88 control Having a tan is in style: o Post-test 1: 3.29 intervention, 3.58 control o Post-test 2: 3.16 intervention; 3.49 control Barriers to sunscreen use: o Post-test 1 (by grade): 4th grade: 2.00 intervention; 2.27 control; 5th grade: 2.52 intervention, 2.00 control; 6th grade: 2.40 intervention; 2.33 control I like the colour of my skin untanned (agreement on single item):	randomised o Relatively short follow-up **Evidence gaps and/or recommendations for future research:** o More objective evaluations o Effects of a repeated curriculum **Source of funding:** Arizona Disease Control Research Commission and the Arizona Cancer Center Core Grant

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		and the United States. These resources of information include local dermatology societies and national organisations such as American Academy of Dermatology, the American Cancer Society, the National Cancer Institute, the Skin Cancer Foundation. Some of these sources have "learning programs" available for children in this age group, but most are targeted to students in kindergarten through third grade." A two-hour training session for teachers in the intervention arm was carried out before implementing the intervention. **Intervention category[¥]:** I **Intervention period:** one unit taught each week over five weeks **Comparator/s:** not reported, probably no intervention **Sample sizes:** **Total n =** 139	**Method of analysis:** Not reported if ITT (probably not – children lost to follow-up not accounted for). Analysis of variance and correlation techniques	o Post-test 1 (by grade): 4th grade: 77% intervention; 67% control; 5th grade: 79% intervention, 13% control; 6th grade: 56% intervention; 66% control o Post-test 2 (by grade): 4th grade: 67% intervention; 86% control; 5th grade: 78% intervention, 54% control; 6th grade: 75% intervention; 41% control <u>Behaviour:</u> Wear sunscreen in winter (single item, range 1-3): o Post-test 1: 1.40 intervention, 1.25 control; o Post-test 2: 1.51 intervention; 1.33 control; Lie out in the sun to get a tan (single item, range 1-3): o Post-test 1: 1.57 intervention, 1.93 control; Use lip balm (two items, range 2-6): o Post-test 2: 3.85 intervention; 3.46 control; Wear protective clothing in summer (single item, range 1-3): o Post-test 1 (by grade): 4th grade: 1.52 intervention; 1.53 control;	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Intervention n = not reported **Control n =** not reported **Baseline comparisons:** *"Comparisons between the two schools at baseline revealed equivalence of nearly all relevant outcome measures (…). Exceptions included that students in the control school recognised more terms (…) and more frequently wore hats (…) than the children in the intervention school, whereas children in the intervention school more frequently wore protective clothing in the winter than children in the control school…"* **Study sufficiently powered?:** no information on power calculation		5th grade: 1.91 intervention, 1.00 control; 6th grade: 1.64 intervention; 1.43 control o Post-test 2: 1.71 intervention; 1.34 control; Wear sandals in summer (single item, range 1-3): o Post-test 2: 1.92 intervention; 2.06 control; Sunscreen use (two items, range 2-6): o Post-test 1 (by grade): 4th grade: 4.36 intervention; 4.00 control; 5th grade: 4.09 intervention, 4.93 control; 6th grade: 4.08 intervention; 4.17 control **Secondary outcomes:** *"Intervention teachers were very satisfied with the curriculum and did not recommend changes to the content. However, several recommendations were offered to strengthen the format of the programme."* These included: o Organising in-class and take-home activities into a workbook o Building a review of previous lessons o Some grades or individual classes might be more prepared for some of the information than others – more individualised approach	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				Attrition details: 160 students completed the pre-test, 124 completed the first post-test and 137 the second post-test; 139 full data sets were analysed;	

Table 30 Buller 1997

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Buller et al.[17] **Year:** 1997 **Aim of study:** *"to implement a school based skin cancer prevention effort – Sun Smart Day – designed to improve fourth-graders' and their parents' knowledge, attitudes, and behaviour related to skin*	**Source population/s:** elementary school children **Country:** USA **Study year:** 1993 **Eligible population:** children from fourth-grade classes in three public elementary schools in Tucson, Arizona **Selected population:** 318 children (including a mixed arm) from fourth-grade classes in three public elementary schools in Tucson, Arizona; three quarters of	**Method of allocation:** schools assigned randomly to one of the interventions or control group **Measures to minimise confounding:** results adjusted for baseline responses **Intervention/s** One of the interventions included a curriculum with distribution of free sunscreen samples and results for this arm will not be reported. The intervention analysed in this report was an interactive sun safety fair. It	**Primary Outcomes:** The Sunshine and Your Skin Questionnaire was used – an age-appropriate questionnaire consisting of "*a 10-item term recognition scale (…) and 35-item true/false knowledge scale(…). The knowledge scale addressed environmental factors (e.g., ultraviolet radiation, latitude, sun intensity, tanning booths), skin (type, layers, moles), and skin cancer (screening, treatment, and prevention strategies).*	**Primary outcomes:** Recognition of terms (range 0-10; not stated if a higher score indicates a more or less favourable result; no units provided): Immediate post-test (adjusted for pre-test responses) Health Fair: 9.02 Control: 8.09 F (for all groups including mixed) = 55.99 ($p<0.05$); authors report that intervention significantly higher recognition of terms than control arm; Follow-up results (adjusted for pre-test responses) Health Fair: 9.32 Control: 8.54 F (for all groups including mixed) = 8.64 ($p<0.05$); authors report that intervention significantly higher recognition of terms	**Limitations identified by author:** o Possible confounding, as only one school assigned to each arm; results may be heavily influenced by specifics of schools. o *"The reliability of the recognition of terms, hat use, and barriers to sunscreen use were lower than in an earlier study. (…) The measurement error in these scales attenuated*

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
cancer prevention and to evaluate its effectiveness as a model for a national implementation programme sponsored by Skin Phototrauma Foundation." **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 3	children enrolled in these schools are "*white or Caucasian and have the skin phenotype at highest risk for skin cancer"* **Age:** not reported, probably 9-10 **Female (for all children, including mixed arm):** 56% in the first, 58% in the second post-test **Race/ethnicity(for all children, including mixed arm):** Asian or Oriental: 4% in both post-tests Black:2% in the first and 1% in the second post-test Hispanic: 4% in the first and 3% in the second post-test Native American: 2% in the first and none in the second post-test White: 75% in the first and 77% in the second post-test Indian (e.g. from India or Pakistan): 3% in both post-tests Other: 10% in the first and 12% in the second post-test	featured "*five activity stations: (1) Sun Safety Pursuit: a life-size board game quiz; (2) "The Sun Cowboy and Pale Face" puppet show and activity book; (3) Block It Out: a physical and chemical sunblocks display; (4) The Truth About Tanning: a presentation of the effects of sun overexposure; (5) Cover-up: a game about sun-safe clothes, sunglasses and hats; (6) Sun Safety Videos; (7) Lighten Up: a presentation of the electromagnetic spectrum and ultraviolet light using prisms, a rainbow projector, and slides; and (8) Skin Check: a dermatologist-taught skin type and skin self-examination."* Although the programme was evaluated only in fourth-graders, "*the school principal required that all grades be invited to the health pair, so some age-appropriate stations were included for younger students (e.g. puppet show, videos)."* Students had to participate in six stations to be eligible for the drawing of three prizes. They were given	*The attitude scale also contained 11 items measuring attitudes towards tanning (…), barriers to sunscreen use (…), and stylishness of tans (…). Thirteen questions measured intentions to reduce sun exposure through sunscreen use (…), lip balm use (…), and hat use (…). Finally, children reported parental preventive behaviour on an eight-item scale, which was summed into a single index (…)."* **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** immediate and 3 months **Method of analysis:** Not reported if ITT A one-way analysis of covariance was used for comparing results	than control arm; Skin cancer knowledge (range 0-35; not stated if a higher score indicates a more or less favourable result; no units provided): Immediate post-test (adjusted for pre-test responses) Health Fair: 26.04 Control: 21.63 F (for all groups including mixed) = 67.65 ($p<0.05$); authors report that intervention significantly higher level of knowledge than control arm; Follow-up results (adjusted for pre-test responses) Health Fair: 26.96 Control: 23.79 F (for all groups including mixed) = 12.93 ($p<0.05$); authors report that intervention significantly higher level of knowledge than control arm; Hat use (range 2-6; not stated if a higher score indicates a more or less favourable result; no units provided): Immediate post-test (adjusted for pre-test responses) Health Fair: 4.19 Control: 4.04 F (for all groups including mixed) = 0.70 ($p>0.05$); Follow-up results (adjusted for pre-test	*observed effects of the interventions."* **Limitations identified by review team:** o Individual student as unit of analysis; no indication of adjustment for clustering effect (only stated that there were very few differences between classes in schools). o Although it was not clearly stated, it appears from the discussion that parent behaviour was reported by children – possibly want to please the investigator o All outcomes were based on self-reported measured **Evidence gaps and/or recommendations for future research:** o Comprehensive school-based programs that teach skin cancer

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Socioeconomic status: (annual income) not reported **Excluded population:** not reported **Setting:** school	"passports" to collect stamps at each visited station. When leaving the fair they turned in their "passports" and received an attendance certificate. *"The fair was held in the school's Learning Resources Centre (LRC) from 9:00 am to 2:00 pm… Most classes spent between 45 and 90 minutes visiting the stations."* **Intervention category[¥]:** I **Intervention period:** around 45-90 minutes **Comparator/s:** not reported, probably do nothing **Sample sizes (without mixed intervention arm):** **Total n =** 209 **Intervention n =** 105 **Control n =** 104 **Baseline comparisons:** not reported **Study sufficiently powered?:** power	between arms. The pre-test responses were used as the covariate. All reported means were adjusted for the covariate.	responses) Health Fair: 4.06 Control: 4.09 F (for all groups including mixed) = 0.10 (p>0.05); <u>Sunscreen use in summer</u> (range 2-6; not stated if a higher score indicates a more or less favourable result; no units provided): Immediate post-test (adjusted for pre-test responses) Health Fair: 4.78 Control: 4.74 F (for all groups including mixed) = 0.04 (p>0.05); Follow-up results (adjusted for pre-test responses) Health Fair: 4.79 Control: 4.70 F (for all groups including mixed) = 0.69 (p>0.05); <u>SPF of last sunscreen used</u> (1=0, 2=1-14, 3=15 or more; no units provided) Immediate post-test (adjusted for pre-test responses) Health Fair: 2.92 Control: 2.89 F (for all groups including mixed) = 0.72 (p>0.05);	prevention skills and supportive structural and policy changes at schools o Including *activities to be completed at home with parents and other family members* **Source of funding:** grants from the Skin Phototrauma Foundation and the National Cancer Institute (CA23074)

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		calculation not reported		Follow-up results (adjusted for pre-test responses) Health Fair: 3.07 Control: 2.86 F (for all groups including mixed) = 1.93 (p>0.05); <u>Extent of sunscreen application</u> (1 = none, 2 = some of body, 3 = all of body; no units provided) Immediate post-test (adjusted for pre-test responses) Health Fair: 2.67 Control: 2.63 F (for all groups including mixed) = 0.15 (p>0.05); Follow-up results (adjusted for pre-test responses) Health Fair: 2.56 Control: 2.64 F (for all groups including mixed) = 0.81 (p>0.05); <u>Lip balm use</u> (range 2-6; not stated if a higher score indicates a more or less favourable result; no units provided): Immediate post-test (adjusted for pre-test responses) Health Fair: 3.98 Control: 3.82 F (for all groups including mixed) = 0.57	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				(p>0.05); Follow-up results (adjusted for pre-test responses) Health Fair: 3.98 Control: 3.76 F (for all groups including mixed) = 1.15 (p>0.05); <u>Parental protection behaviour</u> (range 8-24; not stated if a higher score indicates a more or less favourable result; no units provided): Immediate post-test (adjusted for pre-test responses) Health Fair: 16.36 Control: 15.51 F (for all groups including mixed) = 3.20 (p<0.05); reported as parents doing more in the intervention than in the control group; Follow-up results (adjusted for pre-test responses) Health Fair: 16.72 Control: 16.16 F (for all groups including mixed) = 0.67 (p>0.05); <u>Parents perform skin self-exam on child</u> (0 = never, 1 = once every few years; 2 = once each year; 3 = once each month; no units provided) Immediate post-test (adjusted for pre-test	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				responses) Health Fair: 1.31 Control: 0.92 F (for all groups including mixed) = 2.75 (p<0.05); Follow-up results (adjusted for pre-test responses) Health Fair: 1.46 Control: 1.11 F (for all groups including mixed) = 1.13 (p>0.05); reported as parents examining their children's skin more frequently in the intervention compared to control arm <u>Attitude toward tanning</u> (range 4-8; not stated if a higher score indicates a more or less favourable result; no units provided): Immediate post-test (adjusted for pre-test responses) Health Fair: 5.01 Control: 5.36 F (for all groups including mixed) = 3.20 (p<0.05); reported as less positive towards tanning in the intervention compared to the control group; Follow-up results (adjusted for pre-test responses) Health Fair: 5.11 Control: 5.44 F (for all groups including mixed) = 0.67 (p>0.05);	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				Barriers to sunscreen use (range 3-6; not stated if a higher score indicates a more or less favourable result; no units provided): Immediate post-test (adjusted for pre-test responses) Health Fair: 3.21 Control: 3.28 F (for all groups including mixed) = 0.29 (p>0.05); Follow-up results (adjusted for pre-test responses) Health Fair: 3.10 Control: 3.12 F (for all groups including mixed) = 0.80 (p>0.05); Tan is in style (range 2-4; not stated if a higher score indicates a more or less favourable result; no units provided): Immediate post-test (adjusted for pre-test responses) Health Fair: 3.47 Control: 3.53 F (for all groups including mixed) = 0.26 (p>0.05); Follow-up results (adjusted for pre-test responses) Health Fair: 3.63 Control: 3.55 F (for all groups including mixed) = 0.43 (p>0.05);	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				Secondary outcomes: N/A **Attrition details:** reported for all three groups (including a mixed arm of 109 students) 232 students attended the pre-test, 216 completed the immediate post-test and 159 the 3 months follow-up	

Table 31 Buller 1998

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Buller et al.[12-14] **Year:** 1998 **Aim of study:** to examine "*the potential mediating role of language intensity in the interaction between behavioural intention and logical*	**Source population/s:** "*parents with elementary-school-age children were recruited from a managed-care, clinic-based paediatric practice and seven elementary schools* [selected at random from 23 schools] *in a metropolitan area in southern Arizona, the region with the highest rates of skin cancer in the United States."* **Country:** USA	**Method of allocation:** "*each parent was randomly assigned to one of the cells in the factorial design"* **Measures to minimise confounding:** not reported **Intervention/s** Messages (newsletters and brochures containing information on sun protection) were sent to parents in the spring and summer months. *"Three persuasive prevention*	**Primary Outcomes:** Before the intervention a telephone interview (mean 20.6 minutes) was conducted; post-test interviews took a mean of 23.1 minutes; no mean time was provided for final interviews. In the pre-test survey a 97-item questionnaire was used which asked about sources of skin cancer information, knowledge and attitudes, practice of sun safe behaviours, skin cancer risk factors and demographic	**Primary outcomes:** Hypothesis testing: Hypothesis 1: "*high intense language would produce more compliance with sun protection recommendations than those with less intense language"* – confirmed in solar protection behaviour both for parents and children. Hypothesis 2: "*high-intensity deductive messages would be more effective than inductive ones"* – confirmed by analysis	**Limitations identified by author:** o Use of self-reported measures: susceptible to memory mistakes, social desirability and demand effects; o White parents and those with slightly higher incomes were overrepresented in the sample

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
argument style" **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 4	**Study year:** 1994-1996 **Eligible population:** a random sample of 846 parents chosen from the clinic patients and a random sample of 1129 parents from 42 randomly chosen classes from schools with kindergarten through fifth grades and at least 75% of Caucasian students **Selected population:** 841 consenting parents completed the pre-test **Age:** children 5-11; age not reported for parents **Female:** not reported **Race/ethnicity:** not reported **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported **Setting:** domicile	*messages were created that presented arguments on health outcomes of sun protection, parental values and responsibilities for own health and child's health, and importance of physical appearance of the skin. (…) Four versions of each message were produced by altering language intensity (high vs. low), using adjectives and adverbs and opinionated rejection statements, and by changing logical argument structure (deductive vs. inductive), through the presentation of evidence and conclusions…"* The materials that were used in this study included: o 3 four-page newsletters containing lead articles on a newsworthy sun safety topic *"(effectiveness of sunscreens, dangers of artificial tanning, and state of the ozone layer) with an attention-getting headline, short articles with practical sun protection advice, and a child's page with games, projects, and suggested readings. Lead articles always continued onto the upper left-hand column of the second page; the persuasive messages were placed next to the last part*	information. In the <u>first post-test</u> a 103-item survey was used. It additionally asked about exposure to prevention messages and additional demographic characteristics. The <u>last survey</u> comprised 18 items. <u>Outcomes measured:</u> Behavioural intentions (baseline) were measured by asking parents if they were planning to protect themselves and their children (yes/no/don't know). A single variable was created: intentions for both, for self or child, for none. Knowledge scores were constructed as number of correct answers. Attitudes and self-efficacy expectations – measured on 5-point Likert-type scales apart from marked: o Health Outcome Involvement o Physical Impression Involvement	of parents' plans to protect themselves in the upcoming winter <u>Mean change (from baseline to follow-up) in frequency of parent reported behaviour and other variables</u> (reported for high and low intensity, unless there was a significant interaction between intensity and style (inductive/ deductive)): Parent preventive behaviour – summer: Apply sunscreen: 0.18 low, 0.22 high; p=0.610 Apply sunscreen with SPF 15+: 0.32 low, 0.34 high; p=0.804 Wear protective clothing: 0.05 low, 0.12 high, p=0.377 Wear a hat: 0.20 low; 0.30 high; p=0.291 Limit exposure to midday sun: 0.24 low; 0.40 high; p=0.029 Stay in the shade: 0.18 low; 0.28 high; p=0.135 Parent preventive behaviour – winter: Apply sunscreen: 0.94 low; 1.11 high; p=0.114; o Inductive: 0.99 low; 0.96	**Limitations identified by review team:** o Part of the sample recruited in schools: 88% of parents were aware that child received curriculum, 93% reported child brought home information, 87% read these materials, 79% talked with their children about them; school parents however did not achieve better results than from clinic – probably not a confounder? o Demographic information and baseline equivalence of groups not reported o No information on how many parents randomised to groups o Results not always reported for groups to which participants were randomised

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		of the lead article, in the upper right-hand column on page 2…" o 3 brochures containing one of the persuasive messages; on the inside flap there was a list of recommendations based on advice from the American Academy of Dermatology, the US Public Health Service, and the American Cancer Society. Recommendations were: "*(1) limit time spent in the sun; (2) avoid the sun's rays between 10am and 3pm; (3) apply a sunscreen with an SPF of 15 or greater every day of the year; (4) wear clothing that protects the skin – long sleeves and long pants, a wide brimmed hat, and sunglasses; (5) stay in the shade whenever possible – find shade trees and ramadas or bring an umbrella; (6) avoid artificial tanning from booths, beds or lamps; (7) be careful not to get sunburn; (8) examine your skin regularly; and (9) make sun safety a family habit."* o An initial newsletter with the description of the programme o 3 magnetic "3x5" refrigerator tip cards repeating	o Value Involvement for a tan o Barriers to Self Protection ("similar scale") o Barriers to Child Protection ("similar scale") – with subscales: Barriers to Child Sunscreen Use, Child Complaints, and Difficulty of Protecting Child o Self-efficacy expectations for engaging in more solar protection for themselves o Self-efficacy expectations for engaging in more solar protection for children Sun protection (each assessment) – reported by parents on 5-point scales (*never, rarely, sometimes, often, always*) 1) for themselves: frequency of using sunscreen and sunscreen with SPF 15+, wearing protective clothing or hats, avoiding the sun at midday, staying in the shade 2) for children: additionally application of sunscreen before school Summed scales were generated for parent and child summer and winter protection. Pre-test: current winter and	high; p not reported o Deductive: 0.89 low; 1.26 high; p=0.049 Apply sunscreen with SPF 15+: 1.14 low; 1.35 high; p=0.093 o Inductive: 1.23 low; 1.14 high; p not reported; o Deductive: 1.06 low; 1.55 high; p=0.012 Wear protective clothing: 0.79 low; 0.93 high; p=0.323 o Inductive: 0.89 low; 0.76 high; p not reported o Deductive: 0.69 low; 1.12 high; p=0.038 Wear a hat: 0.78 low; 0.76 high; p=0.864 Limit exposure to midday sun: 0.94 low; 1.09 high; p=0.227 Stay in the shade: 0.89 low; 1.12 high; p=0.051 o Inductive: 0.98 low; 1.01 high; p not reported o Deductive: 0.80 low; 1.22 high; p=0.073 Self-efficacy for self protection: 0.07 low; 0.00 high; p=0.227 o Inductive: 0.15 low; -0.04 high; p not reported o Deductive: 0.00 low; 0.03 high; p=0.062 Self-efficacy for protection of children: -0.04 low; -0.06 high;	o Not ITT o Drop-outs – reasons not reported in sufficient detail and not analysed **Evidence gaps and/or recommendations for future research:** Not reported **Source of funding:** a grant from the National Cancer Institute

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		recommendations on sunscreen, protective clothing and avoiding intensive sunlight. "*Language intensity and logical structure were not altered on these materials.*" *"Newsletters, brochures and tip cards were mailed one at a time to participating parents in rotating order, beginning with the introductory newsletter and followed by a brochure, tip card, another newsletter and so on. Mailings to parents were equally spaced across the intervention period"* (2.5 weeks for 6 month duration and 1.25 for 3 month). Children in the elementary schools were taught the Sunny Days, Healthy Ways curriculum by their teachers in March and April (on this condition schools agreed to participate). Materials for parents were designed to be independent of the curriculum, but contained graphics and characters used in the curriculum. **Intervention category[¥]:** III **Intervention period:** mail sent from March to August; duration of the campaign was also	previous summer, 1 post-test: current summer and plans for winter; 2 post-test current winter. Exposure to messages (1 post-test) – how many different materials were received and read by themselves and other members of family; **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** letters inviting to participate mailed in October through December, January and February – telephone pre-test, mail sent from March to August; September and October – post-test; in February a short post-test was conducted to assess winter sun protection **Method of analysis:** ITT not reported; not used	p=0.774 Perceived susceptibility to cancer for self: -0.01 low; 0.06 high; p=0.316 o Inductive: -0.05 low; 0.20 high; p not reported o Deductive: 0.04 low; -0.08 high; p=0.022 Perceived susceptibility to skin cancer for child: -0.04 low; -0.07 high; p=0.766 o Inductive: -0.09 low; 0.01 high; p not reported o Deductive: 0.01 low; -0.15 high; p=0.088 Barriers to protection of self: 0.03 low; -0.03 high; p=0.311 o Inductive: -0.05 low; 0.00 high; p not reported o Deductive: 0.10 low; -0.07 high; p=0.064 Barriers to protection of child: -0.05 low; -0.03 high; p=0.617 o Inductive: -0.11 low; 0.02 high; p not reported o Deductive: 0.01 low; -0.08 high; p=0.040 SPF of sunscreen used most often: 3.56 low; 2.64 high; p=0.294	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		investigated as a factor: either 6 months (March to August) or 3 months (June to August) – since there was no effect observed, this was not discussed; **Comparator/s:** different content compared **Sample sizes:** **Total n =** 841 included, 768 analysed **Inductive Low n =** 192 **Inductive High n =** 190 **Deductive Low n =** 199 **Deductive High n =** 187 **Baseline comparisons:** not reported **Study sufficiently powered?:** power calculation not reported		<u>Change in frequency of reported child preventive behaviour</u> from pre-test to post-test (only reported for high and low intensity): Preventive behaviour for child – summer: Apply a sunscreen: 0.13 low; 0.09 high; p=0.474 Apply sunscreen with SPF 15+: 0.19 low; 0.27 high; p=0.229 Apply sunscreen before school: 0.38 low; 0.42 high; p=0.627 Wear protective clothing: 0.18 low; 0.22 high; p=0.620 Wear a hat: 0.13 low; 0.13 high; p=0.931 Limit exposure to midday sun: 0.25 low; 0.27 high; p=0.733 Tell child to play in the shade: 0.21 low; 0.31 high; p=0.245 Preventive behaviour for child – winter Apply sunscreen: 1.37 low; 1.60 high; p=0.027 Apply sunscreen with SPF 15+: 1.58 low; 1.88 high; p=0.020 Apply sunscreen before school: 1.09 low; 1.36 high;	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				p=0.003 Wear protective clothing: 1.00 low; 1.25 high; p=0.045 Wear a hat: 0.86 low; 1.02 high; p=0.127 Limit exposure to midday sun: 1.26 low; 1.49 high; p=0.041 Tell child to play in the shade: 1.32 low; 1.54 high; p=0.051 Average time child spent outside: -11.48 low; -7.94 high; p=0.617 <u>Exposure to messages</u> 87% read or looked into at least one newsletter, 42% read all newsletters and 37% reported that at least one family member read at least one. 65% read or looked into at least one brochure, 37% read all brochures and 28% reported that at least one family member read at least one. 91% read at least one tip card, 66% read all 70% reported that at least one family member read at least one. Results for parents stratified by	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				other factors than intervention arm were not extracted. **Secondary outcomes:** N/A **Attrition details:** 804 (96%) parents completed the post-test Analysis performed only on 768 parents who had complete data on all variables of interest.	

Table 32 Buller 2006a (RCT)

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Buller et al.[16] **Year:** 2006 **Aim of study:**	**Source population/s:** elementary schools in Tucson, Arizona **Country:** USA **Study year:** probably 1996	**Method of allocation:** assigned at random to the single instruction (B) or no-instruction (C) **Measures to minimise confounding:** not reported	**Primary Outcomes:** Knowledge score K-1: measured in a 4-item photographic test – four pairs of photographs labelled "A" or "B" were	**Primary outcomes:** Knowledge (K-1): Pre-test: B 3.71, C 3.30; Post-test: B 3.90, C 3.79; Significantly smaller increase in knowledge in B compared to control	**Limitations identified by author:** o Possible that the knowledge test for K-1 was not

††††††† This evidence table only reports the results of the randomised part of the study

‡‡‡‡‡‡‡ Numbers of children in intervention groups appear to be inconsistent with numbers of children completing pretest and posttest in different grades

§§§§§§§ Percentages appear to be inconsistent with the ones reported for single units within grades

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
to evaluate the "Sunny Days, Healthy Ways" program for kindergarten through fifth grade **Study design:** RCT for comparison between B and C; Before after for A††††††† **Internal validity[§]:** - **External validity[†]:** 2/ 3 for K-1	or 1997 (based on a footnote) **Eligible population:** schools which had a minimum of 75% Caucasian students and classes in kindergarten through fifth grades **Selected population:** children who both assented and had parental consent **Age:** not reported **Female:** K-1: not reported 2-3: B 53%, C 49% 4-5: B 54%, C 39% **Race/ethnicity (white):** K-1: not reported 2-3: B 71%, C 71% 4-5: B 72%, C 77% **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported	**Intervention/s** A. repeated instruction for classes which participated in a previous pilot-test of the program (reported in another evidence table). B. single instruction: "*it contained three age-appropriate versions for kindergarten and first grade (K-1), second and third grades (2-3), and fourth and fifth grades (4-5) expanded from a version used previously. Each component contained four units – "Living with Sunshine", "Limiting Time in the Sun", "Wearing Cover-up Clothes" and "Using Sunscreen" – designed to be taught in four 1-hour class periods."* Activities incorporated knowledge and skills from different areas (such as health or reading). "*The grade K-1 component contained 2 storybooks and a limited number of activity sheets that taught curriculum content. Grade K-1 and 2-3 components included animated characters (…). The components for grades 2-3 and 4-5 contained multiple activity sheets with activities, games and puzzles; the 4-5 component included cards with UVR sensitive ink and activities using computers."*	presented to children. They were later asked to indicate which photograph demonstrated appropriate sun safety behaviours. For children in groups B and C 11 simple questions with dichotomous answers were added. 2-3: 30-item questionnaire with 3 options ("yes", "no", "don't know") 4-5: 35-item questionnaire with 3 options ("yes", "no", "don't know") *"A few item comprising the knowledge scales in grades 2-3 and grades 4-5 differed between the repeated-instruction and the single-instruction and no-instruction groups, due to minor revisions in content in the grade specific components from the pilot test to the field trial. Therefore, grade group- and year-specific means and standard deviations were calculated and used to transform the percent correct into z-*	(p=0.047); difference between post-test values not significant; Knowledge (2-3): Pre-test: B – 0.09, C 0.11; Post-test: B 1.17, C 0.40; Knowledge (4-5): Pre-test: B -0.04, C 0.03; Post-test: B 1.31, C 0.25; Increase in knowledge significantly higher in B compared to control for grades 2-5 (p = 0.0001); there was no significant interaction with grade (p = 0.497) Attitude (2-3): Pre-test: B 0.06, C –0.25 Post-test: B 0.18, C -0.13 Attitude (4-5): Pretest: B 0.13, C -0.08 Posttest: B 0.25, C -0.14 No significant effect in grades 2-5 (p=0.363); no significant interaction with grade (p=0.339) Child solar protection (2-3): Pre-test: B 2.09, C 1.99 Post-test: B 2.08, C 1.96 Child solar protection (4-5): Pretest: B 2.00, C 1.95 Posttest: B 2.01, C 1.89 The difference for grades 2-5 was not statistically significant (p=0.129); there was no significant interaction with	sensitive enough or there was a ceiling effect o Follow-up might have been too short to detect changes in attitudes o Non-equivalence of some measures at baseline o Several measures were self-reported o Colorimeter measures are subject to reliability errors o Possibility of seasonality effect (pretesting in winter and post testing in spring – higher sun intensity and temperatures) **Limitations identified by review team:**

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Setting: school	*"A 1.5-hour training session for teachers was conducted by the researchers."* It included an overview of the project, research procedures and of the curriculum along with a demonstration of classroom activities. **Intervention category[¥]:** I **Intervention period:** 6 weeks **Comparator/s:** C. no instruction Teachers in this group were trained on consenting and testing procedures. **Sample sizes[‡‡‡‡‡‡]:** **Total n =** 642 **Intervention A n =** 208 **Intervention B n =** 227 **Control C n =** 207 **Baseline comparisons:** "*No significant demographic differences among students in the three experimental conditions in grades 2-3 and 4-5 were found."* **Study sufficiently powered?:** power calculation not reported	*scores."* Attitude score (higher score indicating more favourable attitude towards sun protection) 2-3: 7-item questionnaire with 3 options ("yes", "no", "maybe") 4-5: 10-item questionnaire with 3 options ("yes", "no", "maybe") Self-reported solar protection: 13 questions; 3 options ("always", "sometimes", "never"); with higher score indicating safer behaviour – measured only in children from second grade above Protection behaviours by parents: 8 questions; 3 options ("always", "sometimes", "never"); with higher score indicating safer behaviour – measured only in children from second grade above	grade (p=0.529) Parent solar protection (2-3) Pre-test: B 2.04, C 1.91 Post-test: B 1.92, C 1.85 Parent solar protection (4-5) Pretest: B 1.98, C 1.80 Posttest: B 1.97, C 1.82 There was no statistically significant improvement in parent solar protection compared with control group (p=0.308) **Secondary outcomes:** Chroma Meter scores L (K-1) Pre-test: B -5.76, C -5.48 Post-test: B -7.66, C -7.16 No significant difference in change in skin tone (p=0.659) Chroma Meter scores L (2-3) Pre-test: B -6.85, C -6.61 Post-test: B -8.89, C -8.56 Chroma Meter scores L (4-5) Pre-test: B -7.68, C -7.95 Post-test: B -9.86, C -9.89 No significant difference in change in skin tone in grades 2-5 (p=0.541) Chroma Meter scores b (K-1) Pretest: B 4.26, C 4.30	o Possible contamination – not reported if intervention and control classes were from different schools; o Grades 2-5 analysed together although results were measured with slightly different questionnaires and interventions differed; o No demographic data provided for K-1 **Evidence gaps and/or recommendations for future research:** Study with a longer follow up **Source of funding:** supported by a

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
			Adverse events: not reported **Secondary outcomes:** children's skin tone measured with a colorimeter (outside lower arm vs. inside upper arm) on 3 scales: Light-dark (L): lower scores indicating more skin darkening and exposure to UVR Blue-yellow (b): higher scores indicating more skin darkening and exposure to UVR Red (a): higher scores indicating more skin redness and exposure to UVR **Follow-up periods:** February to April or May **Method of analysis:** Not reported if ITT Mixed effects analysis of variance (ANOVA) was used. Results for K-1 were analysed separately due to extreme differences in	Posttest: B 5.26, C 5.18 No significant difference in change in skin tone (p=0.721) Chroma Meter scores b (2-3) Pre-test: B 5.18, C 4.66 Post-test: B 5.71, C 5.58 Chroma Meter scores b (4-5) Pre-test: B 5.48, C 5.52 Post-test: B 6.17, C 6.43 No significant difference in change in skin tone in grades 2-5 (p=0.0697) Chroma Meter scores a (K-1) Pre-test: B 2.77, C 2.56 Post-test: B 3.72, C 3.48 No significant difference in change in skin tone (p=0.908) Chroma Meter scores a (2-3) Pre-test: B 3.22, C 3.14 Post-test: B 3.89, C 3.85 Chroma Meter scores a (4-5) Pre-test: B 3.56, C 3.75 Post-test: B 4.27, C 4.67 No significant difference in change in skin tone in grades 2-5 (p=0.490) % of teachers reporting implementation of all activities in all units[§§§§§§§]: Kindergarten: 50%	grant from the National Cancer Institute

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
			testing procedures.	First grade: 93% Second grade:73% Third grade: 100% Fourth grade: 68% Fifth grade: 66% **Attrition details:** Not provided for intervention groups; only lost to follow up by grade: K-1: 7 (baseline 299) 2-3: 16 (baseline 226) 4-5: 7 (baseline 268)	

Table 33 Buller 2006a (CBA)

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Buller et al [16] **Year:** 2006a **Aim of study:** to evaluate the 'Sunny Days, Healthy Ways'	**Source population/s:** elementary schools in Tucson, Arizona **Country:** USA **Study year:** unclear	**Method of allocation:** Six schools that had been enrolled in an earlier pilot-test of the 'Sunny Days Healthy Ways' (SDHW) programme were re-enrolled to form the repeated-instruction condition (group A). **Measures to minimise**	**Primary Outcomes:** The effect of the repeated instruction was tested by comparing the change in outcome from pre-test (year 1) to post-test (year 2) between group A (those receiving the curriculum in 2 successive years) and	**Primary outcomes:** ***Knowledge*** ***Grades K-1*** Sun-safety knowledge was not improved when compared with one exposure (group B), p=0.369 or when scores following the first and second exposure were compared within group A students, p=0.333. ***Grades 2-5*** Sun-safety knowledge in group A was	**Limitations identified by author:** The diary measure covered only the part of the day spent in school. Composite measures included behaviours which can be partial substitutes (such as using sunscreen and staying in the shade).

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
programme for kindergarten through to 5th grade students NB: using an RCT design the study compared a single instruction (group B) with no-instruction (group C); using a controlled before & after design the study compared the impact of the provision of repeated instruction (group A) with single instruction (group B). **Study design:** Controlled before & after for group A: the results are reported in	**Eligible population:** schools had a minimum of 75% Caucasian students and classes for kindergarten through to 5th grade **Selected population:** Data were provided by children who both assented and had parental consent. Children in grades 1, 3 and 5 received the repeated instruction 12 months after the initial instruction when in grades K, 2 and 4. **Age:** not reported **Female:** K-1: not reported 2-3: 58% 4-5: 42% **Race/ethnicity (white):** K-1: not reported 2-3: 75% 4-5: 71% **Socioeconomic status: (annual income)** not reported	**confounding:** not reported **Intervention/s** The initial single instruction *"contained three age-appropriate versions for kindergarten and first grade (K-1), second and third grades (2-3), and fourth and fifth grades (4-5) expanded from a version used previously. Each component contained four units – "Living with Sunshine", "Limiting Time in the Sun", "Wearing Cover-up Clothes" and "Using Sunscreen" – designed to be taught in four 1-hour class periods."* Activities incorporated knowledge and skills from different areas (such as health or reading). *"The grade K-1 component contained 2 storybooks and a limited number of activity sheets that taught curriculum content. Grade K-1 and 2-3 components included animated characters (…). The components for grades 2-3 and 4-5 contained multiple activity sheets with activities, games and puzzles; the 4-5 component included cards with UVR sensitive ink and*	pre-test/post-test change (year 2) for group B (those receiving the curriculum in the second year only). Also examined was the change in outcomes for those in group A from pre-test (year 1) to post-test (year 2) compared with their change over year 1 (from year 1 pre-test to year 1 post-test). <u>Knowledge score</u>: For K-1st grade students: knowledge was measured in a 4-item photographic test – four pairs of photographs labelled "A" or "B" were presented to children and they were later asked to indicate which photograph demonstrated appropriate sun safety behaviours. For 2nd-3rd grade students: knowledge was measured using a 30-item questionnaire with 3 options ("yes", "no", "don't know"). For 4th-5th grade students: knowledge	significantly improved when compared with one exposure (group B), p=0.0005, and when the scores following the first and second exposures within group A were compared, p=0.0381 **Secondary outcomes:** ***Changes in skin tone*** ***Grades K-1*** There was no significant change in skin tone amongst the children receiving repeated instruction in comparison with group B, p=0.593. Comparisons of changes across the years within group A were also not significant, p>0.05. ***Grades 2-5*** Children in group A displayed lighter skin tones, indicating lower exposure to UVR, than children in group B. On the 'L' scale children in group A had smaller changes when compared with those in group B, p=0.0001. The reduced exposure amongst children in group A was also confirmed on the 'b' scale. Children in the group A showed smaller increases in skin darkening in comparison with those in group B, p=0.052. Children in group A demonstrated a lower increase in redness on the 'a' scale than those in group B, p=0.0243, indicating less erythema. ***Attitudes*** ***Grades 2-5*** There were no significant differences in	Active parental consent may have created selection bias. The study was conducted in three states with relatively high UV radiation levels. Measures were self reported. **Limitations identified by review team:** Nothing to add. **Evidence gaps and/or recommendations for future research:** A larger higher quality trial (preferably in the form of an RCT) assessing the impact of enhanced education provision in the longer term would be beneficial. **Source of funding:** The project was supported by a grant from the National Cancer Institute.

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
this evidence table; RCT for comparison between group B & group C: the results are reported in a separate evidence table. **Internal validity[§]:** - **External validity[†]:** 3	**Excluded population:** not reported **Setting:** school	*activities using computers."* For children in grades 1, 3 and 5, *"three 2-hour age-appropriate 'booster units' were developed so that these students received novel instructional materials in a second year. These consisted of interactive activities that included reviewing the main sun safety concepts and applying and reinforcing them in individual and small and large group activities."* **Intervention category[¥]:** I **Intervention period:** Approximately 1 year (booster sessions were provided over a 6-week period in late February (year not stated) to students who had received the SDHW curriculum during the spring semester of the previous school year). **Comparator/s:** Single instruction (group B), and no instruction (group C). **Sample sizes:** **Total n =** 642 **Intervention A n =** 208	was measured using a 35-item questionnaire with 3 options ("yes", "no", "don't know"). *"A few items comprising the knowledge scales in grades 2-3 and grades 4-5 differed between the repeated-instruction and the single-instruction and no-instruction groups, due to minor revisions in content in the grade specific components from the pilot test to the field trial. Therefore, grade group- and year-specific means and standard deviations were calculated and used to transform the percent correct into z-scores."* <u>Attitude score</u>: A higher attitude score indicated a more favourable attitude towards sun protection. For grades 2-3: 7-item questionnaire with 3 options ("yes", "no", "maybe"). For grades 4-5: 10-item questionnaire with 3 options ("yes", "no", "maybe").	attitudes towards sun-protection amongst children in group A compared with group B, p=0.152. However group A expressed more favourable attitudes than the no-instruction group (group C), p=0.05. **Attrition details:** not reported	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Intervention B n = 227 **Control C n =** 207 **Baseline comparisons:** *"No significant demographic differences among students in the three experimental conditions in grades 2-3 and 4-5 were found."* **Study sufficiently powered?:** power calculation not reported	<u>Behaviour score</u>: Self-reported solar protection: 13 questions; 3 options ("always", "sometimes", "never"); with higher scores indicating safer behaviour. Protection behaviours by parents: 8 questions; 3 options ("always", "sometimes", "never"); with higher scores indicating safer behaviour. **Adverse events:** not reported **Secondary outcomes:** Children's skin tone was measured with a colorimeter (outside lower arm vs. inside upper arm) on 3 scales: Light-dark (L): lower scores indicating more skin darkening and exposure to UVR; Blue-yellow (b): higher scores indicating more skin darkening and exposure to UVR; Red (a): higher scores		

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
			indicating more skin redness and exposure to UVR. **Follow-up periods:** approximately 15 months **Method of analysis:** Changes in knowledge attitudes and behaviour from pre-test to post-test were analysed using mixed effects analysis of variance (ANOVA). Results for grades K-1 were analysed separately due to extreme differences in testing procedures.		

Table 34 Buller 2006b

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Buller et al.[15] **Year:** 2006a **Aim of study:** "*to create a sun-safety curriculum for grades 6 to 8, and to test whether exposure to the curriculum would increase children's sun protection behaviour"* **Study design:** RCT **Internal validity[§]:** + **External validity[†]:** 2	**Source population/s:** students in grades 6 through 8 from middle schools in Colorado, New Mexico, and Arizona **Country:** USA **Study year:** 2001-2003 **Eligible population:** students in schools that were approached through districts and consent was obtained from districts and principals (30 schools, 41 teachers, 145 classes) **Selected population:** 2038 students whose parents consented to testing (consent rate = 55.5%) **Age (mean[********]):** 12.9 in both groups	**Method of allocation:** stratified, pair-matched, group-randomization with school as unit of randomization **Measures to minimise confounding:** not reported **Intervention/s:** "*The Sunny Days, Healthy Ways Curriculum had six 50-minute lessons intended to increase perceived personal risk for skin damage and cancer, positive outcome expectations about sun protection to reduce personal risk, and self-efficacy expectations for performing sun protection in a variety of situations."* It taught the following skills: *"selecting and applying sunscreen, selecting sun protective clothing, hats and sunglasses, using shade, and minimizing time in the sun. It contained activities to help children set goals for sun protection, monitor progress towards them, and overcome barriers to sun protection. Each unit was designed to be presented on its own or in 15- or 30-minute segments over several classes."* Before delivering the	**Primary Outcomes:** Diary measure: "*time outside, mostly in sun/shade, wearing a head covering, wearing clothing that covered legs, and wearing sunscreen – children completed these reports for times they were outdoors, while at school yesterday during lunch, physical education class, and recess. A weighted body coverage measure was created for each time outdoors, ranging from 0 to 15."* *"A series of five-point frequency items assessed how often children applied sunscreen with sun protection factor (SPF) of ≥15, wore clothes covering most of the body, wore a hat, limited time in the sun during midday, stayed in the shade, and wore sunglasses. A mean rating was calculated across the*	**Primary outcomes:** Diary reports[††††††††] – total body coverage score (mean, SE) during Lunch: Intervention: 8.91, 0.185 Control: 8.75, 0.182 Estimate[‡‡‡‡‡‡‡‡]: -0.15, 0.260, p=0.5687 Effect size: 0.08 Physical education class: Intervention: 9.34, 0.996 Control: 7.10, 1.256 Estimate: -2.23, 1.450, p=0.2430 Effect size: 0.85 Recess Intervention: 8.86, 0.197 Control: 8.90, 0.240 Estimate: 0.036, 0.331, p=0.9275 Effect size: 0.02 Frequency rating on sun protection when outside for >15 minutes in the past	**Limitations identified by author**: o The diary measure covered only the part of the day spent in school o Composite measures included behaviours which can be partial substitutes (such as using sunscreen and staying in the shade) o Active parental consent might have created selection bias o Study conducted in three states with relatively high UV radiation o Self reported measures **Limitations identified by review team:** Not identified

[********] Calculated based on the percentage age data provided in the study

[††††††††] For diary reports a relatively large amount of non-composite data was also reported; it was however not included in this table

[‡‡‡‡‡‡‡‡] Control - intervention

[§§§§§§§§] Probably (odds in control group)/(odds in intervention group)

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Female: Intervention: 58.2% Control: 56.1% All post-tested: 56.8% Sample used in analysis: 57.2% **Race/ethnicity:** White Intervention: 78.6% Control: 77.2% All post-tested: 78% Sample used in analysis: 78% Hispanic Intervention: 24.2% Control: 25.7% All post-tested: 25.4% Sample used in analysis: 24.8% Black/ African American: Intervention: 6.5% Control: 6.3% All post-tested: 6.3% Sample used in	intervention teachers attended 2-hour training sessions. **Intervention category[¥]:** I **Intervention period:** 6 weeks **Comparator/s** probably do nothing **Sample sizes:** **Total n =** 2038 (30 schools) – 1788 analysed **Intervention n =** not reported **Control n =** not reported **Baseline comparisons:** *"randomization appeared to allocate children evenly; experimental conditions only differed on age, with slightly more students being age 13 in the control group than the intervention group"* **Study sufficiently powered?:** sample size was designated to adjust for the effect of clustering	*items."* **Adverse events:** not reported **Secondary outcomes:** Frequency of lying out in the sun to get a tan and using a self-tanning cream, being sunburned during the past month and in the last summer, the SPF of sunscreen used, and the perceived importance of having a tan (1 = not important, 4 = very important); Sun-safety knowledge assessed with 10 true-false questions Attitudes towards sun exposure and sun protection – assessed with 17 questions (5-point Likert scale) Self-efficacy expectations – assessed with four 3—point items (1 = not sure, 3 = sure)	month - composite outcome (mean, SE): Intervention: 3.43, 0.020 Control: 3.56, 0.021 Estimate: 0.13, 0.029, p=0.0035 Effect size: 0.24 **Secondary outcomes:** Sun exposure in the past month Lay out in the sun to get a tan: Intervention: 1.75, 0.047 Control: 1.88, 0.049 Estimate: 0.13, 0.066, p=0.0974 Effect size: 0.14 Use a self tanning cream Intervention: 1.31, 0.038 Control: 1.32, 0.040 Estimate: 0.01, 0.054, p=0.9129 Effect size: 0.01 Get sunburned Intervention: 0.42, 0.045 Control: 0.48, 0.047 Estimate: 0.06, 0.065, p=0.4222	**Evidence gaps and/or recommendations for future research:** The effectiveness of such programmes in older children and other types of schools The effectiveness of other (additional) community-wide efforts The long-term effectiveness of such a programme If an intervention repeated over time would improve results Replicating the results of the trial elsewhere **Source of funding:** the project was supported by the National Cancer Institute **Comments:** The pair of schools excluded from the analysis apparently included 19 children. No reason for exclusion provided.

********* Results for individual items reported in the original paper

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	analysis: 6.5% American Indian/ Alaska Native: Intervention: 6.8% Control: 8.4% All post-tested: 7.7% Sample used in analysis: 6.5% Native Hawaiian/ Other Pacific Islander: Intervention: 3.1% Control: 2.8% All post-tested: 2.9% Sample used in analysis: 2.9% **Socioeconomic status: (annual income)** Not reported – one of the factors taken into account in matching schools **Excluded population:** not reported **Setting:** school		Barriers to use sunscreen, barriers to sun-protection, negative normative perceptions of sun-safety **Follow-up periods:** students first tested in February and March and than in May at the end of the school year **Method of analysis:** adjusted for clustering, ITT analysis performed on primary outcome measures with missing follow-up values replaced by baseline data; for dichotomous measures in an additional analysis was conducted where missing values were replaced with ones indicating a non-sun-protective behaviour	Effect size: 0.06 SPF of sunscreen used in past month: Intervention: 27.28, 0.82 Control: 28.76, 0.84 Estimate: 1.48, 1.11, p=0.2035 Effect size: 0.15 Sunburned in the past month adjusted OR§§§§§§§§ = 1.23 (95% CI 0.87, 1.74) Use sunscreen adjusted OR[5] = 2.16 (95% CI 1.54, 3.01) Knowledge as number of correct answers out of 10 items (mean, SE): Intervention: 8.07, 0.14 Control: 6.65, 0.14 Estimate: -1.42, 0.18, p<0.0001 Effect size: 0.84 Composite barriers to sunscreen use (mean, SE)********* Intervention: 2.36, 0.034 Control: 2.51, 0.035 Estimate: 0.15, 0.047,	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				p<0.0046 Effect size: 0.24 Composite barriers to other sun protection (mean, SE): Intervention: 3.34, 0.026 Control: 3.42, 0.028 Estimate: 0.08, 0.038, p=0.0662 Effect size: 0.14 Composite barriers – social norms (mean, SE) Intervention: 2.40, 0.029 Control: 2.44, 0.030 Estimate: 0.04, 0.042, p=0.4331 Effect size: 0.05 Composite self-efficacy (mean, SE): Intervention: 2.10, 0.028 Control: 2.02, 0.029 Estimate: -0.08, 0.038, p=0.0577 Effect size: 0.18 **Attrition details:** 2038 students completed the baseline survey, 1788 (87.8%) completed the post-test; one pair of schools was	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				eliminated from the analysis leaving 1769 students (86.8%); 42% of dropouts were from 2 schools – *"one in the intervention group composed entirely of 8th graders and one in the control group with a large Hispanic population."* This apparently contributed to the drop-out pattern with a large number in the intervention group being 6th and 8th graders and Hispanic in the control group.	

Table 35 Castle

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Castle et al.[22] **Year:** 1999 **Aim of study:** to provide a cross-sectional analysis of adolescents' sun tanning	**Source population/s:** *"students from a College of Further Education on south coast of England"* **Country:** UK **Study year:** 1996 **Eligible population:** *"112 students from a College of Further Education on south coast of England taking one*	**Method of allocation:** within each type of course equal numbers of classrooms randomised to intervention or control **Measures to minimise confounding:** not reported **Intervention/s** Health Education Authority leaflet "If you worship the sun, don't	**Primary Outcomes:** Demographic characteristics Self reported behaviour (sun tanning, sunburns, protective measures) Stage of change (pre-contemplative, contemplative,	**Primary outcomes:** Results measured as a cross-section of the sample were not reported. Stage of change (numbers): Action: Baseline: 49 experimental, 26 control; Follow-up: 41 experimental, 26 control;	**Limitations identified by author:** o Small number of participants o Men excluded from the analysis o Based on self-reported measures o Lower number of participants in the control arm

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
behaviours and evaluate the effectiveness of the Health Education Authority leaflet "If you worship the sun, don't sacrifice your skin" **Study design:** RCT **Internal validity[§]:** + **External validity[†]:** 2	*of two types of courses (A level or GNVQ) requiring similar entrance qualifications, were invited to participate in a study of sunbathing (none refused)."* **Selected population:** 97 women (due to relatively small number of men) **Age:** mean 17.5 (SD 2.1); range 16-19 **Female:** 100% **Race/ethnicity:** not reported **Socioeconomic status: (annual income)** not reported **Excluded population:** men **Setting:** College	sacrifice your skin" containing *"information on identifying your skin type and appropriate sun screen factor number, tips on sensible sun exposure, the information on melanoma."* **Intervention category[¥]:** III **Intervention period:** not applicable **Comparator/s:** not reported, probably do nothing **Sample sizes:** **Total n =** 97 (88 after excluding participants who have not read the leaflet) **Intervention n =** 66 (57 after excluding participants who have not read the leaflet) **Control n =** 33 **Baseline comparisons:** in the experimental group there significantly more smokers and *"women with sensitive skin that burns easily but tans eventually;"* the experimental group also had a higher knowledge score at baseline **Study sufficiently powered?:** *"with group*	preparation for action, action, maintenance); for the purpose of this study they were classified as either action (action or maintenance) or non-action (remaining stages) Health belief model constructs: Benefits of sun tanning for: mood, attractiveness, healthiness, sociability; Costs of sun protection Perceived susceptibility to skin cancer Severity ("*rating the statement "I could die from skin cancer""*) Individual differences – *"Big Five personality dimensions (Extroversion, Agreeableness, Emotional Stability, Conscientiousness, and Intellect)"* Knowledge about skin	Non-action: Baseline: 8 experimental, 5 control; Follow-up: 16 experimental, 5 control; p=0.003 Health belief model constructs: Benefits: baseline: 9.47 (3.21), experimental, 10.13 (3.71) control; follow-up: 9.77 (3.48) experimental, 9.71 (3.96) control; p = 0.241; Costs of sun protection: baseline: 10.33 (2.52), experimental, 10.68 (2.88) control; follow-up: 10.51 (2.35) experimental, 9.90 (2.45) control; p = 0.278; Benefits vs. costs: baseline: -1.04 (2.78), experimental, -0.06 (3.59) control; follow-up: -0.56 (3.44) experimental, -0.19 (3.78) control; p = 0.874; Perceived susceptibility to skin cancer: baseline: 8.56 (3.14), experimental, 9.68 (1.83) control; follow-up: 10.51 (2.35) experimental, 9.16 (2.72) control; p = 0.244; Severity: baseline: 2.09 (1.63), experimental, 2.06 (0.89) control; follow-up: 1.75 (0.87) experimental, 2.16 (0.90) control; p = 0.492; Severity x Susceptibility baseline: 20.25 (21.76), experimental, 19.39 (10.41) control; follow-up: -16.68 (16.20) experimental, 20.65 (13.12) control; p = 0.343	o Short follow-up **Limitations identified by review team:** Population of students – results might not be generaliseable to a wider population **Evidence gaps and/or recommendations for future research:** *"A longitudinal study with more objective data to supplement self-reports."* **Source of funding:** not reported

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		sample sizes of 31 and 57, power was approximately 0.80 to detect a medium effect size with the alpha level at 0.05"	cancer – 19 questions (yes/no, multiple choice and open-ended); possible scores 0-30 **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** 1 week **Method of analysis:** not reported; probably not ITT – participants who did not read the leaflet excluded from analysis	Knowledge about skin cancer: baseline: 14.23 (3.81), experimental, 11.87 (3.50) control; follow-up: 16.09 (4.91) experimental, 12.03 (3.76) control; p = 0.001 **Secondary outcomes:** not reported **Attrition details:** 9 participants in the experimental group admitted that they did not read the leaflet and were excluded from the analysis	

Table 36 Cho

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Cho et al.[23]	**Source population/s:** students of a large	**Method of allocation:** *"participants were randomly*	**Primary Outcomes:** The following outcomes were measured	**Primary outcomes:** Threat	**Limitations identified by author:**

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Year: 2006 **Aim of study:** "*to investigate the effects of fear appeals promoting skin cancer preventive behaviour among college students"* in different stages of change **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 3	Midwestern University **Country:** USA **Study year:** not reported **Eligible population:** *"undergraduate students of a large Midwestern University recruited from introductory communication courses for extra credit and a drawing for gift certificates"* **Selected population:** 274 students **Age:** mean 20, SD 2.1; range 18 to 37 **Female:** 60.6% **Race/ethnicity:** 83.9% white **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported **Setting:** university	*assigned to either high- or low-threat message conditions"* **Measures to minimise confounding:** analysis "*controlling for significant message confounds"* was undertaken (perceived message accuracy, clarity and quality) **Intervention/s** Participants were asked to read carefully: High threat (HT) message: *"highlighted the facts that are pertinent to college students' risk of skin cancer, emphasizing that college students are vulnerable to skin cancer unless they engage in preventive behaviour and that the consequence of skin cancer is severe. The fictionalised case described how a student at the university where the study was done suffered from and died of skin cancer."* It also included *"graphic colour photos of skin cancer patients."* Low threat (LT) message: *"presented general facts*	on Witte, Cameron, McKeon, and Berkowitz's scale: Threat – *"susceptibility to and severity of threat"* of skin cancer Efficacy Attitude towards recommended behaviour (favourable - unfavourable); Intentions to engage in recommended behaviour; Behaviour – self reported sunscreen use; measured at a 4-week follow up; Defensive avoidance – items such as avoiding the thought of skin cancer while sunbathing; Message derogation – measured if participants considered the message to be exaggerated; Perceived manipulation – if participants thought the message was manipulative, misleading, etc. Rippetoe and Roger's scale was used to measure: Fatalism – having no influence on course of events related to skin cancer; Hopelessness – the extent to which thought of cancer made participants feel staying healthy to be useless; Wishful thinking – level of agreement with the following statement: *"When faced with the prospect of developing skin cancer, it helps me to dream of a world where there are no diseases such as cancer";* In most cases a 7-point Likert-type scale (1 strongly disagree to 7 strongly agree)	Susceptibility (mean) 5.00 (HT), 3.59 (LT); p<0.001; Severity 5.86 (HT), 3.78 (LT); p<0.001; Attitude (mean) 4.23 (P), 4.74 (C/PP), 4.83 (A/M); p=0.002 Intentions (mean): 4.17 (HT), 3.71 (LT); p=0.003 3.05 (P), 4.06 (C/PP), 4.72 (A/M); p<0.001; Behaviour (mean) 3.64 (HT), 2.84 (LT); p<0.001 2.35 (P), 2.83 (C/PP), 4.54 (A/M); p<0.001 Defensive avoidance 4.52 (P), 4.24 (C/PP), 3.74 (A/M); p=0.011; Message derogation – "*no significant (…) effects were found"* Perceived manipulation 2.95 (P), 3.05 (C/PP);	o Single forced exposure to a message (may differ from real-life exposure) o Laboratory setting o Population of students – relatively high socio-economic status and education level compared to an average person that age o Confounding factors (controlled in the analysis) **Limitations identified by review team:** o Relatively short follow-up o Outcomes not measured at baseline **Evidence gaps and/or recommendations for future research:** Further investigation of factors motivating participants in the P stage *"Tailoring messages in accordance with the intended audience's*

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		about skin cancer. The fictionalised case described how a 52-year old farmer in New Zealand discovered and treated an early-stage skin-cancer symptom. The low threat message included colour photos conveying neutral images, such as lab test results." *"At the end of both the high and low threat messages was a list of recommended behaviour, including sunscreen use, wearing a protective hat and clothing, minimising sun exposure at midday, and performing periodic skin self-examination."* **Intervention category[¥]:** III **Intervention period:** not reported (within a day) **Comparator/s:** interventions compared against each other **Sample sizes:** **Total n =** 274 **Intervention HT =** not reported	was used. Participant's stage of change was assessed (before randomization) and they were classified as: Precontemplation (P) – "*individuals have no intention to stop a risky behaviour within 6 months"* Contemplation (C) – "*individuals consider initiating preventive behaviour within 6 months"* Preparation (PP) – "*individuals plan to start preventive behaviour within a month"* Action (A) – "*individuals have engaged in a behaviour changes for less than 6 months"* Maintenance (M) – "*individuals regularly engage in preventive behaviour for more than 6 months."* **Adverse events:** not reported; some of the primary outcomes were adverse events **Secondary outcomes:** confound checks – *"perceived accuracy, clarity, objectivity, quality, understandibility, and amount of learning from the message"* **Follow-up periods:** most outcomes measured on the same day as provision of information; 4 weeks for behaviour change **Method of analysis:** not reported if ITT; 2	2.65 (A/M); p=0.063 Fatalism (mean): 2.40 (HT), 1.98 (LT), p=0.023 2.46 (P), 1.98 (C/PP), 2.13 (A/M); p=0.041 Hopelessness (mean) 2.77 (HT), 2.19 (LT); p=0.002; 2.70 (P), 2.47 (C/PP), 2.27 (A/M); p=0.089 Wishful thinking (mean): 3.97 (HT), 3.40 (LT), p=0.044 **Secondary outcomes:** *"mean scores of the HT group were higher than those of the LT group for perceived message accuracy (5.54 vs. 4.90), clarity (5.74 vs. 5.11), and quality (5.52 vs. 4.50; all tests p<0.001). Participants in the HT condition also believed that they understood (6.07 vs. 5.58) and learned from the message (5.51 vs. 4.63) more than those who ere in the LT*	*stages of change"* Study in a different setting and in participants more representative for the general population **Source of funding:** not reported

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Intervention LT = not reported **Baseline comparisons:** not reported **Study sufficiently powered?:** power calculation not reported	(high and low threat) x 3 (P, C/PP and A/M stages of change) analysis of covariance controlling for significant message confounds.	*condition (both tests p<0.001).”* **Attrition details:** Of the 274 participants, 239 responded to the 4-week follow-up	

Table 37 Clowers-Webb

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Clowers-Webb et al.[24] **Year:** 2006 **Aim of study:** *“to quantify the effect of an intensive prevention educational programme on knowledge and behaviour in this high-risk population and to assess*	**Source population/s:** transplant recipients **Country:** USA **Study year:** not reported **Eligible population:** “*all transplant recipients presenting for dermatologic consultation in the von Liebig Transplant Centre at Mayo Clinic“* **Selected population:** 202 verbally consenting *“transplant recipients*	**Method of allocation:** patients assigned randomly to groups; *“the randomisation schedule was generated using a block randomisation scheme and stratified according to history of skin cancer”* **Measures to minimise confounding:** not reported **Intervention/s** *“A laminated, pocket-sized copy of standardized verbal education guidelines was*	**Primary Outcomes:** Knowledge was assessed with 18 statements which patients were asked to indicate if they were correct or incorrect. For each patient a knowledge score was calculated as percentage of correct answers. Only for patients who answered to at least 75% of questions the score was calculated. In a secondary analysis missing responses were considered as	**Primary outcomes:** <u>Knowledge</u> The result for the knowledge score was found to be highly skewed (most patients with 1 or no incorrect answers) – therefore it was additionally analysed in intervals. Baseline o Participants answered at least 75% of questions: 93/101 in intervention and 88/101 in control arm o Mean: 91.5 (SD 9.3) intervention; 92.0 (SD 7.2) control; o 90-100% correct: 58 (62%) intervention, 56 (64%) comparator;	**Limitations identified by author:** o High knowledge level at baseline o Possible seasonal effect o Relatively short follow-up o Lack of formal validation of study instrument **Limitations identified by review team:** o Possibility of a self-selected population of patients who

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
whether intensive education produces a measurable improvement compared with standard episode-of-care-based education for the outcomes." **Study design:** RCT **Internal validity[§]:** + **External validity[†]:** 3	*presenting for dermatologic consultation in the von Liebig Transplant Centre at Mayo Clinic"* **Age:** mean 52.8 (SD 13.4), range 18 to 76 intervention and 55.8 (SD 12.7) range 11 to 75 control **Female:** 42 (42%) intervention and 41 (41%) control **Race/ethnicity:** White: 96 (95%) intervention, 99 (98%) control Asian/Indian: 3 (3% intervention), 1 (1%) control African American: 0 intervention, 1 (1%) control Unknown: 2 (2%) intervention, 0 control **History of skin cancer:** 28 (28%) and 29 (29%) in the control group **Socioeconomic status: (annual income)** not reported **Excluded population:**	*given to all recruiting physicians to ensure coverage of essential points. Patients were informed on their increased risk for and potential morbidity owing to skin cancer. An individualised risk assessment was performed, and patient-specific risk factors were discussed. Patients were instructed to use sunscreen with sun protection factor of 15 or greater on all exposed skin daily for all activities and even for short periods of sun exposure regardless of the weather. They were instructed to wear protective clothing and hats and to avoid times of peak UV light year-round. They were asked to stop intentional tanning outdoors or indoors by means of tanning lamps or at salons. Monthly skin self-examinations were recommended, with any changes reported promptly to their physician. They were given a copy of the Mayo Clinic pamphlet "Skin Cancer and Organ Transplant Recipients", which includes this information in more detail, reviews additional risk factors for skin cancer (i.e., fair skin, personal or family*	incorrect. <u>Behaviour</u> was assessed using 17 items. Patients used a five-point scale (1 – all of the time, 2 – most of the time, 3 – some of the time, 4 – rarely, 5 – never) to indicate their level of compliance. A score was calculated as an average of all items with lower score indicating better compliance. Only for patients who responded to at least 75% of the questions, a score was calculated. Additional items were used to collect detailed information on the level of behaviour. **Adverse events:** not reported **Secondary outcomes:** analysis of responders and non-responders **Follow-up periods:**	o 80-89% correct: 27 (29) intervention, 25 (28%) comparator; o 70-79% correct: 4(4%) intervention, 1 (1%) comparator; o <70% correct: 4 (4%) intervention, 1 (1%) comparator 3 months o Participants answered at least 75% of questions: 66/67 in intervention and 68/68 in control arm o Mean: 93.8 (SD 7.8) intervention; 94.1 (SD 6.1) control; o 90-100% correct: 51 (77%) intervention, 52 (76%) comparator; o 80-89% correct: 11 (17) intervention, 12 (18%) comparator; o 70-79% correct: 3 (4%) intervention, 4 (6%) comparator; o <70% correct: 1 (2%) intervention, 0 (0%) comparator o Difference between groups: p=0.66 10 months o Participants answered at least 75% of questions: 70/70 in intervention and 71/73 in control arm o Mean: 94.4 (SD 6.9) intervention; 93.9 (SD 6.7) control; o 90-100% correct: 58 (83%) intervention, 53 (75%) comparator; o 80-89% correct: 7 (10) intervention, 15 (21%) comparator; o 70-79% correct: 5 (7%) intervention,	presented for consultation o Very narrowly defined population o Change in knowledge and behaviour from baseline not calculated and compared **Evidence gaps and/or recommendations for future research:** Longer follow-up (planned for patients in this study) **Source of funding:** Clinical Practice Innovation Grant form Mayo Foundation, Rochester, Minn.

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	not reported **Setting:** transplant clinic	*history of skin cancer, and past exposure), stresses the need for general sun protection (especially sunscreen use and reapplication), and describes and illustrates the appearance of skin cancers."* *"At 2, 6, and 9 months after recruitment, patients in the intensive intervention group were sent a cover letter encouraging careful review of the enclosed pamphlets (at 2 months, the Skin Cancer Foundation pamphlets "Simple Steps to Sun Safety" and "Skin Cancer: If You Can Spot It, You Can Stop It"; at 6 months, the American Academy of Dermatology pamphlet "Skin Cancer – An Undeclared Epidemic" and leaflet "Stop-Look for Danger Signs in Pigmented Lesions of the Skin"; and at 9 months, the Mayo Clinic pamphlet "Skin Cancer and Organ Transplant Recipients")."* **Intervention category[¥]:** I+III vs. I **Intervention period:** 9	three and ten months after recruitment all patients were sent a questionnaire; if no response was received, the questionnaire was mailed again a month later **Method of analysis:** Reported as ITT, but missing values were not replaced; Wilcoxon rank sum test for knowledge and 2-sample t test for behaviour	2 (3%) comparator; o <70% correct: 0 (0%) intervention, 1 (1%) comparator o Difference between groups: p=0.50 <u>Behavioural assessment</u> Baseline: o Participants answered at least 75% of questions: 100/101 in intervention and 101/101in control arm o Mean: 2.9 (SD 0.6) intervention; 3.0 (SD 0.6) comparator; o Median (range): 2.9 (1.5-4.7) intervention, 3.0 (1.1-4.1) comparator 3 months o Participants answered at least 75% of questions: 64/67 in intervention and 68/68 in control arm o Mean: 2.4 (SD 0.6) intervention; 2.7 (SD 0.7) comparator; o Median (range): 2.4 (1.2-3.9) intervention, 2.8 (1.2-4.1) comparator o Difference between groups (based on two sample t-test): p=0.006 10 months o Participants answered at least 75% of questions: 65/70 in intervention and 72/73 in control arm o Mean: 2.4 (SD 0.6) intervention; 2.6	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		months vs. not clear **Comparator/s:** the same session with a physician as intervention group, but without letters and pamphlets at 2, 6 and 9 months **Sample sizes:** **Total n =** 202 **Intervention n =** 101 **Control n =** 101 **Baseline comparisons:** *"there were no significant differences between the two groups"* **Study sufficiently powered?:** power calculation not reported		(SD 0.7) comparator; o Median (range): 2.4 (1.2-3.9) intervention, 2.8 (1.4-4.2) comparator o Difference between groups (based on two sample t-test): p=0.007 **Secondary outcomes:** At 3 months older patients and those with a higher knowledge level at baseline were more likely to respond in both groups. At 10 months older patients were more likely to respond in both groups. Those better at behavioural assessment at baseline were more likely to respond both at 3 and 10 months in the intervention group. **Attrition details:** 3 months follow-up: o 2 patients in the control arm died o 5 participants lost due to mailing errors in the intervention group o 29 patients in the intervention and 31 in the comparator arm did not respond Response rate: 70% intervention and 69% control 10 months follow-up: o 1 patient in the intervention and 3 in the comparator arm died	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				o 5 participants lost due to mailing errors in the intervention group o 25 patients in the intervention and 25 in the comparator arm did not respond Response rate: 74% intervention and 74% control	

Table 38 Cody

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Cody et al.[25] **Year:** 1990 **Aim of study:** *"to assess the effectiveness of emotional and informational skin cancer prevention videotapes upon health beliefs, skin protection intentions, skin examination behaviour, and*	**Source population/s:** Australian university students **Country:** Australia **Study year:** not reported **Eligible population:** psychology students at the University of Newcastle, Australia **Selected population:** 312 first-year psychology students at the University of Newcastle, Australia **Age:** mean 20; range 17-48	**Method of allocation:** laboratory classes randomly assigned to conditions **Measures to minimise confounding:** not reported **Intervention/s** Informational video: *"12-minute presentation entitled "Skin Deep" obtained from the New South Wales Cancer Council. A female gave an informative talk covering the causes, consequences, and incidence rates of skin cancer and suggested skin protection, skin examination, and treatment-*	**Primary Outcomes:** <u>Baseline questionnaire:</u> Demographic data Health beliefs: o Perceived susceptibility to skin cancer (4 items) o Perceived severity (4 items) o Perceived benefits (7 items) o Perceived barriers (7 items) Behaviour – using a modified version of New South Wales Cancer Council o Sun exposure	**Primary outcomes:** <u>Knowledge</u> (range 0-10) – mean (SD): Baseline: 7.6 (SD 1.5) informational; 8.0 (SD 1.4) emotional; 7.8 (SD 1.3) control; Post-video: 8.5 (SD 1.0) informational; 8.4 (SD 1.2) emotional; 7.8 (SD 1.5) control; Follow-up: 8.3 (SD 1.1) informational; 8.6 (SD 1.1) emotional; 8.1 (SD 1.6) control; Post-test knowledge significantly higher than pre-test; Follow-up significantly higher than post-video; no main effect of video on knowledge; post-test scores in the informational group significantly higher than controls; <u>Skin protection behaviour / intentions</u> (range 0-20) – mean (SD): Baseline: 10.6 (SD 4.4) informational;	**Limitations identified by author:** o Self-reports can be unreliable o Reported increased skin protection intentions might be caused by demand effects o Low internal reliability of severity questions **Limitations identified by review team:** o *Drop-outs reported significantly lower skin protection intentions and higher scores on*

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
treatment-seeking intentions and behaviour. A further aim was to assess whether components of the Health Belief Model can predict skin protection behaviour and intentions, skin examination behaviour, and treatment-seeking intentions and behaviour." **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 3	**Female:** 58% **Race/ethnicity:** reported that "*none was Negro, Polynesian, or Aboriginal ethnic origin"* **History of skin cancer:** 8% participants **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported **Setting:** university	*seeking behaviour."* Emotional video: *"comprised two interviews with local people diagnosed as having malignant melanoma. One was dying, while the other had fully recovered. The two interviews went a total of 8 min. The emotional video finished with the last 4 min of "Skin Deep", which comprised a succinct overview of topics covered in the first 8 min of "Skin Deep" video. This ensured that subjects were exposed to the same information."* **Intervention category[¥]:** II **Intervention period:** 12 minutes **Comparator/s:** Control video *"addressed the issue of dietary recommendations for the prevention of heart disease. It also ran approximately 12 min."* After the second post-test participants were offered to watch both intervention videos.	while at the beach (2 items) – at risk behaviour: *"spending more than 2 hr at the beach for three or more times a week"* o Skin protection and examination behaviour (10 items) Knowledge – 10 items devised by New South Wales Cancer Council <u>Post-video questionnaire:</u> Health beliefs – identical as baseline Knowledge – identical as baseline Behavioural intentions – identical as baseline only future tense Treatment seeking intentions – 1 item added Follow-up questionnaire: Health beliefs – identical as post-video Knowledge – identical as post-video Behavioural intentions	12.1 (SD 4.4) emotional; 12.3 (SD 3.9) control; Post-video: 16.2 (SD 3.1) informational; 16.3 (SD 3.3) emotional; 14.4 (SD 3.9) control; Follow-up: 14.3 (SD 3.6) informational; 15.2 (SD 3.3) emotional; 14.3 (SD 3.6) control; *"Both post-video and follow-up intentions were significantly higher than pre-video behaviour, but there was a significant decrease between post-video and follow-up.* *At the post-test, the intentions of the informational and emotional group were significantly higher than the controls. At follow-up, intentions had decreased significantly from post-video for both the informational and control groups but not for the emotional group."* <u>Skin examination behaviour</u> (range 0-4) – mean (SD): Baseline: 1.4 (SD 1.5) informational; 1.5 (SD 1.4) emotional; 1.3 (SD 1.5) control; Post-video: not assessed Follow-up: 2.1 (SD 1.8) informational; 2.2 (SD 1.8) emotional; 1.6 (SD 1.7) control; A significant increase from baseline to follow-up; no significant difference between video types <u>Perceived susceptibility</u> (range 4-16) – mean (SD): Baseline: 11.5 (SD 2.2) informational; 12.0 (SD 2.4) emotional; 12.6 (SD 2.2)	*perceived barriers at the post-video assessment.* o Groups significantly differed at baseline with respect to some variables; o Relatively short follow-up o Significance not clearly stated for between-group and within-group comparisons o Clustering not reported as accounted for o Possible contamination **Evidence gaps and/or recommendations for future research:** o Focus on ways of reducing perceived barriers to skin protection – possibly using modelling; o Health promotion to focus on more positive non-health consequences of preventive behaviour o Focus on overexposure to

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Sample sizes: **Total n =** 312 **Informational video n =** 114, 6 classes **Emotional video n =** 108, 6 classes **Control n =** 90; 5 classes **Baseline comparisons:** groups significantly differed on some variables **Study sufficiently powered?:** power calculation not reported	– identical as post-video Skin-examination behaviour – 2 additional items Treatment seeking – assessed only in participants who thought they had skin cancer **Adverse events:** **Secondary outcomes:** not reported **Follow-up periods:** immediately after watching video; 10 weeks later **Method of analysis:** Not reported if ITT Analysis of variance	control; Post-video: 12.4 (SD 2.0) informational; 12.5 (SD 2.4) emotional; 12.2 (SD 2.1) control; Follow-up: 12.2 (SD 2.1) informational; 12.6 (SD 2.1) emotional; 12.3 (SD 2.1) control; Post video and follow-up scores significantly higher than pre-video; <u>Perceived severity</u> (range 4-16) – mean (SD): Baseline: 9.1 (SD 1.6) informational; 9.2 (SD 1.8) emotional; 9.2 (SD 1.7) control; Post-video: 10.1 (SD 1.8) informational; 10.3 (SD 1.8) emotional; 9.3 (SD 1.7) control; Follow-up: 9.7 (SD 1.6) informational; 10.0 (SD 1.7) emotional; 9.5 (SD 1.6) control; Post-video and follow-up scores significantly higher; pre-, post-video and follow-up scores in control group significantly lower than emotional group's post-video scores; post-video and follow-up scores in intervention groups significantly higher than their baseline scores; <u>Perceived benefits</u> (range 7-28) – mean (SD): Baseline: 24.9 (SD 2.8) informational; 25.3 (SD 2.3) emotional; 25.6 (SD 2.0) control; Post-video: 26.4 (SD 2.1) informational; 26.7 (SD 1.8) emotional; 25.7 (SD 2.2)	sun as cause of drying and premature skin ageing, and possibility of scarring from melanoma removal **Source of funding:** not reported

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				control; Follow-up: 26.1 (SD 2.2) informational; 26.6 (SD 2.3) emotional; 25.8 (SD 2.3) control; Post-video and follow-up scores significantly higher than baseline; follow-up significantly lower than post-video; post-video and follow-up scores in intervention groups significantly higher than baseline; no significant change for controls; <u>Perceived barriers</u> (range 0-21) – mean (SD): Baseline: 7.2 (SD 3.9) informational; 6.4 (SD 3.5) emotional; 6.2 (SD 3.6) control; Post-video: 5.6 (SD 4.2) informational; 5.1 (SD 3.6) emotional; 6.1 (SD 3.7) control; Follow-up: 6.7 (SD 4.1) informational; 6.2 (SD 4.1) emotional; 6.4 (SD 3.4) control; Post-video and follow-up scores significantly lower than baseline; <u>Treatment-seeking intentions:</u> decrease from baseline to follow-up; no difference between video types; Results for regression investigating Health Belief Model Variables as predictors in sot reported in this evidence table; **Secondary outcomes:** N/A	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				Attrition details: 312 completed baseline assessment and the first follow-up; 252 completed the second follow-up 15 withdrew from Psychology 1 and 45 failed to attend the follow-up session;	

Table 39 Dey

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Dey et al.[28] **Year:** 1995 **Aim of study:** *"to assess the effectiveness of a health education leaflet in reducing sunburn"* **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 3	**Source population/s:** UK holidaymakers **Country:** UK **Study year:** 1993 **Eligible population:** UK holidaymakers on Air UK Leisure flights **Selected population:** 12385 *"holidaymakers travelling on Air UK Leisure flights from Manchester airport during August 1993"* **Age:** Intervention: median 32,	**Method of allocation:** flights were stratified into long haul (North America and Jamaica) and short haul (Europe) and than randomised to intervention or control **Measures to minimise confounding:** **Intervention/s** *"The Health Education Authority leaflet "If You Worship the Sun, Don't Sacrifice Your Skin" was placed in seat pockets on flights"* **Intervention category[¥]:** III	**Primary Outcomes:** *"Cabin crew distributed questionnaires to passengers on Air UK Leisure return flights to Manchester."* It asked if passengers experienced sunburns and if they were associated with: "*redness of skin, blistering of the skin, pain for less than a day, pain for more than a day. Adults completed the questionnaire for children."* *"The study endpoint, severe sunburn, was defined as any episode*	**Primary outcomes:** Severe sunburn incidence: All flights: o 1013 (16.1%) intervention; 1053 (17.2%) control o Difference in proportion = 0.731 (95% CI: -0.014 to 0.036), p=0.392 Short haul: o 717 (16.3%) intervention; 793 (17.1%) control o Difference in proportion = 0.276 (95% CI: -0.022 to 0.038), p=0.6 Long haul: o 296 (15.7%) intervention; 260 (17.7%) control o Difference in proportion = 1.288	**Limitations identified by author:** Passengers were not asked if they had seen or read the leaflet as this might have influenced their response to the questionnaire **Limitations identified by review team:** o No baseline measurements o Impossible to tell if groups were comparable o The study measures the differences between groups –

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	range 0-97 Control: median 33, range 1-88 **Female:** 52.2% (1.9% not recorded) intervention, 52.9% (1.6% not recorded) control **Race/ethnicity:** not reported **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported **Setting:** flight	**Intervention period:** N/A **Comparator/s:** No leaflet **Sample sizes:** **Total n =** 31 long haul, 124 short haul flights, 12385 passengers **Intervention n =** 16 long haul and 62 short haul flights; 6276 returned questionnaires **Control n =** 15 long haul and 62 short haul flights; 6109 returned questionnaires No information on how many passengers were on the flights from Manchester **Baseline comparisons:** *"there was no significant difference between the two groups in the distribution of baseline characteristics or the proportion reporting severe sunburn"* **Study sufficiently powered?:** 90% power to show a 5% difference at 5% two sided significance level	*of sunburn which was either painful for more than a day or resulted in blistering."* **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** N/A **Method of analysis:** Not reported if ITT (apparently not) Clustering parameter was calculated for the study endpoint	(95% CI: -0.014 to 0.052), p=0.256 **Secondary outcomes:** N/A **Attrition details:** 21611 questionnaires distributed and 14956 (69%) returned; 2483 were completed by passengers who did not depart from Manchester during study period, 88 inconsistent or illegible questionnaires were excluded from the analysis, which left 12385 passengers in the analysis Information on how many passengers were on the flight from Manchester not provided	not change in behaviour due to information o Information on how many passengers were on the flight from Manchester not provided o No indication on flight destinations and their UV levels **Evidence gaps and/or recommendations for future research:** Study with baseline measurements **Source of funding:** North Western Regional Health Authority

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes

Table 40 Dixon

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Dixon et al.[32] **Year:** 2007 **Aim of study:** *"to systematically evaluate the impact of UV forecasts on a sample of Australian adults' sun-protection behaviour using a randomised controlled trial during 18 weeks"* **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 3	**Source population/s:** adult employees with weekday access to e-mail and internet **Country:** Australia **Study year:** not reported **Eligible population:** adult employees of Melbourne-based consulting firms and one university with weekday access to e-mail and internet **Selected population:** 557employees who agreed to participate in the study (10% of those invited to participate), submitted baseline data at least 1 week of	**Method of allocation:** participants were randomised to one of the interventions **Measures to minimise confounding:** Analysis was adjusted for possible correlations between responses from the same individuals **Intervention/s** On Thursday evenings participants were e-mailed: A standard weather forecast + UV forecast and definition B standard weather forecast + UV forecast and definition + protective recommendations The weather forecasts were e-mailed to the	**Primary Outcomes:** Every Monday participants were sent a questionnaire to report sun related behaviour and any sunburn experienced during the previous weekend. Participants could fill it in and submit online from Monday to Wednesday. **Adverse events:** not reported **Secondary outcomes:** response rates to weekly surveys manipulation check assessing short-term reactions to a sample forecast communication performed among a	**Primary outcomes:** Reported sun protection in response to forecasts More: A 23%, B 25%, C 19% Less: A 4%, B 3%, C 7% No effect: A 73%, B72%, C 74%; p[††††††††]=0.022 For those who took more precautions, their behaviour was mostly influenced by the aspect of the forecast: Fine/sunny: A 10%, B 5%, C 20%; Temperature: A 17%, B 16%, C 75% Temperature and UV: A 10%, B 15%, C 1% UV: A 63%, B 64%, C 4% p<0.0001 Participants were also asked	**Limitations identified by author:** o Knowledge of the participants was likely to be high at baseline; o Completing the survey every week might have had impact on the behaviour o Participants could have received UV forecasts from other sources (5% in the control group who reported some sun protective behaviour also reported being influenced by UV forecasts) o Possible cross-contamination (although 96% of the participants indicated they never compared forecasts with another

†††††††† For difference between groups

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Monday survey data **Age:** <25: A 14%, B 8%, Control 17%, Total 13% 25-29: A 25%, B 31%, Control 26%, Total 27% 30-39: A 33%, B 32%, Control 28%, Total 31% 40-49: A 18%, B 16%, Control 19%, Total 18% ≥50: A 11%, B 13%, Control 10%, Total 11% **Female:** A 67% B 68% Control 64% Total 66% **Race/ethnicity:** not reported **Socioeconomic status: (annual income)** Not reported **Excluded population:** not reported **Setting:** workplace	participants at the end of the working week as a prompt for their sun-related activity over the weekend ahead. **Intervention category[¥]:** IV **Intervention period:** 18 weeks (November to March with 2-week break for Christmas and New Year) **Comparator/s** (C) standard weather forecast , no UV forecast **Sample sizes:** **Total n =** 557 **Intervention A n =** 183 **Intervention B n =** 190 **Control n =** 184 **Baseline comparisons:** the arms did not significantly differ on any of the reported demographic characteristics **Study sufficiently powered?:** power calculation not reported	convenience sample of 20 office workers (however results are reported for 21) **Follow-up periods:** 20 weeks (with 2-week break) **Method of analysis:** not reported if ITT Analysis was adjusted for possible correlations between responses from the same individuals	what influenced their sun protection over the weekends – 59% were influenced by the weather, 34% by personal habits, 7% by the forecast – the distribution of responses did not differ significantly between conditions. Reported sun protective behaviours for those who stayed out between 11a.m. and 3p.m. on Saturdays: Stay out of the sun: A 37%, B 40%, C 34%, p=0.202 Use hat: peaked cap: A 14%, B 18%, C14%; narrow brim: A 5%, B 7%, C 7%; wide brim A 10%, B 6%, C 7%; p=0.149 Torso cover: sleeveless: A 13%, B 12%, C 14%; short sleeves: A 56%, B 61%, C 57%; long sleeves: A 28%, B 24%, C 25%; p=0.0563 Lower body cover: shorts: A 16%, B 16%, C 21%; midlength: A 25%, B 32%, C 25%; full length: A 58%, B 50%, C 51%; p=0.017 Sunscreen use: A 42%, B 41%, C 42%; p=0.988 Reported sun protective	colleague) **Limitations identified by review team:** o Self-selected population; only 10% of invited agreed to participate; o Weather forecasts for Sundays were less accurate than for Saturdays – possible effect on sunburns and behaviour **Evidence gaps and/or recommendations for future research:** o mass media dissemination of UV forecasts or readings in outdoor leisure context, where sun protection is of current relevance; o possible adverse events associated with a low UV forecast or using high UV forecasts to suntan when the sun is strong; o exploring if people lose interest if the UV

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				behaviours for those who stayed out between 11a.m. and 3p.m. on Sundays: Stay out of the sun: A 37%, B 40%, C 35%, p=0.341 Use hat: peaked cap: A 18%, B 17%, C17%; narrow brim: A 5%, B 8%, C 9%; wide brim A 11%, B 9%, C 8%; p=0.307 Torso cover: sleeveless: A 13%, B 14%, C 14%; short sleeves: A 56%, B 59%, C 58%; long sleeves: A 28%, B 24%, C 25%; p=0.724 Lower body cover: shorts: A 19%, B 17%, C 19%; midlength: A 24%, B 32%, C 27%; full length: A 55%, B 48%, C 50%; p=0.054 Sunscreen use: A 46%, B 43%, C 43%; p=0.750 Reported sunburn on Saturdays: A 10%, B 9%, C 10%; p=0.741 Reported sunburn on Sundays: A 14%, B 14%, C 14%; p=0.966 **Secondary outcomes:** on average 70% of participants	forecast varies little over time; **Source of funding:** the Victorian Health Promotion Foundation

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				submitted their questionnaire each week; on most weeks more than 80% submitted their surveys on Mondays recall of the message content was strongly consistent with the intended manipulation; there was also some evidence of short-term impact on perceptions; those who received interventions A or B reported significantly higher perceived risk than those who did not; the later two did not significantly differ on perceived risk; there were no significant effects on other perceptions assessed (susceptibility, severity, self-efficacy, response efficacy) – possibly due to small sample size **Attrition details:** not reported	

Table 41 Geller 2003

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Geller et al [39] **Year:** 2003	**Source population/s:** All public and private elementary and middle schools in the USA were eligible to participate in the SunWise School	**Method of allocation:** The intervention evaluated in this study was already available across the USA. A sample of 156 schools (n=5,625) was chosen to	**Primary Outcomes:** The effect of classroom lessons on students' knowledge, attitudes, practices, and intended practices was evaluated	**Primary outcomes:** ***Pre-tests and post-tests in schools receiving SunWise (experimental schools) vs. control school district:*** Knowledge: During the school year the 4th & 5th grade	**Limitations identified by author:** School nurses and teachers volunteering to participate in the SunWise programme

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Aim of study: to assess the effectiveness of the SunWise School Programme for sun safety for children in primary and secondary schools (grades K-8) **Study design:** 1. controlled before & after and 2. before & after **Internal validity[§]:** - **External validity[†]:** 3	Programme. **Country:** USA **Study year:** 1999-2002 **Eligible population:** Schools were recruited by distributing information via conferences of various teacher and nurse organisations, meetings of skin cancer interest groups, newsletters, publications, the Internet, and referrals from partner organisations, such as the American Cancer Society and the SHADE Foundation (Arizona). Single classrooms, multiple classrooms, schools, or entire school districts were eligible. All school faculty, including school nurses and classroom teachers, were recruited and eligible to participate. **Selected population:** Of the 3,905 schools registered as of April 2002, 156 were 'randomly' chosen to participate in the survey process. Of these, 102	participate in surveys assessing its effectiveness (1999-2002). The assessment of these results was essentially a pre-test/post-test (before & after) comparison). In the year 2000, all 9 elementary schools in Framingham, MA served as controls (n=1,285) and provided no education during spring months. The students in the control schools were compared with the nationwide profile of children in similar grades receiving SunWise education in spring 2000. **Measures to minimise confounding:** none reported **Intervention/s** The cross-curricular, standards-based classroom lessons were contained in an activity guide and later expanded in the SunWise Tool Kit. Lessons focused on three key areas: 1) the effects of UV radiation, 2) risk factors for overexposure, and 3) sun-protection habits. Each lesson consisted of a variety of developmentally-	using identical, self-administered pre-test surveys distributed in September-March (autumn-spring) and post-test surveys distributed immediately after teaching the SunWise educational programme, generally in May-June (spring-summer). Surveys were collected and individually analysed each year from 1999-2002. For the students (4th & 5th grades only) in the Framingham control/no intervention schools, school nurses conducted pre-tests in November and post-tests in June. Students in the control schools were compared with the nationwide profile of children in similar grades receiving SunWise education in spring 2000. **Adverse events:** none reported **Secondary outcomes:** The effect of classroom lessons on students'	students (n=1,285) in the control schools showed no improvement in knowledge or beliefs about tanning, and reported fewer intentions to play in the shade from pre-test to post-test. Overall changes in knowledge, attitudes and intentions were more likely in experimental schools (no of students not reported) than control schools. ***Pre-tests and post-tests in schools receiving SunWise programme*** Knowledge: Significant improvements were seen from pre-test to post-test: 1. Identifying that wearing a hat and shirt outside were ways to keep safe from the sun increased from 60% to 74% (p<0.001) 2. Identifying that SPF 15 was the minimal number needed for sun protection increased from 52% to 77% (p<0.001) 3. Awareness of the number from the UV index that best correlated with the most optimal sun protection improved from 29% to 57% (p<0.001). Practice: Overall there were few changes in student's practice. Sunscreen (25%), long-sleeved shirts (25%), sunglasses (24%), and hats (18%) were used sporadically with little change at post-test. 'All the time' use of sunscreen decreased by age from 38% at ages 5-9 to 21% at ages 10-12 to 10% at ages 13-15	may have strong personal interests. The positive changes in knowledge and attitudes that occurred during the 4-5 months between pre-tests and post-tests may have occurred elsewhere. **Limitations identified by review team:** The authors state 'students in the control schools were compared with the nationwide profile of children in similar grades receiving SunWise education in spring 2000'. However the composition of this intervention group is unclear. **Evidence gaps and/or recommendations for future research:** Higher quality studies (possibly in the form of cluster randomised controlled trials) assessing the longer term impact of the programme, relating to knowledge retention and the translation of behavioural intentions to behavioural change,

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	schools (65%) completed pre-tests (n=5,625) and post-tests (n=5,028). There were no differences in geographic location or size of the school between the 3,905 eligible schools, the 156 schools invited, and the 102 schools that took part. **Age:** 5 – 15 years (grades K-8) (NB the control group comprised 4th to 5th grade students with a mean age of 10 years) **Female:** not reported **Race/ethnicity:** not reported **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported **Setting:** school	appropriate activities meeting prescribed educational standards that combined education about sun protection and the environment with other aspects of student's regular learning on sciences, social studies, health, and mathematics. At least one or two hours were spent on the activities. There were at least 30 activities for faculty to choose from. Other activities were supplemented by the SunWise web-site which offered schools the opportunity to check for the UV index, report, chart, and compare UV measurements, and play educational games. **Intervention category¥:** I & IV **Intervention period:** 1999-2002 **Comparator/s:** In the year 2000, all 9 elementary schools in Framingham, MA served as controls (n=1,285) and provided no education during spring months.	attitudes, and intended practices. **Follow-up periods:** approximately 4-5 months **Method of analysis:** The effectiveness of the programme was measured by comparing the difference between the pre-tests and post-tests in the percentage of students providing specific responses rather than the change in individual students' responses. 95% confidence intervals of the difference between pre-test and post-test and p-values using the chi-square test for 2 x 2 contingency tables were calculated. The effects of the intervention were evaluated by adjusting for baseline difference (pre-experimental vs. pre-control schools.	(p<0.001). **Secondary outcomes:** ***Pre-tests and post-tests in schools receiving SunWise (experimental schools) vs. control school district:*** Attitudes/intentions: During the school year the 4th & 5th grade students (n=1,285) in the control schools showed no improvement in beliefs about tanning, and reported fewer intentions to play in the shade from pre-test to post-test. Overall changes in knowledge, attitudes and intentions were more likely in experimental schools (no of students not reported) than control schools: intentions to play in the shade improved by 5% in the experimental schools and dropped 8% in the control schools (p<0.05); the attitude that people look healthier with a tan dropped in experimental schools, but rose in control schools (p<0.05). ***Pre-tests and post-tests in schools receiving SunWise programme*** Attitudes: Attitude changes were most prominent in the youngest age group (5-9), but some changes were made in children aged 10-12. At baseline 27% of children reported that they thought suntans were good for their skin compared with 20% at post-test (p<0.001), with a change in belief least pronounced for oldest children. Intended practice: Intentions to play in the shade increased	would be beneficial. **Source of funding:** The study was performed under contract from the Environmental Protection Agency's SunWise School Programme.

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Sample sizes: **1. controlled before & after** **Total n=**not reported **Intervention n=**not reported **Control n=**1,285 **2. before & after** Total n=5,625 Intervention n=5,625 Control=N/A **Baseline comparisons:** There were no baseline differences in age, sex or frequency of sunburns between students in SunWise and Framingham control schools, **Study sufficiently powered?:** power calculation not reported		from 68% to 75% from pre-test to post-test (p=0.001), with the smallest differences seen in children aged 10-12. There was a non-significant improvement from 58% to 67% in reported intentions to use suncream, with few differences between younger and older children. **Attrition details:** Of the 3,905 schools registered for SunWise as of April 2002, 156 were 'randomly' chosen to participate in the survey process. Of these, 102 schools (65%) completed pre-tests (n=5,625) and post-tests (n=5,028). Attrition rates for those assessed in the Framingham comparator group were not reported.	

Table 42 Geller 2006

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Geller et	**Source population/s:** siblings of melanoma	**Method of allocation:** *"siblings were randomly*	**Primary Outcomes:** o *"Having a skin*	**Primary outcomes** (all reported as %): Dermatologist examination within 12	**Limitations identified by author:**

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
al.[35,38] **Year:** 2006 **Aim of study:** *"testing an intervention that provided personalised telephone counselling and individually tailored materials to siblings of recently diagnosed melanoma patients."* **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 3	patients **Country:** USA **Study year:** 1998-2000 **Eligible population:** siblings of melanoma patients from four Boston area teaching hospitals **Selected population:** 494 consenting siblings of 298 consenting melanoma patients from four Boston area teaching hospitals **Age:** 18-50: 55.7% intervention, 60.6% control; 51+: 44.3% intervention, 39.4% control; **Female:** 51.9% intervention, 54.9% control; **Race/ethnicity:** 100% Caucasian **Socioeconomic status: (annual income)** not reported **Excluded population:** siblings < 18 years old;	*assigned in alternate fashion* to one of the conditions; *sibship was the unit of randomisation, therefore multiple siblings of the same patient were assigned to the same condition"* **Measures to minimise confounding:** regression analysis taking into account clustering and other baseline factors **Intervention/s** *"Participants received the following:* *1) an initial motivational and goal-setting telephone intervention session delivered by the health educator;* *2) computer-generated tailored print materials were sent at 1, 3, and 5 months after randomisation.* *The materials were tailored based on responses to the baseline; materials were tailored to level of participation in each of the three target behaviours (skin self-examination, physician screening, and sun protection), self*	*cancer screening examination by a dermatologist within 12 months after completion of the baseline survey;* o *Conducting a personal skin self-examination, defined as careful examination of all moles, including those on the back at least one time in the 12 months after completion of the baseline survey* o *Always or often using sunscreen with sun protection filter (SPF) 15 or greater when outside in the sun for more than 15 minutes during the previous summer, as measured on the 12 month survey."* *"Siblings were also asked to rate their degree of tanning at the end of the summer."* **Adverse events:** not	months: • Baseline: 28.3 intervention, 28.8 control; • 12 months: 68.3 intervention; 67.8 control; • 12 months: OR (change from baseline to follow up): 5.71 intervention; 6.06 control; • OR (intervention vs. control): 1.04 (95%CI: 0.54 to 1.98) Examination of all the moles, including the ones on the back: • Baseline: 60.4 intervention,64.5 control; • 6 months: 84.6 intervention; 79.1 control; • 12 months: 88.5 intervention; 83.5 control; • 12 months: OR (change from baseline to follow up): 4.99 intervention; 2.54 control; • OR (intervention vs. control): 1.76 (95%CI: 1.06 to 2.91) Compare all one's moles to see if one stands out: • Baseline: 57.1 intervention, 61.5 control; • 6 months: 87.0 intervention; 78.9 control; • 12 months: 89.7 intervention; 83.0 control; • 12 months: OR (change from	• Use of self-reported measures • Sample might not be representative for siblings of melanoma patients in the general population • No cost-benefit analysis • No comparison with other high risk populations was made • Participants enrolled at different times of the year – possibility of recall bias about sun tanning during the previous summer • Large loss to follow-up **Limitations identified by review team:** No additional limitations **Evidence gaps and/or recommendations for future research:** • Development of more objective measures of effect

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	not contacted by "case" relative; previously diagnosed with melanoma **Setting:** domicile	*efficacy, and beliefs. (…)* *3) Three telephone counselling sessions with the health educator, timed to follow receipt of the mailed materials; and* *4) Linkages to free screening programmes.* *Both the tailored materials and the counselling phone calls were designed to address the following:* *1) Knowledge and attitudes;* *2) Barriers to change;* *3) Risk perception; and* *4) Self-efficacy for improving skin cancer risk behaviours."* *"The telephone calls lasted for approximately 10-15 minutes and utilised a motivational interviewing style in which the health educator used relative nonconfrontational techniques to encourage siblings to acknowledge their ambivalent feelings and subsequently tailored action steps to the sibling's level of motivation."* **Intervention category[¥]:**	reported **Secondary outcomes:** *"Knowledge was tested with true/ false questions on shape, colour, and risk factors for melanoma."* Psychosocial variables: 5-point Likert scales were used to assess participant's self-efficacy regarding: o completion of a skin self-examination, o having a spouse or a friend examine the participant's skin, o seeing a dermatologist, and o wearing sunscreen. Barriers scales (responses to statements ranging from 1 strongly disagree to 5 strongly agree; sum for each scale): o For early detection (2 statements, range 2-10)	baseline to follow up): 6.90 intervention; 2.92 control; • OR (intervention vs. control): 2.92 (95%CI: 1.22 to 3.98) Ask family member/ friend to look at moles: • Baseline: 45.5 intervention,44.0 control; • 6 months: 73.7 intervention; 65.7 control; • 12 months: 70.8 intervention; 69.1 control; • 12 months: OR (change from baseline to follow up): 2.48 intervention; 2.86 control; • OR (intervention vs. control): 0.97 (95%CI: 0.63 to 1.50) Use picture of moles as help in looking: • Baseline: 14.7 intervention, 9.5 control; • 6 months: 39.3 intervention; 16.5 control; • 12 months: 43.5 intervention; 20.5 control; • 12 months: OR (change from baseline to follow up): 3.65 intervention; 2.19 control; • OR (intervention vs. control): 1.57 (95%CI: 0.89 to 2.75) Routinely use sunscreen with SPF 15+: • Baseline: 55.9 intervention,56.6	• Studies directed at siblings who do not perform skin self-examinations or see a dermatologist **Source of funding:** National Institute of Health, National Cancer Institute

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		II+III **Intervention period:** each phone call lasted approximately 10-15 minutes; N/A to printed materials **Comparator/s:** standard practice: no intervention until the completion of the last survey; patients were advised to notify family members about their diagnosis and make appointments for first-degree relatives to be screened **Sample sizes:** **Total n =** 494 **Intervention n =** 237 **Control n =** 257 **Baseline comparisons:** *"Generally, randomisation balanced the two study groups on baseline characteristics."* The only ones which had an effect on estimated effects being skin type and intention to see a dermatologist. **Study sufficiently powered?:** no information	o For sun protection (six statements, range 6-30) o For skin self-examination (three statements; range 3-15) **Follow-up periods:** testing at baseline, 6 and 12 months **Method of analysis:** ITT reported in discussion, but no results provided Regression analysis taking into account cluster randomisation and individual characteristics	control; • 6 months: 66.7 intervention;64.4 control; • 12 months: 67.4 intervention; 66.1 control; • 12 months: OR (change from baseline to follow up): 1.34 intervention; 1.48 control; • OR (intervention vs. control): 0.96 (95%CI: 0.67 to 1.38) Tanned by the end of last summer: • Baseline: 41.7 intervention,37.2 control; • 6 months: 36.8 intervention; 38.0 control; • 12 months: 25.7 intervention; 35.6 control; • 12 months: OR (change from baseline to follow up): 0.57 intervention; 0.87 control; • OR (intervention vs. control): 0.72 (95%CI: 0.47 to 1.09) **Secondary outcomes:** <u>Knowledge</u> (% correct): Melanoma found mostly on face/ arms: • Baseline: 52.4 intervention,59.4 control; • 6 months: 63.1 intervention; 59.4	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		on power calculation		control; • 12 months: OR (change from baseline to follow up): 1.62 intervention; 0.86 control; • OR (intervention vs. control): 1.90 (95%CI: 1.19 to 3.05) Melanoma is a round brown or black spot: • Baseline: 44.3 intervention,45.1 control; • 6 months: 55.6 intervention; 41.9 control; • 12 months: OR (change from baseline to follow up): 1.65 intervention; 0.79 control; • OR (intervention vs. control): 2.10 (95%CI: 1.37 to 3.22) Increased risk of melanoma? Lots of moles: • Baseline: 41.0 intervention,48.8 control; • 6 months: 52.2 intervention; 53.1 control; • 12 months: OR (change from baseline to follow up): 1.64 intervention; 1.19 control; • OR (intervention vs. control): 1.35 (95%CI: 0.86 to 2.13) Increased risk of melanoma? Having freckles: • Baseline: 20.7 intervention,22.0	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				control; • 6 months: 32.6 intervention;27.3 control; • 12 months: OR (change from baseline to follow up): 1.52 intervention; 1.52 control; • OR (intervention vs. control): 0.99 (95%CI: 0.58 to 1.67) <u>Attitudes</u> (reported as %): Confidence: self-examination: • Baseline: 64.5 intervention,66.0 control; • 6 months: 77.0 intervention; 72.1 control; • 12 months: 76.5 intervention; 70.3 control; • 12 months: OR (change from baseline to follow up): 1.63 intervention; 1.06 control; • OR (intervention vs. control): 1.39 (95%CI: 0.85 to 2.28) Confidence: examination by a spouse or a friend: • Baseline: 54.3 intervention,59.4 control; • 6 months: 60.0 intervention; 62.8 control; • 12 months: 60.4 intervention; 60.5 control;	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				• 12 months: OR (change from baseline to follow up): 1.14 intervention; 0.96 control; • OR (intervention vs. control): 1.16 (95%CI: 0.77 to 1.74) Confidence: see a dermatologist: • Baseline: 48.1 intervention,53.9 control; • 6 months: 62.1 intervention; 53.3 control; • 12 months: 61.2 intervention; 53.3 control; • 12 months: OR (change from baseline to follow up): 1.47 intervention; 0.70 control; • OR (intervention vs. control): 2.14 (95%CI: 1.23 to 3.73) Confidence: wear sunscreen: • Baseline: 64.7 intervention,64.8 control; • 6 months: 70.3 intervention; 66.5 control; • 12 months: 69.8 intervention; 70.3 control; • 12 months: OR (change from baseline to follow up): 1.14 intervention; 1.18 control; • OR (intervention vs. control): 1.15 (95%CI: 0.75 to 1.77) Intentions to perform skin self-examination:	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				• Baseline: 80.9 intervention,79.6 control; • 6 months: 86.5 intervention; 85.9 control; • 12 months: 90.5 intervention; 85.3 control; • 12 months: OR (change from baseline to follow up): 2.05 intervention; 1.26 control; • OR (intervention vs. control): 1.32 (95%CI: 0.74 to 2.37) Intentions to have a dermatological examination: • Baseline: 57.7 intervention,67.3 control; • 6 months: 68.3 intervention; 66.2 control; • 12 months: 69.9 intervention; 65.2 control; • 12 months: OR (change from baseline to follow up): 1.62 intervention; 0.84 control; • OR (intervention vs. control): 1.68 (95%CI: 1.16 to 2.44) Intentions: likely to use sunscreen: • Baseline: 41.5 intervention,44.3 control; • 6 months: 51.0 intervention; 42.7 control; • 12 months: 58.5 intervention; 49.4 control; • 12 months: OR (change from	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				baseline to follow up): 1.55 intervention; 1.34 control; • OR (intervention vs. control): 1.25 (95%CI: 0.83 to 1.87) **Attrition details:** *"The 6-month survey was completed by 82% of baseline respondents and the response rate at 12 months was 64%."*	

Table 43 Gerbert

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Gerbert et al.[40] **Year:** 1997 **Aim of study:** To investigate "*whether the source and emphasis of mailed messages about skin cancer would differentially activate patients to initiate skin cancer prevention by calling a toll-free number."*	**Source population/s:** Lists of patients of 15 physicians - from 4 Health Maintenance Organisations (HMOs) that are part of California Pacific Medical Group - who agreed to participate in the study. In total 20 were asked. **Country:** USA **Study year:** not reported **Eligible population:** approximately 18,000 patients left after a screening by physician to	**Method of allocation:** patients randomised to one of 9 groups **Measures to minimise confounding:** not reported **Intervention/s** All participants were sent a Skin Cancer Questionnaire (including respondents concerns about skin cancer and factors related to the risk of skin cancer) which enabled them to calculate their own scores. The last page contained a toll-free number patients were invited to contact regardless of their score.	**Primary Outcomes:** patients call a toll-free number to report their skin cancer risk scores and request free sunscreen **Adverse events:** not reported **Secondary outcomes:** risk score was collected from	**Primary outcomes:** A total of 66 (7%) patients called in and completed the interview. By source of mail: 1. Physician – 34 (11%) 2. HMO – 23 (7.3%) 3. Junk mail – 9 (2.9%) By emphasis:	**Limitations identified by author:** The authors applied a very specific definition of activation. It is impossible to tell if patients were affected in any other way than calling the toll-free number. The calls were answered by an investigator for only 30 hours a week between 9am and 5pm on weekdays [should be 40 hours?] – callers outside of these hours were asked to leave a message, but they could have been missed.

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Study design: RCT **Internal validity[§]:** - **External validity[†]:** 2	exclude unsuitable ones. **Selected population:** 981 randomly selected individuals **Age:** Of the 66 activated participants – mean 50.5 (SD 17), range 21-88 Of the 75 non-activated participants – mean 48.6 (SD 13.6), range 20-89 **Female:** Of the 66 activated participants – 48 (72.7%) Of the 75 non-activated participants – 49 (65.3%) **Race/ethnicity:** Caucasian: 57 (86.4%) activated, 60 (80%) non-activated African American: 2 (3.0%) activated, 3 (4.0%) non-activated Asian: 5 (7.6%) activated, 9 (12%) non-activated Other: 2 (3.0%) activated, 3 (4.0%) non-activated **Socioeconomic status:**	Each questionnaire was accompanied by a cover letter signed by: 1. their own physician 2. their own HMO 3. a fictitious junk mail organisation named Safe Sun and emphasising the effects of UV rays on 1. the risk of skin cancer 2. aging and wrinkling of the skin 3. aging and wrinkling further emphasized by a book on these harmful effects of the sun (*How to Outsmart the Sun*, Michael J. Martin MD) There were 9 groups corresponding to various combinations of both factors **Intervention category[¥]:** III **Intervention period:** not reported **Comparator/s** interventions compared against each other **Sample sizes:** **Total n =** 981 **Intervention n =** 109 in each group	patients who called the toll-free number they were also asked additional 26 questions assessing: susceptibility severity barriers cues to action preventive behaviours (higher scores indicated endorsement of attitudes and behaviours consistent with skin cancer prevention) Analysis of a random sample of non-responders (75 out of 128 with whom contact was attempted) If patients with different demographic characteristics and concerns about or risk of skin cancer were differentially activated by	1. skin cancer risk – 27 (8.8%) 2. appearance – 22 (7.1%) 3. appearance and book – 17 (5.4%) **Secondary outcomes:** Total risk score (range 0-18): 8.33 (activated), 6.79 (non-activated); p=0.007; Susceptibility (range 7-29): 22.10 (activated), 22.84 (non-activated); ns Severity (range 3-14): 4.45 (activated), 4.42 (non-activated); ns Barriers (range 11-55): 36.64 (activated), 35.91 (non-activated); ns	**Limitations identified by review team:** The hours in which the calls were answered might bias against individuals in full time employment or education. **Evidence gaps and/or recommendations for future research:** targeting messages at different demographic groups; **Source of funding:** the project was supported by the National Cancer Institute Grant, Person & Covey, Inc. donated sunscreen;

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	(annual income) not reported **Excluded population:** unsuitable for the study (e.g., those who were deceased, demented, or terminally ill) **Setting:** place of domicile	**Baseline comparisons:** data not collected from all patients in groups; **Study sufficiently powered?:** Sample of 900 calculated to detect a 5% difference between the 3 sources of information with a power of 80%	interventions **Follow-up periods:** not reported **Method of analysis:** not ITT	Cues to action (range 3-15): 6.52 (activated), 5.67 (non-activated); p=0.02 Preventive behaviour (range 2-4): 3.16 (activated), 3.01 (non-activated); Demographic characteristics: Male: 18 (27.3%) activated, 26 (34.7%) non-activated; Female: 48 (72.7%) activated, 49 (65.3%) non-activated; Caucasian: 57 (86.4%) activated, 60 (80%) non-activated; African American: 2 (3%) activated, 3 (4%) non-activated; Asian: 5 (7.6%) activated, 9 (12%) non-activated; Other: 2 (3%) activated, 3 (4%)	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				non-activated; Age range: 21-88 activated, 20-89 non-activated; Mean age: 50.5 (SD 17.0) activated, 48.6 (SD 13.6) non-activated; **Attrition details:** of the 981 mailed messages, 48 were returned undelivered;	

Table 44 Girgis

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Girgis et al.[41] **Year:** 1993 **Aim of study:** "*(a) to develop an accurate and valid self-report diary to assess the*	**Source population/s:** primary schools **Country:** Australia **Study year:** not reported **Eligible population:** the largest government primary schools in the region	**Method of allocation:** schools randomly allocated to: intensive intervention, standard intervention and control **Measures to minimise confounding:** adjustment for baseline differences and participants coming from different schools	**Primary Outcomes:** <u>Knowledge and attitudes</u> A questionnaire was developed and pilot tested on a group of children in the target age group. It contained 19 knowledge and 19 attitude items. "*Students were required to respond to*	**Primary outcomes:** Predictors of high solar protection (post-test 1): o High (vs. low) baseline protection: OR=4.55 (95%CI: 2.79 to 7.40) o Intensive intervention (vs. control): OR=2.45 (95% CI: 1.37 to 4.38) No other variables were identified as significant predictors.	**Limitations identified by author:** o Self-reported measures o Differences in baseline solar protection o Children required to wear standard school uniforms (limits impact on

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
prevalence of solar protection behaviours in children aged 9 to 11 years; (b) to assess the differential effectiveness of two interventions aimed at changing the knowledge, attitudes, and solar protection behaviours of this target age group, compared to a no-intervention control group; and (c) to identify the predictors of use of a high level of solar protection." **Study design:** RCT **Internal validity[§]:** - **External**	**Selected population:** 648 students from years 5 and 6 (age range 9 to 11 years) from 11 government primary schools (the largest ones in the region) **Age:** 9-11: 9 – 13% intervention; 10% control 10 – 82% intervention, 79% control 11 – 5% intervention, 11% control **Female:** 53% intervention 51% control **Race/ethnicity:** not reported **Socioeconomic status: (annual income)** was measured in terms of father's occupational status and rated as: High: 19% intervention, 16% control; Low: 23% intervention, 36% control Data was missing for: 58% intervention, 48% control	**Intervention/s** <u>Intensive intervention</u> SKIN SAFE was a programme "*developed by the New South Wales (NSW) Cancer Council in collaboration with the NSW Department of School Education (…). During the 4 weeks in which the programme was incorporated into the curriculum, cooperative learning techniques, student participation and problem-based learning strategies were utilised in an attempt to promote an awareness of the problems and potential solutions associated with solar exposure; and to encourage the students to develop some responsibility for their own welfare by critically examining and improving their own environment. The SKIN SAFE booklets were delivered to participating teachers in the intensive intervention group by NSW Cancer Council education officer. The teachers then implemented the programme simultaneously over the next 4 weeks across a number of curriculum areas. The*	*each item by circling "True", "False" or "Don't know"."* Four subscales were derived, which included: 1. Perceived barriers to solar protection 2. Benefits of using solar protection 3. Desirability and attractiveness of a suntan 4. Susceptibility to skin cancer *"Six items did not fit into any of the subscales."* *"A score for each student was calculated by adding up the factor scores on individual items within each subscale, with a low score on a subscale indicating that students were more likely to agree with the belief that was being measured by the subscale. The scores for each factor were included as variables in the logistic regression analysis."* <u>Solar protection</u>	Predictors of high solar protection (post-test 2): o Adequate (vs. inadequate) baseline protection: OR=2.39 (95%CI: 1.43 to 3.99) o Intensive intervention (vs. control): OR=3.06 (95% CI: 1.33 to 6.99) o No. of opportunities to use protection: OR=0.74 (95% CI: 0.60 to 0.91) indicating that with each additional opportunity students were less likely to protect themselves No other variables were identified as significant predictors. No other results were reported **Secondary outcomes:** N/A **Attrition details:** Out of the 648 students, 36 were excluded from analysis because of missing data. No further information provided.	wearing protective clothing) **Limitations identified by review team:** o No information on how many schools were allocated to each intervention arm o Exact results for outcomes for study arms not provided **Evidence gaps and/or recommendations for future research:** o Interventions targeting parents and teachers o Investigation of continued education **Source of funding:** not reported

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
validity[†]**:** 3	**Excluded population:** not reported **Setting:** school	*actual number of hours allotted to the programme depended on the extent to which teachers incorporated the programme within their curriculum. The booklets provided teachers with background information, programme aims and objectives, and suggested teaching strategies and activities. Comprehensive instructions are given for both the teacher and the student for undertaking each of the eight steps of the programme. (…) Teachers were encouraged to contact the education officer if any queries arose in the use of the programme."* <u>Standard intervention</u> This arm is not analysed, as apart from a 30-minute lecture it included distribution of sunscreen. **Intervention category**[¥]**:** I **Intervention period:** 4 weeks **Comparator/s:** *Students in this group received no*	<u>behaviour</u> It was measured with a validated Solar Protection Behaviour Diary completed by students over 5 consecutive school days. Methods of completing the diary were explained by teachers with the use of overhead transparencies. *"Students completed diaries by circling the number corresponding with their answer in each category."* A score was calculated for every opportunity available for protection (student being outdoors in the periods of recess or lunch during fine weather). It was completed for 5 school days during recess, first and second half of lunch (a total of 15 possible opportunities). Protection level was calculated for each of the body regions. The points assigned to each region were weighed (to reflect the risk of that region developing skin cancer) to calculate the overall		

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		intervention. **Sample sizes:** **Total n =** 648 (612 after excluding participants with missing data) **Intensive intervention n =** 247 **Standard intervention n =** 180 **Control n =** 185 **Baseline comparisons:** *There were no significant differences among the groups in the demographic variables. However (…) in the intensive intervention group there were significantly more students using a high level of solar protection at baseline compared to the control group…* **Study sufficiently powered?:** no information on power calculation	protection level. The maximum was 16 points. Participants scoring 12 or more were classified as having a high level of protection. **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** Post-test measures were collected 5 weeks and 8 months after the baseline measures **Method of analysis:** Not reported if ITT Regression analyses to identify predictors of high solar protection.		

Table 45 Glanz

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Glanz et al.[42] **Year:** 2001 **Aim of study:** to report the "*impact of a childhood skin cancer prevention program (SunSmart) on staff at outdoor recreation sites where a child-focused intervention was conducted"* **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 3	**Source population/s:** staff of Hawaii recreation centres **Country:** USA **Study year:** 1996 **Eligible population:** 258 group leaders **Selected population:** 176 group leaders who responded to the baseline survey, "*all of whom led groups of children"* (6-8 years old) "*through various daily activities, including outdoor games, field trips, sports, and arts and crafts"* **Age:** 20.9 (SD 7.7) – for 170 participants from all groups **Female:** 106 (60.9%) in all three groups **Race/ethnicity (for all three groups):** White: 9 (5.3%) Hawaiian/ part-Hawaiian: 39	**Method of allocation:** sites randomised to interventions by blocking strategy **Measures to minimise confounding:** the analysis controlled for *"staff age, education, ethnicity, recreation site, type of staff position, and baseline level of the dependent variable of concern"* **Intervention/s:** Education arm: *"60-90 minute staff training, a leader's guide for staff, on-site activities, and educational materials for children aged 6 to 8 years and their parents"* and incentives for children including "*logo lunch sacks, school supply kits, magnets, temporary SunSmart tattoos, logo hats, and logo T-shirts"* Education + environment/ policy arm[‡‡‡‡‡‡‡‡‡] *"education components plus sunscreen, portable shade tents, and policy consultations"*	**Primary Outcomes:** o Knowledge about skin cancer prevention o Attitudes o Sun protection habits – *"scores were calculated on the basis of a composite of 5 sun protective behaviours (wearing a shirt with sleeves, wearing sunglasses, seeking shade, using sunscreen and wearing a hat)"* o Sun protection policy score – created by adding up responses to 5 questions on required or encouraged sun protective practices in the recreation sites o Norms for sun protection index	**Primary outcomes:** Knowledge Unadjusted mean Baseline: 4.46 intervention, 4.67 control Post-test: 5.02 intervention, 4.57 control Follow-up: 4.92 intervention, 4.55 Adjusted difference between baseline and post-test intervention: 0.79 (SE 0.27), p<0.01 Adjusted difference between changes in intervention and control group: 0.46 (SE 0.30), p≥0.05 Staff sun protection habits Unadjusted mean Baseline: 2.39 intervention, 2.33 control Post-test: 2.49 intervention, 2.33 control Follow-up: 2.30 intervention, 2.25 control Adjusted difference between baseline and post-test intervention: 0.37 (SE 0.12), p<0.05 Adjusted difference between	**Limitations identified by author:** o Reliance on self-reported measures o Survey non-response both at baseline and at follow-up o Possibly selective drop out o Limited time frame **Limitations identified by review team:** No additional limitations identified **Evidence gaps and/or recommendations for future research:** A study with a longer term evaluation of this kind of intervention. **Source of funding:** *"a cooperative agreement with the Health Promotion and Education Branch, Department of Health, State of Hawaii, and the Division of Cancer Prevention and Control at the Centers for*

‡‡‡‡‡‡‡‡‡ Data for this mixed arm not extracted

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	(22.8%) Japanese: 53 (31.0%) Filipino: 16 (9.4%) Chinese: 10 (5.8%) Other/ other mixed: 44 (25.7%) **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported **Setting:** workplace	After the initial training leaders delivered interventions for children over the following 6 weeks **Intervention category[¥]:** I+III **Intervention period:** 60-90 minutes **Comparator/s:** do nothing and an abbreviated educational package after the last follow-up test **Sample sizes:** **Total n =** 176; results for 127 participants who completed baseline and post-test survey **Intervention n =** not reported **Control n =** not reported **Baseline comparisons:** of the 11 variables measured at baseline there were significant differences for two (gender and age); all these variables were adjusted for in the analysis **Study sufficiently powered?:** no information on power calculation	– created by adding up responses to 3 statements about whether most staff use sunscreen, wear hats, and cover up when outdoors; **Adverse events:** not reported **Secondary outcomes:** process and implementation evaluation **Follow-up periods:** 8 weeks for all staff and 3 months for staff who agreed to be mailed a questionnaire **Method of analysis:** not ITT – only analysis of respondents to multiple surveys; missing values were imputed, but this analysis was not reported	changes in intervention and control group: 0.06 (SE 0.15), p≥0.05 Staff sunscreen use Unadjusted mean Baseline: 2.18 intervention, 2.08 control Post-test: 2.46 intervention, 2.44 control Follow-up: 2.40 intervention, 2.39 control Adjusted difference between baseline and post-test intervention: 0.35 (SE 0.22), p≥0.05 Adjusted difference between changes in intervention and control group: 0.18 (SE 0.40), p≥0.05 Perceived norms Unadjusted mean Baseline: 3.01 intervention, 3.11 control Post-test: 3.43 intervention, 2.99 control Adjusted difference between baseline and post-test intervention: 0.51 (SE 0.25), p<0.05 Adjusted difference between changes in intervention and control group: not reported	*Disease Control and Prevention, within the US Public Health Service"*

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				Program sun protection policies Unadjusted mean Baseline: 1.72 intervention, 1.44 control Post-test: 2.12 intervention, 1.68 control Adjusted difference between baseline and post-test intervention: 0.68 (SE 0.39), p≥0.05 Adjusted difference between changes in intervention and control group: not reported **Secondary outcomes:** For both intervention groups (education and education + environmental changes): *"85.6% reported that they gave sun safety messages to children; 88.9% used the stickers on the SunSmart scoreboard; 82.2% encouraged kids to be sun smart at home; and 76.7% went over the ABCs of sun protection. Although the education-only group tended to have slightly higher levels of implementation, none of these differences was significant."* **Attrition details:** 176 staff members responded to the baseline survey, 144 to the	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				post-test and 66 to the follow-up questionnaire; 17 of the respondents to the post-test survey were not included in the main analysis, as they did not complete the baseline survey;	

Table 46 Glazebrook

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Glazebrook et al.[44] **Year:** 2006 **Aim of study:** to evaluate the effectiveness and acceptability of a targeted multimedia health education program in a Family Practice setting	**Source population/s:** Family Practices in Nottinghamshire **Country:** UK **Study year:** 1998 **Eligible population:** convenience sample of morning, afternoon and evening surgeries **Selected population:** consenting patients identified to have at least one risk	**Method of allocation:** five pairs of practices were matched. One practice in each pair was randomly allocated to intervention by an independent researcher blind to the identity of practices by toss of coin. **Measures to minimise confounding:** not reported **Intervention/s:** Skinsafe computer program designed to be completed in a single sitting (10-15 minutes) It used animation, photographs and simple text to inform users about the dangers from excessive sun exposure,	**Primary Outcomes:** Measured in a three part Melanoma Questionnaire 1. knowledge: how to reduce risk from melanoma, risk factors for melanoma, early signs of melanoma; maximum score 12; 2. behaviour during the previous year (six months for follow up): shade seeking, use of high factor sunscreen (SF 15+), wearing a hat and covering skin, sunbathing, sunburn,	**Primary outcomes:** 1. mean knowledge Pre-intervention: intervention 2.90 (SD 1.55), control 2.75 (SD 1.65); Post-intervention §§§§§§§§§.: intervention 3.71 (SD 1.71), control 3.03 (SD 1.64) Sensitivity**********: intervention 4.12 (SD 1.55), control	**Limitations identified by author:** possible selection bias with lower recruitment in the control group; the outcome measurement is based on self-reported behaviour; practitioners did not keep a record of prescribing rates so it is not clear what was the reason for the low rate of men **Limitations identified by review team**: A possible additional source of selection bias was that patients were prescribed Skinsafe and when they intended to use it – they were invited to participate (more enthusiastic than controls?) **Evidence gaps and/or recommendations for future**

§§§§§§§§§ Missing follow up values replaced with baseline data

********** Follow up data analysis for responders only

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Study design: RCT **Internal validity[§]:** + **External validity[†]:** 1	factor of melanoma based on a chart of characteristics: red hair, multiple moles, history of sunburn as a child, freckling, family history of melanoma, fair sun sensitive skin; patients prescribed to Skinsafe who intended to use it were invited to participate in the study; patients in the control group were invited to participate if they met at least one of the characteristics; **Age (mean):** intervention 38.2 (SD 14.3); control 38.4 (SD 15.2) **Female:** intervention 82.6%, control 78.5% **Race/ethnicity:** not reported **Socioeconomic status:** (annual income) not reported **Excluded population:** not reported **Setting:** Family Practice	how to protect the skin from the sun, characteristics of skin at risk, early signs of melanoma, how to reduce risk from melanoma, how to check skin for suspicious lesions. The final section prompts the user concerning personal risk factors and gives individualised feedback of relative risk. The prescription resembled a standard one. The Skinsafe program which was operated by a trackball device, was sited at a dedicated workstation either in a separate room or in a quiet corner of the waiting room. It was self-directed, but an illustrated instruction sheet attached to the workstation provided additional operating instructions. **Intervention category[¥]:** IV **Intervention period:** 10-15 minutes **Comparator/s:** probably do nothing **Sample sizes:** **Total n=** 589 **Intervention n=** 5 practices, 259 patients **Control n=** 5 practices, 330 patients	skin self-examination and examination by others every few months; maximum score 8, higher score indicating sun safe behaviour 3. perceived risk: rated on a five point scale compared to general population **Adverse events:** not reported **Secondary outcomes:** satisfaction questionnaire **Follow-up periods:** 6 months **Method of analysis:** ITT replacing missing values for non-responders with baseline data; sensitivity analysis performed to examine the effect of this strategy;	3.36 (SD 1.46) Mean difference †††††††††† Primary[1]: 0.51 (95% CI: 0.30, 0.72); sensitivity[2]: 0.59 (95% CI: 0.33, 0.86) Effect size: primary 0.31 ($p<0.001$), sensitivity 0.39 ($p<0.001$) 2. mean skin protective behaviour: Pre-intervention: intervention 4.60 (SD 1.82), control 4.66 (SD 1.55); Post-intervention: intervention 5.36 (SD 1.72), control 5.06 (SD 1.59) Sensitivity: intervention 5.70 (SD 1.51), control 5.30 (SD 1.57) Mean difference Primary: 0.30 (95% CI: 0.10, 0.51); sensitivity: 0.33 (95% CI: 0.09, 0.57) Effect size:	**research:** prescribing of such a program to male patients and their intention to use it **Source of funding:** Trent NHS Executive **Comments:** study published 8 years after recruitment begun; recruitment started 2 years before the publication of a study on the results of which power calculation was based; numbers of patients in follow up groups slightly higher than at baseline – including values form patients not included in pre-intervention analysis?

†††††††††† Mean difference between intervention and control at follow up adjusted for baseline values

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Baseline comparisons: more patients consented in the intervention practices than in control ones (93.6% vs. 79%); authors report that there were no significant differences between groups with regards to possible predicators of response such as age, gender, educational level and occupational status **Study sufficiently powered?:** the sample size was determined for a 5% two-sided significance level, with 90% power, to detect a 0.6 point difference in knowledge scores with a SD of 1.7 based on a previous study; using a conservative strategy for a matched-pair cluster design with no correlation between matched pairs, an intracluster correlation coefficient of 0.02 and 60 patients per cluster a total of 10 practices was required		primary 0.18 (p=0.004), sensitivity 0.21 (p<0.007) 3. perceived risk: at baseline only 132/589 (22.4%) rated themselves as above average risk, and 126/589 (21.4%) rated themselves as below average. There were no significant changes in ratings over time in either group. At 6 months 27 (12.6%) participants in the intervention group and 23 (9.4%) in the control group (OR 1.39, 95% CI 0.77, 2.51). 4. number of patients checking moles (%) Pre-intervention: intervention 159/257 (61.9%), control 215/327 (65.7%) Post-intervention: intervention 209/259 (80.7%), control 243/328	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				(74.1%) Sensitivity: intervention 186/214 (86.9%), control 192/245 (78.4%) Odds ratio: primary 1.67 (95% CI 1.04, 2.70, p=0.035), sensitivity 1.78 (95% CI 1.01, 3.14, p=0.045) **Secondary outcomes:** 98% agreed or strongly agreed that the surgery was a good place for Skinsafe. 96% agreed or strongly agreed that they enjoyed using Skinsafe, 87% had found the programme easy to use, 90% agreed that they had learned a lot from the program, 91% would use this type of program again. **Attrition details:** Intervention group: 0 practices, 45 (17%) patients	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				did not respond to follow-up questionnaire Control: 0 practices, 85 (26%) patients did not respond to follow-up questionnaire	

Table 47 Greene

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Greene & Brinn[45] **Year:** 2003 **Aim of study:** to explore messages which may be effective in reducing the use of tanning beds amongst Caucasian college females	**Source population/s:** Caucasian female college students at a midsized South-Eastern University in the USA (precise details of venue not reported). **Country:** USA **Study year:** not reported **Eligible population:** Participants were recruited (methods not reported) from undergraduate courses.	**Method of allocation:** not reported **Measures to minimise confounding:** none reported **Intervention/s** *"The study explored messages which may be effective in reducing the use of tanning beds amongst Caucasian college females, specifically by increasing perceived susceptibility to skin cancer and sun damage.* *After providing written*	**Primary Outcomes:** The study measured tanning behaviour change, and tanning bed use. **Adverse events:** none reported **Secondary outcomes:** The study measured message perceptions, intention to tan, intention to protect skin, and perceived susceptibility to skin cancer.	**Primary outcomes:** ***Tanning bed use and change*** *"Tanning bed use (M=3.06; SD=6.32) was measured at the pre-test with the question 'How many times have you used a tanning bed in the past month?* *Tanning bed change (M= -1.67; SD=5.11) between the pre-test and post-test was measured by telephone callback. Subjects were asked to answer the question 'Would you please estimate how many times you have used a tanning bed in the past month?' Behaviour change was measured by subtracting each subject's use of tanning beds in the month following the pre-test from their month prior to the pre-test. A positive score indicated a reduction and a negative score an increase in tanning bed use. Prior*	**Limitations identified by author:** The study was conducted during the six weeks prior to the spring break which is a popular time for students to use tanning beds with the aim of developing a 'base tan' before going on vacation. Participants who reported tanning prior to the spring break may have considered a base tan a preventive behaviour to decrease the likelihood of burning during the spring break but this possibility was not explored in the data.

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Study design: controlled before & after **Internal validity[§]:** - **External validity[†]:** 3	**Selected population:** 141 Caucasian female college students participated in the study outside class time, and received extra credit for participation. *The participants were raised primarily in the southeast (72%), and most had previously visited a dermatologist (60%).* **Age:** 19-26 years (mean 21.4 years) **Female:** 100% **Race/ethnicity:** 100% Caucasian **Socioeconomic status: (annual income)** not reported **Excluded population:** All males and non-Caucasian females **Setting:** university	*consent, participants were placed in a room with up to seven other people and given a survey to complete (approximately 20 minutes).* *Upon completion of the survey all participants were given a modified debriefing form (to not contaminate the post-test).* *A telephone survey contacted 98.6%of the initial participants 3-4 weeks later."* Surveys were identical with the exception of the presence or absence of one of two types of evidence format (statistical, narrative or no message), and the presence or absence of a self-assessment to calculate personal risk for skin cancer (3 x 2 design). There were three message evidence conditions focusing on problems associated with tanning, tanning beds, and sun exposure. One message was statistical in format, providing statistical proof or evidence about the risk of use of tanning beds and information about skin cancer. The second message used a narrative format that told	**Follow-up periods:** 3-4 weeks **Method of analysis:** *"Perceptions of the message evidence format (statistical or narrative) were tested via a series of t-tests. The level of significance was set at p<0.05 for all tests except correlations, where 0.01 was utilised to protect against Type I error."*	*tanning behaviour was measured with a single item, 'How many times have you used a tanning bed in the past year?'"* Participants who read the statistical message reported decreased tanning behaviour (or change) ($F(2,136)=2.87$, $p<0.05$, $eta^2=0.05$) compared with those who did not read any message (the effect of the narrative message was not significantly different). For tanning bed use one month post message, the statistical message was significantly better ($F(2, 136)=3.02$, $p<0.05$, $eta^2=0.04$) than either the narrative or no message. **Secondary outcomes:** ***Message perceptions*** *"Perceptions of the message (narrative or statistical) were measured by ten Likert-type items with five-point responses ranging from 'strongly agree' to 'strongly disagree'."* There were significant differences between the statistical or narrative messages in mental effort ($t(98) = -0.47$, $d=0.05$) or message reflectiveness ($t(98) = 0.14$, $d=0.01$). The narrative message ($M=3.89$; $SD= 0.56$) produced greater ratings of realism ($t(98)= 2.29$, $p<0.05$, $d=0.23$) than the statistical message ($M=3.57$; $SD=0.52$). The statistical message ($M=3.10$; $SD= 0.76$) produced greater ratings on information value ($t(98)= 2.85$, $p<0.01$, $d=0.31$) than the narrative message ($M=2.69$; $SD=0.79$). ***Intention to tan*** *"This was measured at the pre-test using six Likert-type items with five-point responses ranging from 'strongly agree' to 'strongly*	This trend of tanning bed use before the spring break was reflected in the call back surveys, which indicated an increase in tanning during the month following the survey compared to the month before the survey. The self-reported nature of the data has inherent limitations. The sample size and geographic location prevent broad generalisation. **Limitations identified by review team:** As participants were surveyed by telephone at follow-up social acceptability bias may have influenced their responses. **Evidence gaps and/or recommendations for future research:** A larger higher quality trial (i.e. RCT) assessing the impact of different styles of message provision at a different time of the year (rather than the spring

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		the history of a young woman who used tanning beds and later developed facial skin cancer. The statistical and narrative messages contained identical arguments (quality and number) and sources, but were presented in different evidence formats. Participants in the control condition received no message (and no message perception ratings). **Intervention category[¥]:** III **Intervention period:** not reported **Comparator/s:** control group/no message **Sample sizes:** **Total n =** 141 **Intervention n=**not reported **Control n =** 45 **Baseline comparisons:** not reported **Study sufficiently powered?:** power calculation not		*disagree'."* For intention to use tanning beds, both messages ($F(2,136)= 3.93$, $p< 0.05$, $eta^2 =0.05$) were significantly better than the no message condition. ***Perceived susceptibility*** *"Perceived susceptibility to skin cancer and sun damage was measured at pre-test using eight Likert-type items with five-point responses ranging from 'strongly* agree' *to 'strongly disagree'."* For susceptibility, all three messages differed significantly from each other ($F(2,136) = 3.17$, $p<0.05$, $eta^2 =0.06$), with the statistical message resulting in the most susceptibility and the no message condition the least. There were no significant differences by message evidence format in intentions to protect skin ($F(2, 136)= 0.96$, $eta^2 =0.05$). **Attrition details:** Of the 141 students recruited 139 (98.6%) were contacted in the follow-up telephone survey.	break when students traditionally use tanning beds to obtain a base-tan before vacation) and over the longer term would be useful. **Source of funding:** not reported

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		reported			

Table 48 Hanrahan

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Hanrahan et al.[46] **Year:** 1995 **Aim of study:** *"to test whether educational material may increase knowledge about melanoma and assist in discrimination between benign and malignant pigmented skin lesions"* **Study design:** RCT **Internal validity[§]:** +	**Source population/s:** men aged at least 45 **Country:** Australia **Study year:** not reported **Eligible population:** *"men over the age of 45 who were employees of The Broken Hill Propriety Co. Ltd and its subsidiaries in Newcastle"* **Selected population:** 368 employees who consented to participate **Age, median (years):** 55 intervention, 53 control A, 54 control B; range in all groups was 45-65 **Female:** 0% **Race/ethnicity:** not reported	**Method of allocation:** "*men in an industrial complex were allocated to an intervention (…) and two control groups"* **Measures to minimise confounding:** *"multivariate regression analysis to examine the effect of demographic, educational and social factors"* **Intervention/s** Participants were given two brochures to retain for three weeks. The brochures were: *""The many faces of melanoma", prepared by the New York Skin Cancer Foundation, and a booklet especially designed for men over the age of 45. The former contained 24 coloured photographs illustrating melanomas at different stages and general*	**Primary Outcomes:** Questionnaire which contained 7 parts: o 1-6 with general questions about melanoma o 7 contained 8 photographs which tested ability to distinguish between pigmented skin lesions which required to be seen by a doctor and harmless ones *"Most questions were in a "yes, no, don't know" format Each question was given a score of 1 and the sum of correct scores in each part was used to derive an overall score which was converted to a percentage."* At three months questions about perceptions and	**Primary outcomes:** Knowledge about melanoma: o Baseline: 52.4 intervention; - control A; 53.1 control B o 10-11 week: 62.8 intervention; 52.0 control A, 53.8 control B o 20 week: 66.8 (75 participants) intervention; 57.4 (69 participants) control A, 57.6 (75 participants) control B o Increases from baseline to week 10-11: 19.8 ($p<0.0001$) intervention; - control A; 1.3 (NS) control B o Increases from baseline to week 20: 19.7 ($p<0.001$) intervention; 5.5 (NS) control A; 1.6 (NS) control B Results for the intervention group for individual parts of the questionnaire were also reported, but are not included in this evidence table; Correlations between counts of pigmented lesions by participants and doctors at the end of the study: p=0.908	**Limitations identified by author:** o More blue collar workers and less managers than in the general population o High loss to follow-up, especially at second post-test **Limitations identified by review team:** o Results in groups not compared against each other o Demographic information not provided in detail o Not ITT analysis o Only self-reported measures of effectiveness **Evidence gaps and/or**

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
External validity[†]: 3	**History of skin cancer:** only reported that there were no differences between groups at baseline **Socioeconomic status: (annual income)** not reported; Reported employment categories: o Managers and administrators 5% o Professionals 15% o Paraprofessionals 7% o Clerical and sales workers 9% o Trades-persons 18% o Labourers 20% o Plant operators 26% **Excluded population:** not reported **Setting:** workplace	*information about melanoma. The second brochure was designed to provide answers to questions contained in the questionnaire. It included facts about melanoma, changes they should look for on their skin, instructions for self-examination and photographs of benign pigmented lesions (freckles, naevi, atypical naevi, seborrhoeic keratoses) and both early- and late-stage melanoma. This booklet was developed after consultations with many professionals. The language was simple and direct and the booklet was in question-and-answer format. It was tested in pilot studies in 50-year-old males in a "club" setting and found to be understood by this target group."* **Intervention category[¥]:** III **Intervention period:** N/A **Comparator/s:** A. no information with only post-testing B. no information with pre-	self-examination were added. *"The self-examination body chart included demonstrations of self-examination techniques and body outlines of the areas (trunk and arms) in which pigmented lesions were to be counted. Participants were instructed to document the number of pigmented lesions greater and less than 1cm in diameter on their trunk and arms. The chart contained separate rows for distinguishing between moles and other pigmented lesions, such as seborrhoeic warts."* Examinations by doctors were carried out after the first post-test and they included only the trunk and arms. **Adverse events:** not reported **Secondary outcomes:**	intervention; p=0.027 control A; p=0.01 control B <u>Awareness of melanoma and ability to examine skin</u> (3 month follow-up), % positive responses: o Awareness of melanoma: 98% intervention, 80% control A, 80% control B o Ability to examine own skin: 96% intervention, 73% control A, 70% control B o Frequency of self-examination: 71% intervention, 69% control A, 71% control B o Skin check by doctor: 75% intervention, 67% control A, 77% control B o Skin check by self: 69% intervention, 47% control A, 64% control B **Secondary outcomes:** N/A **Attrition details:** Of 368 participants who entered the study, 314 completed the four-week and 219 three-month follow-up. *"Losses from the study were caused by changes in their wish to participate, failure to return material despite repeated prompts, or loss of contact."*	**recommendations for future research:** comparing the effects of interventions between groups **Source of funding:** a grant-in-aid from Broken Hill Propriety Co. Ltd and the Hunter Melanoma Foundation

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		and post-testing **Sample sizes:** **Total n =** 314 analysed of 368 who were enrolled **Intervention n =** 110 **Control A n =** 108 **Control B n =** 96 **Baseline comparisons:** *"There was no significant difference between the three groups (…) confirming an absence of any detectable bias in the randomisation process."* **Study sufficiently powered?:** no information on power calculation	not reported **Follow-up periods:** The study was reported to be carried out in the following time periods: Week 1: consent obtained Week 2-3: baseline questionnaire and self-examination Week 4-6: participants retain brochures Week 10-11: post-test 1 questionnaire and self-examination chart Week 12: examination by doctors Week 20: post-test 2 questionnaire and self-examination chart **Method of analysis:** Not ITT: "*data from participants who did not complete the study were not included in the analysis."* *"A total knowledge score was computed and compared to the correct answers of the questionnaire by*		

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
			multivariate regression analysis. Missing values were excluded from analysis. Values were missing at random and were less than 0.5 per cent of the answers. *Multivariate regression analysis was used to examine the effect of demographic, educational and social factors on knowledge scores on differences between groups. The Pearson correlation test was used to assess agreement between participant and doctor for lesion counts."*		

Table 49 Hewitt

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Hewitt et al [47] **Year:** 2001 **Aim of study:** *"to assess the effectiveness*	**Source population/s:** 179 state maintained primary and junior schools located within the boundaries of Nottinghamshire Health District.	**Method of allocation:** The 12 schools whose head teachers agreed to participate in the intervention were stratified according to their geographical location to ensure a balance between urban and rural schools. Using computer generated	**Primary Outcomes:** Effectiveness was measured in changes in levels of knowledge. The lessons were taught and supervised by the teachers in the presence of a researcher. The	**Primary outcomes:** ***Knowledge*** Mean ± SD pre-intervention scores for the 3 groups were as follows: computer, 8.23 ± 2.07; workbook, 7.65 ± 2.27; control, 8.54 ± 2.22. Mixed-model analysis revealed significant increases in all 3 groups (computer: 1.73,	**Limitations identified by author:** Cluster randomisation was used with schools randomly allocated to the two intervention arms of the study however as the control schools were self

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
of 'Sun-safe', a computer-based resource designed to promote skin cancer awareness and educate children, aged 10-11 years, about the effects of excessive exposure to the sun and associated skin cancer preventive behaviours" **Study design:** controlled before & after **Internal validity[§]:** - **External validity[†]:** 3	**Country:** UK **Study year:** 1998 **Eligible population:** A list of the 179 state maintained primary and junior schools located within the boundaries of Nottinghamshire Health District was arranged in random order, and schools were contacted and asked to participate in the intervention part of the study. This process continued until the required 12 schools had agreed to participate. Subsequently, additional schools from the list were contacted to provide 4 schools willing to act as controls (these schools participated in the testing only). Participation was conditional on a teacher contact attending a briefing session, at the local health promotion specialist centre, prior to the introduction of the resources into the schools. Also the schools had to possess at least 2 Acorn computers (model A3020).	random numbers these schools were allocated to use either the resource incorporating the computer programme or the workbook. The 4 schools acting as controls appear to have been contacted specifically for this purpose. **Measures to minimise confounding:** Stratification according to geographical location - analysis of the urban/rural stratification showed a strong association with average school performance based on the Year 6 annual assessments (SATs), urban schools having scores lower than the LEA average and rural schools having higher scores. **Intervention/s** Sun-safe was offered as either a computer-based or workbook-based resource. Both resources were designed for use in class-based topic work. The class teacher selected pairs of children to work together. Poor readers were paired with readers for peer support. The broad objectives of the 2 resources	researcher acted as an observer and administered a questionnaire before the intervention. The children were asked complete the questionnaire (referred to in the lesson as a quiz). They were advised not to confer. Children with reading difficulties were encouraged to seek help from the teacher but this did not extend to explanations of the meaning of the terms used in the test. The day after the pre-test questionnaire and intervention the teachers went through the answers in the workbook and computer programme and the first post-intervention questionnaire was administered. The second post-intervention questionnaire was administered 6 weeks later. The control schools completed the questionnaires at the same time points. **Adverse events:**	95% CI 1.00 to 2.46; workbook: 2.36, 95% CI 1.66 to 3.05; control: 0.93, 95% CI 0.11 to 1.74) but only the workbook group was significantly better than the control group (1.43, 95% CI 0.36 to 2.50) and there was no significant difference between the intervention groups (0.63, 95% CI -0.8 to 1.63). **Secondary outcomes:** ***Attitudes*** Mean ± SD pre-intervention scores for the 3 groups as follows: computer, 10.41 ± 3.14; workbook, 9.82 ± 3.17; control, 9.86 ± 3.31. Mixed-model analysis revealed significantly greater increases in both intervention groups compared with the control group but no significant differences between them (computer: 1.92, 95% CI 0.76 to 3.09; workbook: 2.37, 95% CI 1.27 to 3.47; control: -0.01, 95% CI -1.28 to 1.27). ***Behavioural intentions*** Mean ± SD pre-intervention scores for the 3 groups were as follows: computer, 6.71 ± 1.72; workbook, 5.91 ± 1.76; control, 6.19 ± 1.79. Mean increases in behavioural intentions scores were small. However mixed-model analysis revealed significantly greater increases in both intervention groups compared with the control group with no significant differences between the intervention groups (computer: 1.11, 95% CI 0.70 to 1.51; workbook: 0.66, 95% CI	selected the study design did not totally adhere to a randomised controlled trial. **Limitations identified by review team:** Losses to follow-up at 6 weeks were between 18 & 23% and as an ITT analysis was not undertaken the impact of selection bias on the final results needs to be taken into account. Also based on the numbers finally assessed the study seemed to lack sufficient statistical power to detect a difference between the treatment groups. **Evidence gaps and/or recommendations for future research:** Further well conducted RCTs assessing the impact of the intervention in the longer term would be of benefit. **Source of funding:** The evaluation project was funded by NHSE Trent. The production of

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Selected population: One class from each of the participating schools took part (n=454) -*classes of Year 6 pupils and mixed classes of both Year 5 and 6 pupils were eligible.* **Age:** 10-11 years **Female:** not reported **Race/ethnicity:** not reported **Socioeconomic status: (annual income)** not reported **Excluded population:** schools already involved in a project covering the same topic **Setting:** school	were: to clarify key messages on skin cancer prevention; to provide information on the effects UV radiation on the skin; and to encourage responsible attitudes and behavioural intentions in relation to skin cancer prevention. <u>1. The Sun-safe teaching computer-based resource</u> The core of the Sun-safe computer-based teaching resource was an interactive computer programme for children aged 10-11 years. It was accompanied by teaching notes intended as guidance on the content and teaching methods to be used in the introduction of the topic. The computer programme was developed by a commercial company with input from health professionals who included a Health Promotion Specialist and a Nurse Specialist in Dermatology. *"The interactive programme uses colour, sound and movement. The story follows the adventures of a central character 'Dillo', the Armadillo who loses his protective armour and has to*	not reported **Secondary outcomes:** Effectiveness was measured in changes in attitudes and behavioural intentions. **Follow-up periods:** 6 weeks **Method of analysis:** *"Scores were created to measure knowledge, attitudes and behavioural intentions. For the analysis, the primary outcome measures were the scores in the tests 6 weeks after the intervention."* Each of the 14 knowledge questions answered correctly scored 1 point (maximum score=14). For attitudes and behavioural intentions a strongly favourable response (agree or disagree as appropriate) scored 2 points, a favourable response scored 1	0.26 to 1.05; control: 0.08, 95% CI -0.37 to 0.52). **Attrition details:** 376 (83%) children from the 454 originally enrolled completed both the pre-intervention test and the 6-week post-intervention test. Numbers allocated to the 3 groups were not reported but of the 374 (82%) children completing the knowledge sections of the pre and post intervention tests there were 128 in the computer group, 142 in the workbook group and 104 in the control group; of the 368 (81%) children giving valid scores for analysis of attitudes there were 125 in the computer group, 139 in the workbook group and 104 in the control group; and of the 348 (77%) children giving valid scores for analysis of behavioural intentions there were 123 in the computer group, 125 in the workbook group and 100 in the control group.	the computer-based resource was funded by Boots PLC.

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		learn how to protect himself from the harmful effects of the sun before reaching his final destination, the 'Sun City' theme park. To progress through the 20 minute programme the children have to correctly answer questions on a searching screen. By answering questions relating to four key sun-safe messages the children collect objects, such as SPF 15+ sun cream, that Dillo can use to protect himself the sun. Methods of sun protection are reinforced on a second page where the children tick off items on a packing list for Dillo's trip. Background information pages on tanning and fashion follow, along with a screen on the potentially harmful effects of UV radiation. A second screen invites users to click on relevant sun-safe objects from a beach scene. Finally Dillo arrives in Sun City where users apply their knowledge by identifying who is 'Most at Risk from the Sun' in a scene of children at a fun park on a hot sunny day." <u>2. The Sun-safe workbook</u> The Sun-safe workbook	point, and an unfavourable response scored 0. Thus maximum scores for 11 questions on attitudes and 5 questions on behavioural intentions were 22 and 10 respectively. To allow for the cluster effect the changes in scores in the 3 groups were compared using a mixed model analysis of variance, allowing for the pre-test score and a random class effect nested within the study groups. The analyses were based on scores from the children who completed the relevant sections of the pre- and 6-weeks post intervention tests.		

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		version of the story was developed to ascertain the effect of the interactive computer programme as a medium for learning. The workbook contained the same text and still images from the computer programme, it was given the same introduction by the teachers and designed to meet the same objectives. **Intervention category[¥]:** I **Intervention period:** During 1998 – precise details not reported **Comparator/s:** no intervention **Sample sizes:** **Total n=454** **Intervention n**=not reported **Control n**=not reported **Baseline comparisons:** The authors reported that the pre-intervention scores for knowledge and attitudes were similar amongst the three groups, and the pre-intervention score for behavioural intentions was			

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		slightly higher in the computer group than in the workbook and control groups. Statistical significance not reported. **Study sufficiently powered?:** An *a priori* sample size calculation was performed based on data from previous studies and by using the formulae given Machin and Campbell for clustered designs (Machin & Campbell, 1996). The calculation was performed using knowledge score as the primary outcome measure. For 80% power to detect, at the 0.05 level of significance, a useful difference in knowledge between the intervention groups, from 60 to 65%, with a standard deviation of 15% and intra-cluster correlation of 0.01, the required sample size was 191 pupils per group. With an average class size of 32, this required six classes in each group.			

Table 50 Hornung

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Hornung et al. [50] **Year:** 2000 **Aim of study:** "*to develop and evaluate a new multimedia computer program for the primary prevention of skin cancer among a childhood population"* **Study design:** RCT **Internal validity[§]:** + **External validity[†]:** 2	**Source population/s:** third and fourth grade schoolchildren in a public elementary school in North Carolina **Country:** USA **Study year:** not reported **Eligible population:** third and fourth grade schoolchildren in a public elementary school in North Carolina **Selected population:** 8 classes (third and fourth grade) in a public elementary school in North Carolina **Age (mean[‡‡‡‡‡‡‡‡‡‡]):**	**Method of allocation:** classrooms randomized to interventions **Measures to minimise confounding:** analysis of potential confounding factors performed; **Intervention/s** Before the intervention all the teachers in the study received written and verbal advice on how to conduct the study protocol. They also received printed materials about skin cancer (skin cancer prevention pamphlets produced by the American Academy of Dermatology and an information sheet written by one of the authors). Additionally in two intervention groups teachers: A. were asked to use a CD-ROM in the classroom setting via large-screen projection, and student volunteers were asked to take turn navigating through the program for the class. The C-ROM took approximately 18 minutes to complete. It contained colourful animation as well as digital audio and video. Three different cartoon characters modelled 3 different sun safety behaviours: extremely protective, overly risky and appropriate. (CD-ROM	**Primary Outcomes:** Measured in a shortened questionnaire (55 items) originally developed by Arizona Cancer Center; it covered 4 categories: 1. knowledge about the sun and dangers of UV radiation exposure, 2. attitudes regarding tanning, 3. behavioural practices of UV radiation protection, 4. demographic information (baseline characteristics); Responses were assessed on a 3-point Likert scale or formulated as "fill in the blank" Surveys were distributed in the	**Primary outcomes (adjusted[§§§§§§§§§§]):** 1.Mean knowledge score (100 pt.) Post intervention: (A) 75.2, p<0.001 compared to B and C, (B) 59.5, p=0.053 compared to C, 55.0 (control); overall p[**********] <0.001; 7 months follow up: (A) 70.9, p=0.005 compared to B, p<0.001 compared to C, (B) 66.5, p=0.0168 compared to C, (C) 57.4; overall p=0.002 2. Mean attitude score (100pt.) Post intervention: (A) 64.0, p=0.003 compared to B, p<0.001 compared to C, (B) 53.0 p=0.239 compared to C, (C) 48.6; overall p=0.002; 7 months follow up: (A) 63.3, p=0.148 compared to B, p=0.006 compared to C, (B) 54.7, p=o.341	**Limitations identified by author:** Possible information bias – all results depend on self reporting; children could have underreported certain behaviours to answer "correctly" **Limitations identified by review team:** o Questionnaires in the immediate post-test included questions about sunburns in the previous month. o The baseline survey was given in autumn and the 7 month follow up in spring – possible that for the second one children had a smaller chance to get sunburned. o Classes from the same school randomised to different interventions – possibility of contamination

[‡‡‡‡‡‡‡‡‡‡] calculated from data provided in the study

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	A. CD-ROM: 8.76 (SD 0.75) B. standard: 8.89 (SD 0.73) C. control: 8.49 (SD 0.63) All groups: 8.70 (SD 0.72) **Female%:** A. CD-ROM: 42 B. standard: 43 C. control: 48 All groups: 44 **Race/ethnicity:** not reported **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported **Setting:** school	group) B. were asked to teach about skin health as per their normal protocol. Since there was no teaching standard for skin cancer prevention, they were instructed to supplement their lessons with the information they previously received. (standard intervention group) **Intervention category¥:** IV vs. I **Intervention period:** probably during 1 class **Comparator/s** C Do nothing **Sample sizes:** **Total n =** 209 (8 classes) **Intervention A n =** 79 (3 classes) **Intervention B n =** 53 (2 classes) **Control C n =** 77 (3 classes) **Baseline comparisons:** age and grade were not equally distributed among intervention groups **Study sufficiently powered?:** no information on power calculation	classroom and teachers read the questions aloud; completion took 20-25 minutes **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** immediately after the intervention and 7 months later **Method of analysis:** not reported if ITT	compared to C, (C) 49.0; overall p=0.155 3. Mean behaviour score (100 pt.) Post intervention: (A) 45.8, p=0.015 compared to B, ns compared to C, (B) 39.0, ns compared to C, (C) 42.3; overall p=0.174; 7 months follow up: (A) 42.0, ns compared to B and C, (B) 38.8, ns compared to C, (C) 42.6; overall p=0.635 **Secondary outcomes:** N/A **Attrition details:** 17 children excluded from the final analysis: 3 from CD-ROM, 6 from standard intervention, 8 from control group	**Evidence gaps and/or recommendations for future research:** studies examining more frequent exposure to intervention; investigating the effect of tailoring messages; studies of multimedia interventions targeting different populations; **Source of funding:** grants from the Robert Wood Johnson Foundation, and the University of North Carolina Health Promotion and Disease Prevention Center **Comments:** The program was developed for kindergarten to second-grade children and tested in third and fourth grade Although it was supposed to be tested in 3rd and 4th graders, 3 second grade children were included

§§§§§§§§§§ Adjusted for baseline knowledge score, age, grade, gender, skin colour, and intraclassroom correlations

********** Based on a test of overall difference in intervention

Table 51 Hughes

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Hughes et al.[51] **Year:** 1992 **Aim of study:** "*to assess the effectiveness of (…) different teaching methods on knowledge, attitudes and behaviour"* **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 3	**Source population/s:** children in schools in England **Country:** UK **Study year:** 1990 **Eligible population:** children in selected schools **Selected population:** five parallel classes within each of seven schools from different areas of England (Liverpool, Rotherham, Rugby, London - 2 schools, Essex and Kent); there were two private schools, one secondary modern, one technical college, and three comprehensive schools; **Age:** 12-16+ **Female:** 51% in the July questionnaire and 61% in the September one	**Method of allocation:** Classes within each school were allocated a teaching method at random **Measures to minimise confounding:** not reported **Intervention/s** *"The educational material consisted of: (i) a colour leaflet "Suncool" which was an attempt to make covering-up look desirable, and also provided tips about avoiding sun exposure; (ii) a workbook containing basic information about the sun and ultraviolet radiation and skin cancer, particularly melanoma, which could easily be photocopied by the schools; (iii) a video called "Suncool" in which the actress Melanie Hill (from the television programme "Bread") discusses the concepts of sun and skin cancer with a class of children."*	**Primary Outcomes:** Knowledge was tested in July in a 33-item questionnaire; the total number of correct answers was counted; if children did not answer at least 6 questions, their score was classed as missing. Maximum score 33. Attitude was tested in July and September in a questionnaire consisting of 15 statements that students could mildly or strongly agree or disagree with. For a correct attitude one point taw given and for an incorrect one – zero. Half a point was given for week positive answers (mildly agree or disagreed with a statement). If children did not answer at least 6 questions, their score was classed as missing. Maximum	**Primary outcomes:** Knowledge (July): the score in the control group was significantly lower than in the remaining four ($p<0.001$). There was no significant difference between the intervention groups. The mean scores (SD) were: 1. (control): 19.5 (3.3) [measured in 133 participants] 2. 21.2 (3.3) [measured in 101 participants] 3. 22.6 (3.0) [measured in 95 participants] 4. 22.8 (4.8) [measured in 87 participants] 5. 20.5 (5.9) [measured in 110 participants] Attitude (July and September): the score in the control group was significantly lower than in the remaining four ($p<0.01$). There was no significant difference between the intervention groups. Scores from both questionnaires *"gave essentially the same results. There was a reasonable correlation between attitude in July and September, suggesting retention of reported attitudes after the summer holiday…"* The mean scores (SD) in July were: 1. (control) 3.55 (1.77) [measured in	**Limitations identified by author:** o Self reported attitudes and behaviour o The authors report: *our questionnaire contained a number of questions which did not provide useful information.* o *Alteration of classes following the summer holiday made it difficult in some schools to use the same group of children.* o The project was not closely supervised in the schools by researchers o *In one school it was noted that the physical education teachers who supervised the project were conspicuous by their sunbathing during lunch-*

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Race/ethnicity: not reported **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported **Setting:** school	Use of these materials defined five groups in each school: 1. *"No special education (control group).* 2. *The class read through the text of the workbook and took home "Suncool"."* (probably leaflet, but not clearly stated) 3. *"As Group 2, but they also watched the video.* 4. *As Group 2, but homework was set to design posters for public education.* 5. *As Group 2, but they had an additional discussion later in the week about issues raised by the package."* *"Teachers at the school were asked to supervise the project, and add identification to the questionnaires, so that the results from the two questionnaires could be paired."* **Intervention category[¥]:** I **Intervention period:** not	score 15. In the September questionnaire students were also asked about their sun-protective behaviour during summer holidays. **Adverse events:** Not reported **Secondary outcomes:** Not reported **Follow-up periods:** May to September (around 4 months) **Method of analysis:** Not ITT analysis One-way analysis of variance was used to compare knowledge and attitudes between intervention groups. *"If significant variation was found the control group (…) was compared with all the other groups (…). If this difference was significant then Groups 2-5 were compared. Behavoiur*	133 participants] 2. 4.18 (2.00) [measured in 100 participants] 3. 4.62 (2.18) [measured in 95 participants] 4. 4.51 (1.83) [measured in 83 participants] 5. 4.47 (1.98) [measured in 101 participants] Behaviour – there was no significant difference in behaviour according to teaching group. Actual results were not provided. Behaviour was significantly different when analysed according to some factors (such as place of holiday), which are however not relevant to this report. Analysis of relationship between behaviour and other factors could have been performed only on the subsample of 262 participants who were identified in both questionnaires. There was no association between the level of knowledge behaviour (in terms of sunburn, wearing a hat, covering up from the sun, or sitting in the shade). Attitude was significantly better in those who covered up in the sun ($p<0.0001$), wore a sunscreen ($p<0.004$), sat in the shade ($p<0.02$). There was no significant difference in attitude for wearing a hat	*breaks.* **Limitations identified by review team:** o No measurements at baseline o Possible contamination o Probably overestimates the effect as questionnaires with less than six answers are classed as missing **Evidence gaps and/or recommendations for future research:** Not provided **Source of funding:** supported by Imperial Cancer Research Fund; main author was in receipt of the Neutrogena Study Fellowship

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		reported; probably up to a week **Comparator/s:** *"no special education"* **Sample sizes:** **Total n =** 7 schools (5 classes in each); 543 students in July and 466 in September Numbers of participants in groups were not reported; maximum numbers for which outcomes were measured in July were: **Intervention 2 =** 101 **Intervention 3 =** 95 **Intervention 4 =** 87 **Intervention 5 =** 110 **Control n =** 133 **Baseline comparisons:** no baseline measurements were made; demographic characteristics were provided for all students in each questionnaire, without any details for study arms; **Study sufficiently**	*among groups was compared using chi-squared tests. Relations between attitude and knowledge scores were assessed by Pearson correlation coefficients."*	and sun burning. **Secondary outcomes:** N/A **Attrition details:** 543 children answered the July questionnaire and 466 the one in September. Only 262 were identified as answering both. *"The shortfall in September questionnaires was due to loss of data from one school in the post. The inability to match all questionnaires from July and September was due to failure of some schools to follow instructions about adding identification of questionnaires."* Probably there were participants who answered only the second survey in September, as there were more female students in the second than in the first one. *"Alteration of classes following the summer holiday made it difficult in some schools to use the same group of children."* For outcomes: o Knowledge (July) is reported only for 526 out of 543 participants (remaining probably answered less than 6 questions)	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		powered?: no information on power calculation		o Attitude (July) - reported for 523 out of 543 participants (remaining probably answered less than 6 questions) o Behaviour – wearing a hat (September) – reported by place of holiday for 414 out of 466 o Behaviour – using sunscreen (September) – reported by place of holiday for 389 out of 466	

Table 52 Jackson

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Jackson[52] **Year:** 2006 **Aim of study:** *"to develop, implement and evaluate a multicomponent psychosocial model-based intervention to reduce sun exposure and increase sun protection*	**Source population/s:** Introductory Psychology students at Arizona State University in Phoenix **Country:** USA **Study year:** not reported **Eligible population:** 456 Caucasian females **Selected population:** 211 non-Hispanic Caucasian women recruited	**Method of allocation:** *"Each participant was randomly assigned to one session (…) from among those that she could attend. Once the sessions (…) were constituted, the sessions were randomly assigned be either sun-protective (…) or control (…) program. (…) Assignment of session (…) was established by creating slips of paper equally divided between experimental and control, sampling them from a jar in sequence, and applying*	**Primary Outcomes:** Knowledge – measured as number of correct answers to 10 items Psychosocial scales – perceived: o Susceptibility (6 items) o Severity (4 items) o Benefits of sun protection (4 items) o Barriers to sun protection (7 items) o Self-efficacy (8 items)	**Primary outcomes:** <u>Knowledge:</u> Pre-test: 6.04 (intervention), 6.07 (control) Post-test: 8.35 (intervention), 6.11 (control) Test for post-test differences adjusted for baseline scores: F=363.38; p<0.01 <u>Psychosocial scales</u> – perceived: o Susceptibility (skin cancer) Pre-test: 4.56 (intervention), 4.73 (control) Post-test: 5.11 (intervention), 4.99	**Limitations identified by author:** o Study conducted in Arizona with 300+ days of sunshine o Messages highlighted dangerous daily sun exposure – might not be transferable to different climate o Participants were a very narrowly defined group (white, non-Hispanic women, college students) –

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
among young women and to characterise the intervention's mechanism of action." **Study design:** RCT **Internal validity[§]:** ++ **External validity[†]:** 3	**Age:** mean 19.46 (SD 1.3); range 18 to 25 **Female:** 100% **Race/ethnicity:** Caucasian 100% **History of skin cancer** 1% in intervention 2.9% in the control group **Socioeconomic status: (annual income)** not reported **Excluded population:** men; non-Caucasian women **Setting:** university	*them to the sequence of sessions throughout the week."* **Measures to minimise confounding:** post-test results adjusted for baseline **Intervention/s** Educational session about sun protection delivered by a trained presenter to groups of 3 to 15 participants (mean 8). The presentation comprised 3 segments: threat of skin cancer and photoaging – concentrated on susceptibility and severity of skin cancer; included a videotaped testimonial of a woman from the same university diagnosed with skin cancer; targeted sun protection – discussion of the effectiveness of sun protection measures and barriers to using sunscreen; included advice on buying sunscreen and a visualisation task on imagining *"purchasing sunscreen, placing it in a visible location and using it daily"* image norms – discussion of changing norms for sunbathing from the 1970s	o Advantages of tanning (7 items) o Descriptive norms for sun protection (4 items) o Descriptive norms for sunbathing (5 items) o Image norms with regard to society and media's views on paleness (5 items) o Intention to sunbathe (5 items) o Intention to sun protect (6 items) Sun-protective and sunbathing behaviour – for the face and for the rest of the body computed by taking the highest score for using: (a) sunscreen, (b) protective clothes or hat, (c) sun avoidance Past week sunbathing was measured with a single item. **Adverse events:** reported that there were no adverse events for this	(control) Test for post-test differences adjusted for baseline scores: F=13.47; p<0.01 o Susceptibility (photoaging) Pre-test: 4.50 (intervention), 4.60 (control) Post-test: 5.10 (intervention), 4.91 (control) Test for post-test differences adjusted for baseline scores: F=17.26; p<0.01 o Severity (skin cancer) Pre-test: 5.62 (intervention), 5.61 (control) Post-test: 5.80 (intervention), 5.70 (control) Test for post-test differences adjusted for baseline scores: F=0.19; p>0.05 o Severity (photoaging) Pre-test: 5.16 (intervention), 5.22 (control) Post-test: 5.42 (intervention), 5.21 (control) Test for post-test differences adjusted for baseline scores: F=18.32; p<0.01 o Benefits of sun protection (skin cancer) Pre-test: 4.92 (intervention), 5.15 (control) Post-test: 5.59 (intervention), 5.30 (control) Test for post-test differences	might limit generalisability o In other contexts messages like "pale is beautiful" could be considered racist o Reliance on self-reports **Limitations identified by review team:** Short follow-up; for the longer – intervention was mixed **Evidence gaps and/or recommendations for future research:** Research in a broader population **Source of funding:** National Institute of Mental Health Grant P30MH39246-13 to the Preventive Intervention Research Center at Arizona State University

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		to the 1990s It was emphasised that sun protection is important and that women can look attractive without a tan, but participants were not specifically instructed not to sunbathe to minimise reactance. Participants were given a sunscreen sample after completing the first post-test – hence results of the follow-up survey are not reported. **Intervention category[¥]:** I **Intervention period:** 35 minutes **Comparator/s:** session on stress management Participants were given a sunscreen sample after completing the first post-test – hence results of the follow-up survey are not reported.	intervention **Secondary outcomes:** not reported **Follow-up periods:** around 60 minutes for the non-mixed phase (2 weeks otherwise) **Method of analysis:** no information if ITT; mixed model ANOVA which controls for any clustering of responses	adjusted for baseline scores: F=20.28; p<0.01 o Benefits of sun protection (photoaging) Pre-test: 4.55 (intervention), 4.89 (control) Post-test: 5.57 (intervention), 5.18 (control) Test for post-test differences adjusted for baseline scores: F=17.24; p<0.01 o Barriers to sun protection Pre-test: 2.89 (intervention), 2.79 (control) Post-test: 2.65 (intervention), 2.77 (control) Test for post-test differences adjusted for baseline scores: F=1.42; p>0.05 o Self-efficacy Pre-test: 3.40 (intervention), 3.47 (control) Post-test: 4.20 (intervention), 3.37 (control) Test for post-test differences adjusted for baseline scores: F=81.86; p<0.01 o Advantages of tanning Pre-test: 3.91 (intervention), 4.22 (control) Post-test: 3.46 (intervention), 4.26 (control) Test for post-test differences adjusted for baseline scores: F=69.90; p<0.01	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Sample sizes: **Total n =** 211 **Intervention n =** 105 **Control n =** 106 **Baseline comparisons:** *"Participants in the two conditions did not differ significantly in mean age (…), or in mean skin tone (…). Nor did they differ in percentage with personal history of skin cancer (1% in SC vs. 2.9% in C) (…) or in percentage with family history of skin cancer(…)."* **Study sufficiently powered?:** *"Sample size was determined on the basis of having a sufficient power to detect a moderate effect size difference on an outcome at α=0.05, subject to consideration of the possibility of a design effect due to administering the treatment to groups of individuals and allowing for attrition at follow-up."*		o Descriptive norms for sun protection Not reported o Descriptive norms for sunbathing Not reported o Image norms with regard to society and media's views on paleness Pre-test: 4.06 (intervention), 3.82 (control) Post-test: 4.78 (intervention), 3.79 (control) Test for post-test differences adjusted for baseline scores: F=54.91; p<0.01 o Intention to sunbathe Pre-test: 4.28 (intervention), 4.46 (control) Post-test: 3.52 (intervention), 4.45 (control) Test for post-test differences adjusted for baseline scores: F=196.26; p<0.01 o Intention to sun protect Pre-test: 4.11 (intervention), 3.95 (control) Post-test: 4.84 (intervention), 4.10 (control) Test for post-test differences adjusted for baseline scores: F=44.33; p<0.01 No other results reported for immediate post-test.	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				Secondary outcomes: N/A **Attrition details:** No participants were lost to follow-up in the immediate post-test.	

Table 53 Jones 1994

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Jones et al.[54] **Year:** 1994 **Aim of study:** to test the hypothesis that *"in a sample of young adults, messages that stressed the negative effects of the sun on physical appearance would be more effective in promoting safe-sun beliefs and intentions*	**Source population/s:** undergraduate students **Country:** USA **Study year:** not reported **Eligible population:** white undergraduate students **Selected population:** 134 or 136 undergraduate students **Age:** 17-23 years old **Female:** 49% **Race/ethnicity:** 100% white **Socioeconomic status:**	**Method of allocation:** *"subjects were randomly assigned to read one of three essays about the effects of the sun on the body"* **Measures to minimise confounding:** **Intervention/s** Students were asked to read: The health-based essay ("Tanning: a Risk to One's Health") which *"discussed the health risks associated with excessive tanning, offered incidence statistics for skin cancer, described*	**Primary Outcomes:** Students were asked to rate: o the degree to which they were "concerned about the harmful effects of exposure to the sun" on a scale from 1 (not at all) to 12 (extremely) o how they planned to "work on getting a tan this coming summer, compared to last summer" on a scale from 1 (much less) to 12 (much more) o degree to which they intended "to	**Primary outcomes:** (only results comparing study arms were extracted) *"Subjects who read the appearance-based essay (mean 8.5) or the control essay (mean 8.1) indicated that they were significantly more concerned about the harmful effects of the sun than those who read the health-based essay (mean 6.4; ps<0.01)."* For subjects low in appearance motivation *"the appearance-based essay resulted in significantly lower intentions to engage in tanning behaviour during the coming summer in relation to the previous summer than did the control essay (p<0.05). In contrast, subjects high in appearance motivation (…) who had read the appearance-based essay expressed greater intentions to be tan*	**Limitations identified by author:** o Specific population, results may not be generaliseable o Self-reported measures of effects o Possible that the responses were reflecting the intention to please investigators o This study does not assess the stability of the results outside the experimental context **Limitations identified by review team:**

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
than messages that stressed the negative effects of the sun on physical health"; it was also predicted that "*the effect would be stronger for people with high appearance motivation because such people would be more motivated to protect their physical appearance"* **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 3	**(annual income)** not reported **Excluded population:** non-white students **Setting:** university/ college	*types of skin cancer, and recommended that people use sunscreen."* The <u>appearance-based</u> essay("Tanning: a Risk to One's Appearance") *"discussed the deleterious effects of excessive tanning on appearance – such as excessive wrinkling, scaring, aging, and so on – and recommended that people use sunscreen."* All essays were approximately 500 words, had similar structure, tone and beginning and concluding paragraphs. **Intervention category[¥]:** III **Intervention period:** not reported **Comparator/s:** The <u>control essay</u> ("Tanning") *"simply described the process by which tanning occurs but did not mention any negative effects of tanning; even so, the essay recommended that people*	use sunscreen when in the sun for prolonged periods" on a scale form 1 (not at all) to 12 (extremely o quality and strength of the essays on a scale from 1 to 12 **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** immediate post-test **Method of analysis:** Not reported if ITT	*during the coming summer in relation to the previous summer than those who had read the control essay (p<0.05).* It was also established that *the lower subjects scored on appearance motivation, the more effective was the appearance-based essay in promoting safe-sun intentions."* *"The effects of the health-based and control essays did not differ significantly across the range of appearance motivation scores (ps>0.15)."* The participants who read the appearance-based essay were more likely to <u>use sunscreen</u> (mean 6.7) than those who read health-based essays (mean 5.3), with p<0.05. *"The control essay fell midway between and did not differ from the others (mean 6.1, ps>0.05).* *Among subjects who scored low (…) in appearance motivation, those who read the appearance-based essay expressed a significantly higher intention to use sunscreen than those who read the health-based essay (p<0.05). Among subjects who scored high in appearance motivation, the essays were not differentially effective (p>0.05)."* Subjects viewed all three essays as equally well written (difference p>0.05). The health-based (mean 8.0) and appearance-based (mean 7.7) were considered more convincing than the control essay (mean 6.6), with p<0.01.	o Numbers of students by gender are not equal to the total number of students by study arm o No baseline measurements o Very little information on population and intervention o Reporting of results not complete **Evidence gaps and/or recommendations for future research:** o Investigation of real effects of such messages o Long-term follow-up **Source of funding:** not reported

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		use sunscreen to prevent burning. Thus the control essay was a minimal intervention…" All essays were approximately 500 words, had similar structure, tone and beginning and concluding paragraphs. **Sample sizes:** **Total n =** 136 **Health-based intervention n =** 44 **Appearance-based intervention n =** 46 **Control n =** 46 **Baseline comparisons:** data from a previous mass testing that the participants attended was used; no significant differences were found **Study sufficiently powered?:** power calculation not reported		**Secondary outcomes:** N/A **Attrition details:** Numbers of participants inconsistent, but no information on losses to follow-up	

Table 54 Jones 2007

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Jones et al [53] **Year:** 2007 **Aim of study:** to assess the effectiveness of doctor-based education on sun protection behaviours in an Irish population **Study design:** controlled before & after **Internal validity[§]:** - **External validity[†]:** 3	**Source population/s:** Patients attending a dermatology outpatient department at Our Lady of Lourdes Hospital in Drogheda, Ireland. **Country:** Ireland **Study year:** not reported **Eligible population:** All dermatology patients (not only those with skin cancer or sun-related complaints) were included regardless of their presenting condition. Newly referred and follow-up patients were included. **Selected population:** 200 patients presenting at the dermatology clinic over a 3 month period. NB: 7% of the intervention group and 11% of the control group had prior skin cancer. **Age:** 51.2 yrs (mean) **Female:** 66%	**Method of allocation:** Participants were alternately allocated by a departmental administrator into two groups: the education group and the control group. **Measures to minimise confounding:** not reported **Intervention/s** At the time of their review in clinic patients were given a written education sheet outlining cause, misconceptions, and general information about skin cancer and sun protection. They were also given verbal information from a doctor in the dermatology clinic. **Intervention category[¥]:** I **Intervention period:** 3 months **Comparator/s:** The control group were not given any information until after completion of the study.	**Primary Outcomes:** Changes in: • Knowledge (7 questions) • Sun protection Questionnaires were administered before the patient's initial review at the clinic (September to November), and posted to all participants within the following three months (December to February) with an enclosed postage-paid envelope. **Adverse events:** none reported **Secondary outcomes:** Self-examination behaviour **Follow-up periods:** 3 months **Method of analysis:** Comparison of the effects of education between the two groups for behavioural and	**Primary outcomes:** ***Knowledge*** Correct responses (%) to the 7 knowledge questions amongst the education and control groups at baseline and 3 months follow-up were as follows: 1. Sun exposure is a major risk factor for skin cancer Baseline: 90% education vs. 86% control Post-intervention: 93.3% education vs. 90.1% control; p=0.556 2. Sun beds are not a safe way to tan Baseline: 95% education vs. 96% control Post-intervention: 100% education vs. 98.6% control; p=1.0 3. Skin cancer is the most common cancer in Ireland Baseline: 26% education vs. 30% control Post-intervention: 72% education vs. 35.2% control; p<0.001 4. Melanoma does not only occur on skin regularly exposed to the sun Baseline: 66% education vs. 58% control Post-intervention: 80% education vs. 59.2% control; p=0.023 5. SPF 60 sunscreen is more effective than SPF 30 & 15 sunscreens Baseline: 80% education vs. 81%	**Limitations identified by author:** As the second survey took place over the winter months in Ireland, sun protection practices would understandably be limited at that time of year. A higher response to sun protection practices may have occurred if the follow-up survey had occurred during summer months. Also skin self-examination is more likely to take place at times in the year when patients are less covered up. **Limitations identified by review team:** Participant selection, i.e. patients attending a dermatology clinic (albeit those with and without skin cancer, or sun-related complaints) limits the extent to which the study results might be generalisable to the population as a whole. **Evidence gaps and/or**

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Race/ethnicity: not reported **Socioeconomic status: (annual income)** not reported **Prior skin cancer:** 7% of the intervention group and 11% of the control group **Excluded population:** not reported **Setting:** hospital	**Sample sizes:** **Total n =** 200 **Intervention n =** 100 **Control n =** 100 **Baseline comparisons:** Study population demographics were similar for age, sex, complexion, and prior skin cancer. **Study sufficiently powered?:** power calculation not reported	knowledge differences after the second survey were tested using Fisher's exact tests. P<0.05 was deemed significant.	control Post-intervention: 85.3% education vs. 80.3% control; p=0.814 6. The sun can cause damage to your sun in all seasons Baseline: 72% education vs. 71% control Post-intervention: 90.7% education vs. 71.8% control; p=0.009 7. The sun can cause damage to your skin on an overcast day Baseline: 81% education vs. 89% control Post-intervention: 93.3% education vs. 87.3% control; p=0.335 ***Sun protection behaviour*** Reported frequency of sunscreen application amongst the education and control groups at baseline and 3 months follow-up was as follows: <u>Daily:</u> Baseline: 17% education vs. 14% control Post-intervention: 18.7% education vs. 15.5% control <u>Once or twice weekly:</u> Baseline: 2% education vs. 4% control Post-intervention: 5.3% education vs. 5.6% control <u>Summer only:</u> Baseline: 22% education vs. 29% control Post-intervention: 30.7% education vs. 26.8% control <u>Summer days only:</u>	**recommendations for future research:** Further, larger higher quality studies (preferably RCTs) addressing the impact of this type of programme in the longer term would be useful. **Source of funding:** not reported

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				Baseline: 29% education vs. 28% control Post-intervention: 29.3% education vs. 31% control <u>Only when going to the beach:</u> Baseline: 16% education vs. 11% control Post-intervention: 5.3% education vs. 8.5% control <u>Never:</u> Baseline: 13% education vs. 14% control Post-intervention: 10.7% education vs. 9.9% control Education had no statistically significant effect on sunscreen use in the follow-up survey. **Secondary outcomes:** At baseline 44% stated they never examined their skin for changes, whereas 35% made checks on at least a monthly basis. The change in skin lesion most were concerned about was an increase in the size of a naevus (96.5%). The changes participant were least concerned about were a scaly area on the face (67.5%), a red patch on the face or body (66.5%), and a lesion that was itchy or bleeding (72.5%). Education had no statistically significant effect on skin examination practices or skin lesion concerns in the follow-up survey. **Attrition details:** Of the 200 patients recruited 146 (73%) responded to the follow-up survey at 3	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				months (intervention group=75; control group = 71).	

Table 55 Katz

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Katz et al.[55] **Year:** 1991 **Aim of study:** unclear; probably to develop and evaluate a programme on detecting and preventing skin cancer **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 4	**Source population/s:** college students **Country:** USA **Study year:** not reported **Eligible population:** approximately 100 students seeking extra course credit **Selected population:** 40 or 43 randomly selected students (numbers unclear) **Age:** not reported **Female:** not reported **Race/ethnicity:** not reported **Socioeconomic status:**	**Method of allocation:** students randomly assigned to intervention or control group **Measures to minimise confounding:** not reported **Intervention/s** The presentation covered four main topics: "*(1) the skin; (2) cancer, the disease; (3) basic facts about skin cancer, which include risk factors, myths, the different types of skin cancer; and (4) preventive measures. The latter stressed the importance of using sunscreens with SPF of at least 15, how to properly apply sunscreens, avoiding excessive sun exposure and tanning booths, how to conduct a*	**Primary Outcomes:** Knowledge tested in a questionnaire developed in cooperation with dermatologists. It was piloted on a sample of 251 college students and questions which were not problematic for them were removed. The final questionnaire contained 29 questions on knowledge and one which was a self-rating of knowledge level. The majority of the questions were either true-false or multiple choice. Two required short written answers. The possible scores ranged from 0 to 37 and the questionnaire took about 10 minutes	**Primary outcomes:** Mean knowledge score: o Test 1: 30.5 (SD 2.9) experimental, 18.8 (3.5) control; difference between groups significant (p<0.0001) o Test 2 (intervention delivered to control group): 25.9 (SD 3.8) experimental, 30.7 (3.5) control o Improvement in controls after training was statistically significant (p<0.0001). o Deterioration in the intervention group was statistically significant (p<0.0001). o The score from second test in the intervention arm was significantly higher than the score from test 1 in the control arm (p<0.0001). Results for 31 high –school students (before and after study): o Before training: 15.2 (SD 3.3)	**Limitations identified by author:** Study did not investigate how education translates into behaviour **Limitations identified by review team:** o No baseline measurements o Impossible to tell if groups were similar at baseline o Not possible to establish the effect of the intervention compared to control group o Study poorly reported o No demographic characteristics

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	(annual income) not reported **Excluded population:** not reported **Setting:** college (and high-school)	*self-examination of the skin, and prompt diagnosis by a dermatologist if any warning signs are noted. The presentation was primarily by a lecture, followed by a brief question and answer period. Slides were used to illustrate different types of skin cancer (basal cell, squamus cell, and malignant melanoma). The "ABCDs" of melanoma [asymmetry, borders, colour, diameter(…)] were also described to help the subjects discriminate between a normal and cancerous mole."* **Intervention category[¥]:** I **Intervention period:** 25-30 minutes **Comparator/s:** No intervention before the first test, the same intervention as experimental group before the second test two weeks later **Sample sizes:** **Total n =** unclear if 40 or 43 students	to complete. **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** up to two weeks **Method of analysis:** not reported	o After training: 26.2 (SD 5.5) o Improvement from baseline statistically significant ((p<0.0001). <u>Knowledge self-assessment</u> Test 1: 3.3 (SD 0.56) experimental, 2.2 (0.85) control Test 2 (intervention delivered to control group): 3.2 (SD 0.66) experimental, 3.6 (0.78) control **Secondary outcomes:** N/A **Attrition details:** not reported	o Methods of data analysis not reported **Evidence gaps and/or recommendations for future research:** Studies on ways to improve compliance and to identify reliable means of disseminating information. **Source of funding:** not reported

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Intervention n = 17 **Control n =** 23 The intervention was also tested on a sample of 31 high school students as a before and after study (further details not provided) **Baseline comparisons:** not reported **Study sufficiently powered?:** power calculation not reported			

Table 56 Kidskin

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: **'Kidskin'** 3 papers 1. Main results, naevus development at 4-year follow-up; Milne et al [73] 2. Naevus development	**Source population/s:** Schools located within 30km of the centre of Perth, Western Australia with 50 or more first-grade students were eligible for participation. **Country:** Australia **Study year:** 1995-1999	**Method of allocation:** The study was a non-randomised, community intervention trial with schools as the units of intervention. Clusters located furthest from the centre of Perth were designated as control group clusters. Clusters closest to Perth were designated as 'high intervention' clusters to reduce costs. No mention	**Primary Outcomes:** The main outcome was the number of naevi on the back at the end of the study. Other outcomes were the number of naevi on the face, arms, and, for boys, the chest. These outcomes were measured at 4-year follow-up (Milne et al [73]) and 6-year follow-up (English et al [33]). Also suntan and sun exposure were measured at 2-year follow-up (Milne et al [72])	As the high intervention group were offered low-cost sun-protective swimwear, a component that could not be disaggregated, we have only included the results reported for the control group and moderate intervention group. **Primary outcomes:** **Naevus counts 4-year follow-up Milne et al [73]**	**Limitations identified by author:** The participants may have been too old at recruitment for the Kidskin intervention to have a major impact on the development of naevi. It is possible that not enough time elapsed for behaviour change to protect against naevus

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
at 6-year follow-up; English et al [33] 3. Suntan and sun exposure at 2-year follow-up; Milne et al [72] **Year:** 3 papers: 1. 2002; 2. 2005 & 3. 2001 **Aim of study:** to assess the effectiveness of 'Kidskin', a school-based intervention amongst first-grade children in Perth **Study design:** controlled before & after **Internal validity[§]:** + **External validity[†]:** 3	**Eligible population:** Eligible schools were grouped into a number of geographic 'clusters'. Fifteen clusters were created and all schools within a cluster were eligible for selection into one group only. **Selected population:** Three groups were included: a control group of 14 schools; a 'moderate intervention' group of 11 schools; and a 'high intervention' group of 8 schools. Of the original 33 schools selected in 1995, 28 agreed to participate. Five replacement schools were randomly selected from the same cluster, and level of social disadvantage, as the schools that declined to take part. Consent was obtained for 1,778 (70%) of the 2,529 year 1 children invited to participate; 1623 were of European ethnicity. Non-European children were excluded as melanoma and other skin cancers are rare in these groups.	was made of a specific geographical designation for the 'moderate intervention' clusters. Schools were randomly selected within clusters, after stratification by socioeconomic status and proximity to the beach. **Measures to minimise confounding:** The authors stated the control group and 'high intervention' group clusters were in designated areas to prevent contamination. Also schools were stratified by socioeconomic status and proximity to the beach prior to selection to reduce the effect of these possible confounders. **Intervention/s** Moderate and high intervention schools taught a specially designed sun-protection curriculum over 4 consecutive years (1995-1998). The materials taught in each grade were age-specific and included both classroom and home-based activities. They were delivered in four to six 40-minute sessions during the spring of each year. Children were encouraged to reduce	Measurement – Naevi *"Nevi were counted in winter to minimise confusion with freckling. Observers were trained according to the International Agency for Research on Cancer protocol for identifying and recording nevi. Under bright light, the observers counted the number of nevi on each child's face and arms. Slides of each child's back, and boy's chests, were taken using professional photographic equipment. Anatomic landmarks were marked on children's skin so that the areas on which nevi were to be counted later could be identified on the slides.* *All slides of each child's trunk were projected side by side on a whiteboard. An experienced observer, blind to study group, identified and marked all pre-existing nevi on the baseline slide and new nevi on the 1999 and 2001 slides. Nevi that had disappeared from the later slide were also marked, and any excisions noted. The observer also indicated whether factors such as freckling or poor slide quality made counting difficult. Standard diagrams were used to assess the level of freckling on the face and arms and on the shoulders when the slides of the*	No significant differences were reported between the groups. Adjusted mean naevus counts on each body site in 1995 and 1999 and ratio of means, group mean divided by control mean, (95% CI) for the control and moderate intervention groups were as follows: **Back** Control (n=629): 4.0 (1995) vs. 7.3 (1999); moderate intervention (n=416): 3.6 (1995) vs. 6.8 (1999); Ratio of means: 0.94 (0.88,1.00) **Chest (boys only)** Control (n=328): 3.3 (1995) vs. 6.3 (1999); moderate intervention (n=227): 3.4 (1995) vs. 6.0 (1999); Ratio of means: 0.95 (0.86,1.04) **Face** Control (n=646): 4.2 (1995) vs. 6.0 (1999); moderate intervention (n=430): 4.4 (1995) vs. 5.4 (1999); Ratio of means: 0.89 (0.79,1.00) **Arms** Control (n=646): 9.2 (1995) vs. 14.1 (1999); moderate intervention (n=430): 9.8 (1995) vs. 13.0 (1999); Ratio of means: 0.92 (0.83,1.01) **Naevus counts 6-year follow-up English et al [33]** Baseline means and ratios of	development (Milne et al [73]). The study was not randomised and there were baseline differences between the groups (English et al [33]). Loss to follow-up may have compromised validity (English et al [33]). **Limitations identified by review team:** Selection bias cannot be discounted given the non-random allocation the control and intervention group clusters. The generalisability of the results of the study to groups other than those of European ethnicity is unclear. **Evidence gaps and/or recommendations for future research:** Further work assessing the impact of this type of programme in the longer term would be beneficial as would research targeting a younger age group.

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	NB: as the 'high intervention' group were offered low-cost sun-protective swimwear the results for this arm of the study do not meet the inclusion criteria for this systematic review and have not been reported. **Age:** 5-6 years (at baseline) **Female:** approximately 47% **Race/ethnicity:** 100% (n=1623) European ethnicity **Socioeconomic status: (annual income)** not reported **Excluded population:** non-European children **Setting:** school	their sun exposure by staying indoors during the middle of the day and by protecting themselves when outdoors by staying in the shade and wearing sun-protective clothing, hats and suncream. Children in the high intervention group were also sent programme materials over the summer vacation, when sun exposure is likely to be highest, and were offered low-cost sun-protective swimwear. **Intervention category[¥]:** I **Intervention period:** 1995-1998 **Comparator/s:** Control schools taught the standard Western Australian health education curriculum. **Sample sizes:** **Total=**1623 **Moderate intervention=**472 **High intervention=**402 **Control=** 749 **Baseline comparisons:**	*back were compared.* *In 1999 (4-year follow-up), nevi on randomly selected pairs of slides were counted twice by the same observer so that intra-rater reliability could be estimated; a dermatologist also counted nevi from randomly selected pairs of slides. Each time nevi on the face and arms were counted, randomly selected children were assessed twice, either by the same observer or two different observers, at least 15 minutes apart"* (Milne et al [73]). *"In 2001 (6-year follow-up) to permit estimation of interrater reliability, the dermatologist counted nevi from 47 randomly selected triplets of slides. Each time nevi on the face and arms were counted, a random sample was assessed by two observers.* *The level of freckling on the face and arms was estimated whenever nevi were counted, and freckling on the shoulders was assessed when the two slides of the back were compared. Winter freckling on the face, arms, and shoulders was scored between 0 (none) and 10 (very heavy)."* <u>Measurement – suntan</u> Skin reflectance was measured in winter 1995 on the inner surface of the arm to assess constitutional colour. *"To assess*	relative change (95%CI) in the mean number of naevi from baseline (1995) to end of follow-up (2001), by anatomic site and study group are presented below: **Primary analyses** **Back** Control: 3.5 (1995) vs. 10.1 (2001); moderate intervention: 3.0 (1995) vs. 8.2 (2001); Ratio of change: 0.94 (0.86,1.04) **Chest (boys only)** Control: 2.7 (1995) vs. 8.6 (2001); moderate intervention: 2.5 (1995) vs. 7.1 (2001); Ratio of change: 0.88 (0.80, 0.97) **Face and arms** Control: 14.7 (1995) vs. 25.2 (2001); moderate intervention: 15.3 (1995) vs. 23.8 (2001); Ratio of change: 0.91 (0.81, 1.02) **Secondary analyses** **Back (boys)** Control: 3.5 (1995) vs. 11.4 (2001); moderate intervention: 3.2 (1995) vs. 9.1 (2001); Ratio of change: 0.88 (0.80, 0.97) **Back (girls)** Control: 3.5 (1995) vs. 9.1 (2001); moderate intervention: 2.8 (1995) vs. 7.5 (2001); Ratio of change: 1.00 (0.89, 1.13) **Face and arms (boys)** Control: 15.2 (1995) vs. 25.7	**Source of funding:** The study was funded by a development programme grant from the Public Health Research and Development Committee of the National Health and Medical Research Council and by the Cancer Foundation of Western Australia. The western Australian Health Promotion Foundation funded a pilot study.

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		The groups were similar in terms of most potential confounders, although there were differences in respect of Southern European ethnicity and parental education. **Study sufficiently powered?:** The actual sample size was slightly larger than the target sample size. *"The study was designed to have 85% power (alpha=0.05, two-sided test) to detect a 25% reduction in exposure when controls were compared with the high intervention group. It was estimated that a 25% reduction in exposure would equate to an 8% difference in the mean number of nevi at the end of the study."* Although adequately powered at baseline, given the large losses to follow-up at 6-years (33%) some statistical power will have been lost.	*the degree of suntan, skin reflectance was measured on the back and dorsal surface of the forearm in February 1997 (end of 1996/1997 summer). Trained observers took two reflectance measurements (at 425nm) on each site using one of two identical reflectance spectrophotometers. Reflectance is inversely related to degree of skin pigmentation, and reflectance near this wavelength is strongly correlated with melanin density. To assess intra-rater reliability all five observers measured reflectance on 20 randomly selected children at one school."* <u>Measurement – sun exposure</u> *"In late winter 1995 and at the end of the 1996/1997 summer, parents were mailed questionnaires that asked about their child's sun-related activities over the previous summer vacation. Follow-up questionnaires were mailed to parents in 1997 asking them to estimate the number of days their child went to the beach or to an outdoor swimming pool during the vacation. They were also asked about the days and times their child played outside around the home, the proportion of time their child wore a hat or sunscreen, stayed in the shade, or had his/her back covered by*	(2001); moderate intervention: 15.7 (1995) vs. 23.0 (2001); Ratio of change: 0.86 (0.75, 1.00) **Face and arms (girls)** Control: 14.1 (1995) vs. 24.5 (2001); moderate intervention: 14.8 (1995) vs. 25.1 (2001); Ratio of change: 0.98 (0.85, 1.13) **<u>Freckling 4-year follow-up Milne et al [73]</u>** Winter freckling ratings on the face, arms and shoulders were similar amongst the groups both at baseline and follow-up (no significant differences were reported). Mean (95%CIs) were as follows: **Face** **1995:** Control: 2.5 (2.3,2.7) vs. Moderate intervention: 2.3 (2.1,2.6) **1999:** Control: 3.7 (3.4,4.0) vs. Moderate intervention: 3.7 (3.4, 4.1) **Arms** **1995:** Control: 1.2 (1.1,1.4) vs. Moderate intervention: 1.0 (0.8,1.2) **1999:** Control: 2.3 (2.1,2.5) vs. Moderate intervention: 2.2 (2.0,2.4) **Shoulders** **1995:** Control: 0.1 (0.07,0.15) vs.	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
			clothing at each venue and the types of clothing, swimwear, and hats worn." **Adverse events:** none reported **Secondary outcomes:** none reported **Follow-up periods:** 2, 4 & 6 years **Method of analysis:** **Naevus counts** At 4-year follow-up the generalized linear mixed model was used to compare 1999 naevus counts amongst the three groups, whilst taking account of group assignment by school and adjusting for potential confounders. Naevus counts were considered separately for individual body sites (Milne et al [73]). Similarly at 6-year follow-up linear growth curves of logged naevus counts for three sites (back, chest, and face and arms combined) with adjustment for confounding variables were constructed (English et al [33]). Month of observation (exposed site only), observer, parental	Moderate intervention: 0.5 (0.0, 0.1) **1999:** Control: 0.6 (0.5,0.7) vs. Moderate intervention: 0.4 (0.3,0.6) **Suntan 2-year follow-up Milne et al [72]** Adjusted mean percentage skin reflectance at 2-year follow-up (1997), on the two exposed anatomic sites, was not significantly different amongst the moderate intervention and control groups: Forearm: Control: 22.7% vs. Moderate intervention: 23.8%, difference relative to control group (CI): 1.1 (-0.2 to 2.5) Back: Control: 34.7% vs. Moderate intervention: 36.2%, difference relative to the control group (CI): 1.5 (-0.1 to 3.2) **Sun exposure 2-year follow-up Milne et al [72]** Sun exposure index and total time spent outdoors were expressed as 'midday minute equivalents' (MMEs). Adjusted means at 2-year follow-up (1997), were not significantly different amongst the moderate intervention and control groups: Sun exposure index: Control: 8.4 vs. Moderate intervention: 7.6, ratio to control group (CI):	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
			education, tendency to sunburn, ethnicity, hair colour, and inner arm skin reflectance were considered as potential confounders (Milne et al [73]; English et al [33]). **Suntan.** The two measurements taken in each site (forearm & back) were averaged in all analyses. A mixed model procedure was used to compare mean reflectance on the exposed sites in each group taking account of group assignment and controlling for confounding. **Sun exposure** Parent questionnaires were used to develop a composite index of sun exposure for each child. The number of 'midday minute equivalents' (MMEs) were derived for the 'whole-body' (a composite of three sites: face, back, and forearms). A mixed model procedure was used to compare mean exposure in each group taking account of group assignment and controlling for confounding.	0.90(0.78 – 1.1) Total time outdoors: Control: 66.0 vs. Moderate intervention: 66.1, ratio to control group (CI): 1.00 (0.88-1.1) **Secondary outcomes:** none reported **Attrition details:** **2-year follow-up Milne et al [72]** Only children with reflectance data for 1995 and 1997 were included in the analysis. 1230 (76%) of the 1623 study participants (control=513; moderate intervention=391; high intervention=326). Only children who had spent some time in Perth over the previous vacation period were included in the analysis: 1103 (68%) of the 1623 study participants (control=485; moderate intervention=347; high intervention=271). **4-year follow-up (Milne et al [73])** Of the 1,623 study participants, 1,615 were examined in 1995 and 1,455 were still living in Perth and available for follow-up in 1999. Either a back or chest slide was missing for 19 subjects; the slides for 19 children were rated impossible to count due to freckling or other	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				skin blemishes. Amongst the remaining 1,417 children information on at least one confounding variable was missing, leaving 1,398 eligible for inclusion in data analyses (control group=629; moderate intervention group=416; high intervention group=353). (Milne et al [73]). **6-year follow-up English et al [33]** Loss to follow-up was much greater in 2001 when only 67% (n=1081) appear to have been included in the analyses (control group=471; moderate intervention group=338; high intervention group=272).	

Table 57 Kristjánsson

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Kristjánsson[57] **Year:** 2003 **Aim of study:** *"to evaluate*	**Source population/s:** schools in four municipalities (selected based on their size and socioeconomic status) in Stockholm Country **Country:** Sweden	**Method of allocation:** *"in every school there were an equal number of classes randomly assigned to intervention and control"* **Measures to minimise**	**Primary Outcomes:** Knowledge about skin cancer risk factors, UVR exposure and sun-protection – assessed using 15 statements; score based on the	**Primary outcomes:** Knowledge index – mean (SD): Intervention group: 8.6 (2.8) pre-test, 10.3 (2.6) post-test, p<0.001 Control group: 9.0 (3.7) pre-test, 9.7 (3.3) post-test, p=0.043	**Limitations identified by author:** o Possible contamination across the school classes o Classes eliminated from the study for procedural reasons

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
the effectiveness of a school-based intervention programme using the skin cancer prevention kit 'You and Your Skin'." **Study design:** RCT **Internal validity[§]:** + **External validity[†]:** 2	**Study year:** not reported **Eligible population:** five non-private schools in four municipalities selected with respect to their interest in participating in the study **Selected population:** year 7 (age 13-14) and year 8 (age 14-15) classes from chosen schools; students and parents informed of the study; parental consent was not required, but it was possible not to participate (one student) **Age:** 13-15 **Female:** 40 (41%) intervention, 48 (55%) control Race/ethnicity: not reported **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported	**confounding:** not reported **Intervention/s:** *"application of the educational material with instructions and recommendations implemented by the student's regular teacher or the school nurse during one lesson (45 min). The educational package contained: (1) a manual for teachers, (2) 10 overhead transparencies (animated comic figures), (3) a video tape (7 min), and (4) recommendations and instructions on how to behave in the sun (which were suggested to be photocopied and given to the students to take home)."* The teachers were recommended to allow their students to work in groups and do several exercises. **Intervention category[¥]:** I	number of correct answers ("yes", "no", "don't know") Attitude towards sunbathing and tanning – higher scores indicate an attitude less favourable towards sunbathing and tanning on a 5-point Likert-scale Readiness to change sunbathing behaviours: o Using clothes for sun protection o Avoiding sun between 11am and 3pm o Staying in the shade for sun protection o Using sunscreen o Giving up sunbathing **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** three months **Method of analysis:** not	Mean increase: 1.7 intervention, 0.7 control; p<0.05 <u>Attitude– mean (SD):</u> "Being tanned makes me more attractive": Intervention group: 2.1 (1.1) pre-test, 2.2 (1.2) post-test, p=0.320 Control group: 2.2 (1.2) pre-test, 2.2 (1.3) post-test, p=0.725 "Sunbathing feels nice and warm": Intervention group: 2.0 (0.9) pre-test, 2.2 (1.0) post-test, p<0.05 Control group: 2.0 (1.0) pre-test, 2.3 (1.2) post-test, p<0.05 "Sunbathing is good and healthy for me" Intervention group: 3.8 (0.8) pre-test, 3.8 (0.9) post-test, p=0.744 Control group: 3.9 (0.9) pre-test, 3.8 (1.0) post-test, p=0.552 "Sunbathing makes my skin feel better" Intervention group: 3.5 (1.4) pre-test, 3.6 (1.4) post-test, p=0.328 Control group: 4.0 (1.1) pre-test, 3.9 (1.4) post-test, p=0.495 "Sunbathing makes me feel close to nature" Intervention group: 3.8 (1.3) pre-test, 4.1 (1.0) post-test, p<0.05	o Relatively small number of participants **Limitations identified by review team:** o Relatively short follow-up o Based on self-reported measures o Outcomes do not directly assess behaviour o Clustering not accounted for **Evidence gaps and/or recommendations for future research:** o *"How well self-reported readiness to change predicts actual change in sun-protection"* o Study testing a longer intervention **Source of funding:** not clear, probably the Stockholm Country Council and the Swedish Cancer Society

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Setting: school	**Intervention period:** 45 minutes **Comparator/s:** do nothing **Sample sizes:** **Total n =** 184 (268 enrolled at baseline) **Intervention n =** 97 **Control n =** 87 **Baseline comparisons:** Groups "*were equivalent regarding gender, age, skin type, hair colour, and stages of change distribution. (…) An exception was that the intervention group had a higher proportion of students who were able to progress in their readiness to give up sunbathing (p=0.01). There were no statistically significant differences between the groups in the pre-test with respect to relevant sun-related variables measured by analysis of variance. An exception was that the intervention group had more favourable attitude*	reported if ITT; possibly not – 2 schools excluded from the analysis; data for students who did not complete one of the tests not reported;	Control group: 4.1 (1.1) pre-test, 4.1 (1.2) post-test, p=0.683 Progression in stages of change related to sun-protective behaviours: Using clothes: Number in intervention group (%): 16/90 (18%) Number in control group (%): 8/76 (11%) Proportion ratio (95% CI): 1.7 (0.8 to 3.7) Avoiding sun between 11am and 3 pm: Number in intervention group (%): 23/90 (26%) Number in control group (%): 10/75 (13%) Proportion ratio (95% CI): 1.9 (1.0 to 3.8) Staying in the shade: Number in intervention group (%): 12/90 (13%) Number in control group (%): 6/75 (8%) Proportion ratio (95% CI): 1.7 (0.7 to 4.2) Using sunscreen Number in intervention group (%): 5/90 (6%) Number in control group (%): 3/77 (4%) Proportion ratio (95% CI): 1.4 (0.4 to 5.8) Giving up sunbathing: Number in intervention group (%): 10/83	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		towards sunbathing and tanning." **Study sufficiently powered?:** no information on power calculation		(12%) Number in control group (%): 10/78 (13%) Proportion ratio (95% CI): 0.9 (0.4 to 2.1) **Secondary outcomes:** not reported **Attrition details:** *"Two schools, or six classes (two Year 7 classes and four Year 8), were excluded from the data analysis because of procedural violations, leaving three schools and 10 classes available for analysis. One school did not adhere to the schedule and there were identification number violations in the questionnaires from the other one."*	

Table 58 Loescher

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Loescher et al. [60] **Year:** 1995 **Aim of study:** To examine	**Source population/s:** Four to five years old children **Country:** USA **Study year:** Not reported **Eligible population:**	**Method of allocation:** Classes within each geographical area were randomly assigned to intervention and control groups using a random permuted blocks method **Measures to minimise**	**Primary Outcomes:** Children's cognitive domain included three levels: (1) Knowledge was demonstrated by the ability to recall or	**Primary outcomes:** (1) Knowledge – unadjusted mean (SD): For participants in first post-test (65 control, 52 intervention group):	**Limitations identified by author:** (1) Self-report methods are susceptible to problems of guessing and of responding in a particular direction to questions. (2) This research was lack of a direct

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
whether a sun safety curriculum designed for and administered to pre-schoolers affects their recognition regarding sun safety **Study design:** RCT **Internal validity[§]:** + **External validity[†]:** 3	Four to five years old children in specific regions. Minimum study eligibility requirements for school participation were (a) willingness of the director to participate; (b) evidence of a structured, full-week program; (c) one classroom of 4- to 5-year-old children with a minimum of 15 students; (d) the ability to send a consent form home with the child for parents to sign, and (e) the ability of children to understand English and of their parents to read and understand English. **Selected population:** Sample recruitment began with a list of state-certified pre-schools obtained from the local child care association in 18 schools in three district geographic areas. Ethnic composition, socioeconomic status, and male/female ratio for the selected schools were examined to ensure reasonable comparability within areas. One class in each of 12 schools constituted the final sample. **Age:** Mean (SD) = 4.7 (0.4) for the	**confounding:** Adapting blocks method **Intervention/s** *"The curriculum began with materials for the teacher that review tanning, the ultraviolet spectrum, skin, skin cancer, and skin cancer risk factors. Each unit (45 to 50 minutes length) was consistently structured and contained teacher information, purpose and objectives, materials available for loan, classroom and take-home activities, key words, and learning resources. Interactive activities included a puppet show, sun safety classification games, art activities, and sun safety songs and storybooks. Throughout the activities, key characters Sunny the Bear and Shadow the Frog conveyed and reinforced sun-safe messages."* **Intervention category[¥]:** I **Intervention period:** not reported, probably 2 weeks **Comparator/s** Current information provision or do nothing **Sample sizes:**	remember the specifics of instruction (2) Comprehension was an understanding of instruction, which was shown by making use of ideas without relating them to other situations. (3) Application is the ability to transfer the concepts learned in one situation into another situation or setting **Adverse events:** Not reported **Secondary outcomes:** Not reported **Follow-up periods:** Outcomes were measured at baseline and at 2 and 7 week follow-up **Method of analysis:**	Control group 2.1 (SD 1.3) pre-test, 2.3 (SD 1.4) 1 post-test; Intervention group: 2.5 (SD 1.2) pre-test, 3.1 (SD 1.2) post-test; Comparison of adjusted means: F=6.474 (p=0.01) For participants in the second post-test (57 control, 52 intervention group) Control group: 2.0 (SD 1.3) pre-test, 2.5 (SD 1.3) post-test, Intervention group: 2.4 (SD 1.1) pre-test, 3.2 (SD 1.2) post-test, Comparison of adjusted means: F=4.756 (p = 0.03) (2) Comprehension – unadjusted mean (SD): For participants in the first post-test (56 control, 48 intervention group): Control group: 1.4 (SD 1.3) pre-test, 2.1 (SD 1.6) post-test; Intervention group: 1.4 (SD 1.4) pre-test,	observational component. (3) It was unable to compare children who participated with those who did not in terms of demographic information and family health motivation. **Limitations identified by review team:** Nothing to add **Evidence gaps and/or recommendations for future research:** The intervention affected knowledge and comprehension significantly, but testing of the application component did not reveal significant improvement. This may be because that children with age of 4 to 5 years old were in their pre-operational stage of cognitive development and lacked the ability to use causal reasoning. Limitations of the Children's Cognitive and Attitudes Assessment instrument may also explain the low application scores. Further research must determine whether the intervention can be linked to short or long term behavioural

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	control group, and mean (SD) = 4.9 (0.4) for the intervention group. **Female:** 38% for the control group, and 61% for the intervention group. **Race/ethnicity:** White 69% for the control group, and 60% for the intervention group. Hispanic 12% for the control group, and 17% for the intervention group. Other 19% for the control group, and 23% for the intervention group. **Socioeconomic status:** Not report **Excluded population:** Those schools that were not satisfy the eligibility criteria. **Setting:** pre-schools	**Total n =** 12 classes, 150 children **Intervention n =** 6 classes, 70 children **Control n =** 6 classes, 80 children **Baseline comparisons:** The numbers of boys and girls in the intervention and control groups were different, but no significance tests were given. **Study sufficiently powered?:** A 0.05 level of significance and 90% power to detect a 2-point change in the mean score for a given section of the instrument	ITT used: no Adjustments made for any baseline differences in important confounders: Sex as a possible modifier variable was examined. No modifying effect of sex was found in any analyses.	3.0 (SD 1.9) post-test; Comparison of adjusted means: F=7.828 (p = 0.006) For participants in the second post-test (52 control, 42 intervention group): Control group: 1.4 (SD 1.5) pre-test, 2.5 (SD 1.8) post-test, Intervention group: 1.5 (SD 1.4) pre-test, 3.5 (SD 2.5) post-test Comparison of adjusted means: F=4.69 (p = 0.033) (3) Application – unadjusted mean (SD): For participants in the first post-test (38 control, 31 intervention group): Control group: 1.5 (SD 0.8) pre-test; 1.6 (0.8) post-test; Intervention group: 1.7 (SD 0.8) pre-test, 1.9 (SD 0.9) post-test; Comparison of adjusted means: F=2.306 (p = 0.134) For participants in the	change and whether it can be effectively implemented by pre-school staff. **Source of funding:** This study was funded in part by grants from the American Cancer Society, the Cancer Research Foundation of America, the Arizona Disease Control Research Commission, and the National Institutes of Health

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				second post-test (27 control, 35 intervention group): Control group: 1.5 (SD 0.9) pre-test, 1.8 (SD 0.8) post-test, Intervention group: 1.6 (SD 0.9) pre-test, 2.1 (SD 0.9) post-test, Comparison of adjusted means: F=0.998 (p = 0.322) **Secondary outcomes:** N/A **Attrition details:** Of the 150 children tested at baseline eight did not participate in any of the post-tests; 122 children were tested two weeks after baseline and 114 children – seven weeks after baseline; 142 children were included in the final analysis For knowledge 120	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				participants were followed-up two weeks after baseline and 109 7 weeks after baseline; For comprehension the numbers were 104 and 94 respectively; For application they were 69 and 62;	

Table 59 Mahler 2005

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Mahler et al.[62] **Year:** 2005 **Aim of study:** to determine whether the findings of an earlier study *"could be replicated when participants were unaware that they*	**Source population/s:** undergraduate students **Country:** USA **Study year:** not reported **Eligible population:** undergraduates from the University of California, San Diego and California State University, San Marcos	**Method of allocation:** *"the condition to be run during each session was determined at the beginning at the beginning of the data collection period using a block randomisation procedure"* **Measures to minimise confounding:** controlling for baseline variables **Intervention/s**	**Primary Outcomes:** Baseline <u>UV exposure and protection</u> – self-reported: 1. *"number of hours sunbathing during the previous weekend;* 2. *number of hours spent in the sun doing activities other than sunbathing during the previous week and weekend*	**Primary outcomes:** (p-values not reported, as they were calculated for both intervention groups – including mixed vs. control) <u>Intentions to use sunscreen</u> (mean (SD)): 3.43 (0.78) intervention, 2.79 (0.94) control; <u>Photoaging and sun protection perceptions</u> (mean (SD)): o Perceived rewards of sunbathing and being tan: 3.08 (0.72)	**Limitations identified by author:** o Location with high rates of incidental sun exposure o Relatively small sample size o Short follow-up o Self-reported measures **Limitations identified by review team:**

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
would be contacted for follow-up." It was also undertaken *"to determine whether the effects of the UV photographic intervention could be enhanced by offering individuals an alternative method of obtaining a tan: a sunless tanning lotion."* **Study design:** RCT **Internal validity[§]:** + **External validity[†]:** 3	**Selected population:** 54 undergraduates from the University of California, San Diego and 92 undergraduates from California State University, San Marcos **Age:** mean 22.21 (SD 4.66) years old, range 17-44 **Female:** 78% (114) **Race/ethnicity:** White 67.8% Asian 16.4% Hispanic 6.8% African American 2.1% Other 6.9% **History of skin cancer:** 1.4% **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported **Setting:** university	*"The intervention consisted of a 12-minute video and UV facial photograph taken with an instant camera. The video defined photoaging (premature wrinkles and age spots due to UV radiation) and discussed ways to reduce the effects of UV exposure (using a sunscreen with an SPF of at least 15 and avoiding the sun between the hours 10am and 2 pm). The video also provided general information about sunscreen, for example, explaining what the SPF means and how much sunscreen to use.* *The UV facial photographs were taken with a single-lens reflex camera equipped with Polaroid 667 professional black-and-white instant film (Weltham, Mass) and a UV filter. (…) The resulting black-and-white photograph highlights clearly and dramatically the nonuniform epidermal pigmentation that has resulted from chronic sun exposure. Each person who had a UV photograph taken also had a natural-light instant photograph taken for comparison. In all cases the natural-light black and white*	*respectively;* 3. *frequency of sunscreen use on face and body (on a 0% to 100% scale) while sunbathing and, separately, while doing other activities in the sun; and* 4. *SPF level of sunscreen used on the face and body while sunbathing and, separately, when doing other outdoor activities."* <u>Intentions to use sunscreen in the future:</u> nine items rated on separate 5-point scales (from 1 strongly disagree to 5 strongly agree) <u>Photoaging and sun protection perceptions</u> assessed by level of agreement (1 strongly disagree to 5 strongly agree): o Perceived rewards of sunbathing and being tan (10 items)	intervention, 3.02 (0.94) control; o Costs of using sunscreen: 2.57 (0.65) intervention, 2.80 (0.64) control; o Perceived susceptibility to photoaging: 3.72 (0.67) intervention, 3.55 (0.67) control; o Perceptions of the severity of photoaging; 3.81 (1.02) intervention, 3.70 (1.00) control; o Perceived response efficacy of sunscreen use for the prevention of photoaging: 4.04 (0.74) intervention, 3.73 (0.62) control; <u>Self-efficacy for regular sunscreen use:</u> 7.35 (1.42) intervention; 7.11 (1.41) control **Secondary outcomes:** N/A **Attrition details:** 2 participants were excluded from the analysis: one had a medical condition requiring daily sunscreen use, the other reported hours of sunbathing more than 35 SDs above the mean	o Outcomes not measured at baseline; o Participants excluded based on criteria not defined before commencement of the study **Evidence gaps and/or recommendations for future research:** Study using more objective behavioural measures of sun exposure, endorsement of a sunless tanning lotion by a physician or nurse **Source of funding:** California State University, San Marcos Research Scholarship, a Creative Activity grant, a California State University, San Marcos, College of Arts and Sciences Faculty Development grant, a grant from the Cancer Research and Prevention Foundation, Alexandria, Va, and a grant from the National Cancer Institute,

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		photograph was shown to participants first, followed by the UV photograph. Participants were told that any "dark, freckled, or pitted areas" in the UV photograph (that did not appear in the natural-light photograph) indicated existing underlying skin damage that would continue to worsen if they did not engage in greater sun protection behaviours (than they currently did)." Participants viewed their photographs for only a few minutes and were not allowed to take them home. One of the study arms was additionally provided with a sunless tanning lotion – this group (mixed intervention) will not be included in the evidence table After completing the session participants were given a free sunscreen sample. Therefore the second post-test is not included in this evidence table. **Intervention category[¥]:** II + III	o Costs of using sunscreen (12 items) o Perceived susceptibility to photoaging (8items) o Perceptions of the severity of photoaging (4 items) o Perceived response efficacy of sunscreen use for the prevention of photoaging (4 items) <u>Self-efficacy for regular sunscreen use:</u> 12 separate 10-point scales (1 certain I could not do, to 10 certain I could do) to indicate how confident participants were they could motivate themselves to use sunscreen despite obstacles **Adverse events:** not reported **Secondary outcomes:**		Bethesada, Md.

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Intervention period: not reported **Comparator/s:** **Sample sizes:** **Total n =** 146 **Intervention n =** 50 **Mixed intervention n** = 46 **Control n =** 50 **Baseline comparisons:** *"The results indicated no significant differences or trends among the 3 groups in age, ethnicity, education level, skin type, whether participants had ever had skin cancer, or number of close family members who had ever had skin cancer."* There were also no difference in reports of sun exposure and frequency of sunscreen use on the face during sunbathing and on the face and body during incidental sun exposure. The intervention group had a lower mean frequency of sunscreen use on the body during sunbathing than the control group. **Study sufficiently**	not reported **Follow-up periods:** First post-test immediately after the intervention and the second one a month later (not reported – participants given sunscreen) **Method of analysis:** Not reported if ITT *"Any demographic or baseline variable found to differ across groups and to be significantly related to the outcome measures was controlled for in subsequent analyses."*		

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		powered?: no information on power calculation			

Table 60 Mahler 2007

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Mahler et al.[63] **Year:** 2007 **Aim of study:** *"to determine if appearance-based interventions also affect more objective assessments of sun exposure over substantially longer periods of time."* **Study design:** RCT **Internal validity[§]:** +	**Source population/s:** students from University of California, San Diego **Country:** USA **Study year:** not reported **Eligible population:** undergraduate students from University of California, San Diego **Selected population:** 133 undergraduate students from University of California, San Diego **Age:** mean 20.13, SD 3.38; range 18-44 **Female:** 80% **Race/ethnicity:** Caucasian 45.0% Asian 35.3%	**Method of allocation:** participants individually or in pairs randomly assigned to one of four conditions **Measures to minimise confounding:** family history of skin cancer as covariate in the analysis of outcomes with which it is at least marginally related (p<0.10) **Intervention/s** Photoaging information: *"was presented via an 11-min videotaped slide show (…). The video depicted photoaging (including graphic photos of extreme cases of wrinkles and age spots), described how sun exposure and UV radiation from any source leads to photoaging, and discussed effective practices for minimising photoaging (e.g.,*	**Primary Outcomes:** Future intentions to use sun protection Cognitive mediators (assessed on 5-point scales from 1 – strongly disagree to 5 – strongly agree): o Perceived rewards of sunbathing/ tanning (average of 10 items) o Costs of using sun protection (average of 12 items) o Perceived susceptibility to photoaging (average of 9 items) o Sun protection intentions (average of 18 items)	**Primary outcomes:** No interaction was found between the UV photo and video interventions. Therefore results are provided for: o Participants who received the photograph (including the photograph and video group) o Participants who did not receive the photograph (including the video group) o Participants who received the video (including the photograph and video group) o Participants who did not receive the video (including the photograph group) The overall effect of the video was significant (p=0.003), but not of the photo (p<0.13) Intentions to sun protect (mean (SD)): o 3.30 (0.69) video, 2.79 (0.75) no video; p<0.001	**Limitations identified by author:** o Study carried out at one site with relatively high level of UV radiation o Specific characteristics of the sample (mainly women, no African-Americans) **Limitations identified by review team:** o Outcomes not measured at baseline o Short follow-up o Small sample-size o Self-reported measures o Results not reported for groups to which participants were

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
External validity[†]**:** 3	Hispanic 11.3% Asian and Caucasian 1.5% Hispanic and Caucasian 0.8% Asian and Hispanic 0.8% Other 5.3% **Socioeconomic status: (annual income)** not reported **Excluded population:** under 18 years old and graduating seniors **Setting:** college	*wearing protective clothing and applying a sunscreen with a sun protection factor [SPF] of at least 15 to protect against both UVB and UVA rays). The video also provided general information about sunscreen, such as the meaning of the SPF number, when to use sunscreen, and how much to apply."* UV photograph: *"taken with instant Polaroid camera modified to include a 315- to 390-mm UV filter. (…) A photograph taken with a UV filter dramatically highlights the nonuniform epidermal pigmentation that results from chronic UV exposure. Each person who had a UV photo taken also had a natural light, instant photograph taken for comparison. In all cases, participants were first shown the natural-light, black-and-white photograph and were told that it depicted what can be seen with the naked eye. Then the UV photograph was placed adjacent to the natural-light photo. Participants were told that any "dark, freckled, or pitted*	**Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** immediate post-test; in mixed intervention stage – 1 year **Method of analysis:** Not reported if ITT Multivariate analysis of variance (MANOVA) with family history of skin cancer as covariate in the analysis of outcomes with which it is at least marginally related ($p<0.10$)	o 3.18 (0.76) photo; 2.91 (0.69) no photo; $p<0.05$ Susceptibility to photoaging (mean (SD)): o 3.70 (0.53) video; 3.54 (0.55) no video; ns o 3.72 (0.47) photo; 3.52 (0.61) no photo; $p<0.05$ Rewards of tanning (mean (SD)): o 2.35 (0.92) video; 2.55 (0.72) no video; ns o 2.46 (0.82) photo; 2.44 (0.81) no photo; ns Costs of sun protection (mean (SD)): o 2.87 (0.60) video; 2.98 (0.51) no video; ns o 2.90 (0.52) photo; 2.95 (0.59) no photo; ns **Secondary outcomes:** N/A **Attrition details:** No participants were lost to follow-up in the non-mixed stage	randomised **Evidence gaps and/or recommendations for future research:** Longer follow-up study **Source of funding:** grants from the Cancer Research and Prevention Foundation, the National Cancer Institute, and CSUSM Research, Scholarship, and Creative Activity grants to Heike I. M. Mahler

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		areas" in the UV photo that did not appear in the natural light photo indicate existing underlying skin damage that would continue to get worse if they continued their current sun exposure levels without additional sun protection." UV photograph and photoaging information All groups were given a sample of sunscreen after completion of the first post-test. **Intervention category[¥]:** II vs. III vs. II+III **Intervention period:** not reported **Comparator/s:** not reported, probably do nothing **Sample sizes:** **Total n =** 133 **Photo n =** 35 **Information n** =34 **Photo + Information n =**30 **Control n =** 34			

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Baseline comparisons: No significant difference was found for any demographic variable apart from family history of skin cancer which was less frequent in the photo and photo + information condition. **Study sufficiently powered?:** no information on power calculation			

Table 61 Mayer

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Mayer et. al.[64] **Year:** 1997 **Aim of study:** To estimate the effect of the intervention on reducing UVR exposure in participating children.	**Source population/s:** Aquatics classes of children in the target age range of 6-9 years. **Country:** USA **Study year:** 1995 **Eligible population:** Individuals or clusters were recruited in a specific area.	**Method of allocation:** Classes were randomly assigned to intervention or control conditions. **Measures to minimise confounding:** Within pairs of adjacent time slots in morning (e.g., 10:00–10:30 and 10:30–11:00 AM) and afternoon (e.g., 1:30–2:00 and 2:00–2:30 PM), within each YMCA, one time slot was randomly assigned to a condition, with the other assigned to the other condition. Randomization occurred for each	**Primary Outcomes:** 1. Change in tanness-associated skin colour dimensions measured objectively pre- and post-intervention using a portable colorimeter, the Chroma Meter (CR-300; Minolta). Two colour dimensions, L* and b*, were measured. L* indicates the colour's lightness from black to white, with the value increasing as the colour	**Primary outcomes:** Change in skin colour measured on L* scale – mean (SD): Baseline: 55.40 (SD 5.67) intervention; 56.46 (SD 5.39) control; Post-test: 54.98 (SD 5.63) intervention; 55.58 (SD 5.40) control;	**Limitations identified by author:** All measures except colorimeter were self-reports by parents; no comparison of responders and non-responders. **Limitations identified by review team:** Nothing to add **Evidence gaps and/or recommendations for future research:**

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Study design: RCT **Internal validity[§]:** + **External validity[†]:** 2	**Selected population:** A total of 48 aquatics classes from four YMCAs in San Diego, California, participated. Only one child per family could be included as a subject. If siblings were in the same class or in classes assigned to the same condition, one child was chosen randomly to serve as a subject. **Age:** mean 7.6 years **Female:** 49.7% **Race/ethnicity:** 79.8% white, non-Hispanic 6.5% Hispanic 7.7% Asian/ Pacific Islander 5.3% African American 0.6% Native American **Socioeconomic status: (annual income)** <$30K 15% $30–49K 18% $50–69K 26% $70–89K 22% ≥$90K 20% reported by parents	new set (i.e., wave) of classes. This assignment procedure was used to reduce possible contamination caused by children in a control class being exposed to the intervention. **Intervention/s** The content was *"centered around four topic areas: sunscreen, protective clothing, shade, and peak sunlight hours. At each of four aquatic lessons, a 5-min SUNWISE lesson was incorporated at the beginning. The aquatic instructor began the lesson with a photograph that depicted an animal engaged in "sunwise behaviour". (…) At each lesson the instructor (a) solicited information from the children about what the animal was doing; (b) modelled sun protection behaviour (…) and (c) rewarded verbally and with stickers the children's use of sun protection. Each behaviour targeted at a lesson was also included in subsequent lessons."* In the beginning of the intervention parents were given a manual about skin cancer prevention, information about the project and materials and instructions for home activities. *"Activities for children ≤ 7 years included coloring a picture to indicate on which body parts the*	lightens (i.e., becomes less tan). b* assesses blue to yellow, with the value increasing as the colour becomes more yellow (i.e., more tan). 2. Composite solar protection habit score (0-16, higher score indicates more protection). The child's specific use of sunscreen and protective clothing obtained from parents using a modified version of the Solar Protection Behaviour Diary. 3. Child's general use of several skin protective strategies provided by parents, including wearing hats and using sunscreen of SPF ≥ 15. For each item, a 5-point Likert-type response scale was used, ranging from 1 for ''never'' to 5 for ''always.'' **Adverse events:** Not report **Secondary outcomes:** Attendance rate **Follow-up periods:**	Adjusted post-test: 55.46 intervention, 55.05 control; p=0.19. Change in skin colour measured on b* scale – mean (SD): Baseline: 16.13 (SD 1.85) intervention; 15.51 (SD 1.91) control; Post-test: 16.04 (SD 1.77) intervention; 15.94 (SD 1.88) control; Adjusted post-test : 15.75 intervention, 16.16 control; p=0.084 Composite solar protection score – mean (SD): Baseline: 11.30 (SD 3.19) intervention; 10.73 (SD 2.90) control Post-test: 12.32 (SD 2.18) intervention; 11.36 (SD 2.93) control; Adjusted post-test: 12.11 intervention, 11.38 control,	The absence of consistent between-group differences may be explained by (1) the time interval between measurement sessions was relatively short, (2) participation bias may have weakened potential between-group differences, if participants had high levels of solar protection practices relative to nonparticipants and (3) the intervention itself may not have been long enough in duration to produce strong effects. Future research: Addition of environmental/structural components to intervention; encouraging all aquatics staff to wear hats; and intensifying and lengthening the intervention and lengthening the pre- to post-colorimeter interval. **Source of funding:** not report

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Excluded population: If one sibling was in a control class and the other in an intervention class, the control class sibling was excluded. **Setting:** aquatics classes	*children should wear sunscreen, a connect-the –dots to illustrate protective clothing, a word search to indicate items that provide shade, and a coloring assignment to indicate which clocks show peak vs nonpeak sunlight hours. Activities for children 8 years and older included letter unscrambling to spell words associated with body parts requiring sunscreen, a fill-in-the-blanks with names of protective clothing, a more challenging word search for shade items, and a more challenging clock task for peak hours. Family activities included a special calendar with reward stickers given for days sunscreen was used; selecting sun protective clothing for different outdoor activities; making a map of the family's yard, emphasizing areas of shade; and an activity-planning session to reduce time spent outdoors during peak sunlight hours. Parents were instructed to send the associated activity sheets with the child to the subsequent swimming lesson, to be collected by the aquatics instructor. Following Lesson 4, several additional materials for child and family activities were mailed to the participants, including SUNWISE "Jeopardy" game and a UVR meter."* **Intervention category[¥]:** I+III	6-8 weeks **Method of analysis:** ITT used: No Adjustments made for any baseline differences in important confounders: No important confounders identified.	p=0.15. Wearing a hat: Baseline: 2.21 (SD 0.94) intervention; 2.59 (SD 1.10) control; Post-test: 2.74 (SD 1.00) intervention; 2.62 (SD 1.08) control; Adjusted post-test: 2.84 intervention, 2.52 control, p=0.029 (0.049 controlling for age and gender). Use of SPF ≥ 15 sunscreen – mean (SD): Baseline: 3.41 (SD 1.13) intervention; 3.33 (SD 1.01) control Post-test: 3.55 (SD 0.96) intervention; 3.39 (SD 1.03) control; Adjusted post-test: 3.52 intervention, 3.41 control; p=0.44 (0.53 controlling for age and gender).	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Intervention period: 6 weeks **Comparator/s** Current information provision or do nothing **Sample sizes:** **Total n =** 169 **Intervention n =** 84 **Control n =** 85 **Baseline comparisons:** There were no statistically significant differences between the groups on key demographic, selected skin cancer risk related, or outcome variables at baseline. **Study sufficiently powered?:** Not report		**Secondary outcomes:** The attendance rates for intervention were 91%, 77%, 77% and 79% for lessons 1 through 4. The attendance rates for control were not reported. **Attrition details:** For adjusted post-test L* and b*, 20 subjects lost (control), and 11 (intervention); For composite solar protection habit score, 17 (control), and 20 (intervention); For wearing a hat and use of SPF ≥ 15 sunscreen, 9 (control), and 8 (intervention).	

Table 62 McClendon

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors:	**Source population/s:**	**Method of allocation:**	**Primary Outcomes:**	**Primary outcomes:**	**Limitations identified**

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
McClendon et al.[65] **Year:** 2001 **Aim of study:** *"first, a theoretically based intervention was expected to have a more pronounced effect on participants than did the largely atheoretical treatments in early studies. Second, a follow-up assessment of skin tone change was included to unobtrusively measure the impact of the PMT* [Protection Motivation Theory] *intervention."* **Study design:** RCT and before	college students **Country:** USA **Study year:** not reported **Eligible population:** "*Caucasians who have tanned intentionally at least once in the past year were recruited."* **Selected population:** 61 male and female introductory psychology students who received course credit. "*Caucasians who have tanned intentionally at least once in the past year were recruited."* **Age:** not reported **Female:** not reported **Race/ethnicity:** 100% Caucasian **Socioeconomic status: (annual income)** not reported **Excluded population:** participants with personal and/or family history of skin cancer or who had friends with history of skin	participants randomly assigned to conditions **Measures to minimise confounding:** not reported **Intervention/s** *"The intervention was divided into two sessions separated by 48 hours. Each session lasted 60-75 minutes."* Time 1: In the first session after completing the baseline questionnaire, participants read 5-page essays containing photos of sun-induced damage to the skin and models on current magazine covers who had light skin tone. *"The message emphasized how unattractive and unhealthy a person looks with a tan in light of new social norms concerning skin tone. It also stressed the effectiveness of the two recommended behaviours (i.e. eliminating sunbathing and using sunscreen) to prevent sun-induced skin damage and contained information on the ease of sunscreen application."* Afterwards in groups of 3-4 students listed ways to avoid *"unpleasant*	<u>Protection Motivation Theory variables:</u> o Vulnerability o Severity of threat o Rewards o Response efficacy o Self-efficacy o Response costs o Primary intentions – directly addressed in the intervention o Supplementary intentions – not addressed directly by the intervention <u>Photographs</u> – "*a 35-mm photograph was taken of the participants to "document the variety of skin tones present in the study". The participants were told to return in one moth to complete more questionnaires; however, they were unaware that a second photo would be taken. (…) All photos were taken in similar lighting against the same background. Four raters blind to the study hypothesis used a five-*	Randomised phase – mean (SD): Vulnerability o Baseline: 41.3 (SD 5.8) intervention, 39.8 (SD 5.7) control o Post-intervention: 44.2 (SD 4.0) intervention; 39.7 (SD 5.5) control Severity of threat: o Baseline: 48.7 (SD 7.2) intervention, 47.9 (SD 6.2) control o Post-intervention: 52.7 (SD 5.4) intervention; 47.3 (SD 6.5) control Rewards o Baseline: 36.9 (SD 6.3) intervention, 37.6 (SD 5.6) control o Post-intervention: 31.4 (SD 8.3) intervention; 37.0 (SD 5.7) control Response efficacy o Baseline: 28.4 (SD 5.9) intervention, 28.7 (SD 4.7) control o Post-intervention: 32.3 (SD 5.6) intervention; 29.0 (SD 5.5) control Self-efficacy: o Baseline: 26.9 (SD 5.6) intervention, 26.3 (SD 6.9) control o Post-intervention: 29.0 (SD 5.9) intervention; 23.5 (SD 6.4) control Response costs o Baseline: 20.5 (SD 6.5) intervention, 19.8 (SD 6.4) control o Post-intervention: 17.0 (SD 5.9) intervention; 20.3 (SD 5.3) control Primary intentions o Baseline: 24.8 (SD 9.0) intervention, 24.2 (SD 7.6) control	**by author:** o Possibility of a seasonality effect o Randomisation broken quickly **Limitations identified by review team:** o Lack of demographic information o No significance reported for changes in variables o ITT not reported o Baseline equivalence not reported **Evidence gaps and/or recommendations for future research:** o Repeat the study at different times of the year to exclude seasonality effects o Keep randomisation for a longer period o Assess gender differences **Source of funding:** not reported

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
and after **Internal validity[§]:** ++ for RCT **External validity[†]:** 4	cancer **Setting:** university	*consequences of the sun's UV rays."* Groups shared the results of their work. Time 2: The second session started with two videos "*from the Australian television program, 60 Minutes, which profiled a young Australian named Marc Marcelis. The first segment (11 minutes) detailed Marc's life after the diagnosis of melanoma and his willingness to help others prevent skin damage. The second segment (7 minutes) occurs after Marc's death and contains testimonial from people who were helped directly by Marc's campaign.* *After the videos, participants discussed possible alternatives to Marc's earlier lifestyle and then designed a campaign for junior high students to convince them to practice sun safe behaviours. The experimenter then gave a brief lecture highlighting the themes of the two sessions."* Finally, participants completed the questionnaire and had a picture taken.	*point scale to compare skin tones (i.e. extremely lighter, somewhat lighter, no difference, somewhat darker, extremely darker)."* **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** immediately after intervention; 1 month – both groups were given the intervention and this can be seen only as a before and after study **Method of analysis:** Not reported if ITT	o Post-intervention: 32.7 (SD 6.8) intervention; 24.9 (SD 8.7) control Supplementary intentions o Baseline: 22.5 (SD 6.2) intervention, 21.6 (SD 5.0) control o Post-intervention: 29.0 (SD 5.1) intervention; 22.4 (SD 5.4) control All the means changed in the appropriate direction in the intervention group and remained essentially unchanged in the control arm <u>Before-after assessment</u> (in 32 participants): Photographs: at follow-up 23 had a lighter skin tone, 4 were assessed as no change and 5 had a darker colour PMT scores – not reported, but probably mean (SD) – significant change from baseline to post-test, but not from post-test to follow-up Vulnerability o Pre-test: 39.3 (SD 5.5) o Post-test: 44.1 (SD 4.2) o Follow-up: 43.9 (SD 4.8) Severity of threat o Pre-test: 47.0 (SD 6.8) o Post-test: 51.7 (SD 5.5) o Follow-up: 52.0 (SD 5.2) Rewards o Pre-test: 38.4 (SD 5.0)	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Intervention category[¥]: I+II+III **Intervention period:** 2 sessions 60-70 minutes long separated by 48 hours **Comparator/s:** Time 1: only questionnaire Time 2: same as intervention group at Time 1 followed by the same as in intervention group **Sample sizes:** **Total n =** 61 (58 completed the post-test) **Intervention n =** 28 **Control n =** 30 **Baseline comparisons:** not reported **Study sufficiently powered?:** power calculation not reported		o Post-test: 33.7 (SD 7.1) o Follow-up: 33.9 (SD 6.5) Response efficacy o Pre-test: 28.1 (SD 5.7) o Post-test: 31.7 (SD 5.3) o Follow-up: 31.9 (SD 5.1) Self-efficacy o Pre-test: 25.4 (SD 6.3) o Post-test: 28.1 (SD 6.2) o Follow-up: 25.7 (SD 6.0) Response costs o Pre-test: 21.4 (SD 6.5) o Post-test: 17.4 (SD 5.8) o Follow-up: 17.8 (SD 6.1) Primary intentions o Pre-test: 22.7 (SD 8.1) o Post-test: 32.6 (SD 7.5) o Follow-up: 31.7 (SD 8.0) Supplementary intentions o Pre-test: 20.6 (SD 4.9) o Post-test: 28.6 (SD 5.5) o Follow-up: 27.3 (SD 5.2) **Secondary outcomes:** N/A **Attrition details:** Of the initially enrolled 61 participants – 58 completed the post-test 32 participants completed the 1 month	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				follow-up	

Table 63 McMath

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: McMath et al.[66] **Year:** 2005 **Aim of study:** To examine the moderating effects of selected personality variables (appearance concern, health locus of control, need for cognition & unrealistic optimism) on reactions to essays concerning skin cancer associated with intentional	**Source population/s:** Undergraduates who sunbathed. **Country:** USA **Study year:** not stated **Eligible population:** Undergraduates who sunbathed. Only Caucasians who had tanned intentionally in the previous year were recruited. Selected population: Undergraduates at the University of Alabama who participated in the trial as partial fulfilment of course requirements. **Age:** not stated **Female:** 73.6% **Race/ethnicity:** 100% white	**Method of allocation:** Participants were randomly assigned to read one of four intervention messages. **Measures to minimise confounding:** Non stated **Intervention/s** The intervention was provided in single, 1-hour sessions to groups of 12 to 20 participants who were advised the study involved health attitudes and personality. After they provided 'informed' consent, participants completed an inclusion criteria screening questionnaire and four personality construct instruments. They were then randomly assigned to read one of four essays emphasizing the detrimental effects of the sun on appearance and the effectiveness of using sunscreen and eliminating sunbathing with an emphasis on new 'paler' norms of attractiveness. The four essays (each 9 to 11 pages long)	**Primary Outcomes:** Protection motivation theory variables (i.e. rewards, severity, vulnerability, response costs, response efficacy, self-efficacy) were used as checks on the successful manipulation of threat appraisal and coping appraisal information in the essays. Intentions to take precautionary measures against skin cancer. **Adverse events:** Not stated. **Secondary outcomes:** None stated. **Follow-up periods:** Upon immediate completion of the 1-	**Primary outcomes:** Threat information affected all appraisal variables in the expected direction ($p<0.001$). Compared to those exposed to the low threat message, participants reading the high threat message reported: stronger beliefs in the severity of skin cancer (M=50.90 vs. 39.03); greater vulnerability to skin cancer (M=48.9 vs. 39.2); and lower rewards for a tanned appearance (M=37.01 vs. 48.58). In addition, the coping information had a significant effect on the rewards variable, with low relative to high coping appraisal leading to greater perceived rewards (M=44.14 vs. M=41.33). However the influence of coping manipulation was minor in comparison with threat manipulation. Suggesting threat appraisal was manipulated effectively.	**Limitations identified by author:** The main limitation was that the threat information manipulation independently effected manipulation checks for the coping appraisal manipulation. **Limitations identified by review team:** Nothing to add. **Evidence gaps and/or recommendations for future research:** Nothing to add. **Source of funding:** Not reported.

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
sunbathing. **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 3	**Socioeconomic status: (annual income)** Not stated **Excluded population:** Not stated **Setting:** university	manipulated threat and coping appraisal as follows: high threat/low coping, low threat/low coping, high threat/high coping and low threat/high coping. Manipulating threat appraisal information involved the amplification or attenuation of statements concerning severity, vulnerability and the rewards associated with sun tanning. Manipulating coping appraisal involved the heightening or attenuation of efficacy (self-efficacy and response efficacy) and response costs related to reduced tanning and increased sunscreen use. After the intervention, the participants completed a protection motivation theory questionnaire, were debriefed, thanked and dismissed. **Intervention category[¥]:** III **Intervention period:** A single 1-hour session with immediate assessment. **Comparator/s:** no control group **Sample sizes:** **Total n =** 208 Numbers randomly assigned to read the different essays not reported.	hour intervention. **Method of analysis:** ITT used: no. Adjustments made for any baseline differences in important confounders: multiple regression analyses performed for each individual-difference variable to assess any first-order and interaction effects in the context of the manipulated threat and coping information variables.	The coping appraisal manipulation also influenced each associated variable in the predicted directed direction ($p<0.01$), with high coping information increasing perceptions of self efficacy (M=33.00 vs. 30.04) and response efficacy (M=36.77 vs. 32.62), whilst reducing perceived response costs (M=25.14 vs. 30.10). Compared with low coping information, high threat information was associated with higher perceptions of self-efficacy (M=33.19 vs. 28.87), response efficacy (M=37.20 vs. 32.31), and lower costs (M=25.92 vs. 29.40). Suggesting the effects of the coping appraisal information should interpreted cautiously. Participants exposed to the high threat message reported increased behavioural intentions, $F(1,192)=54.87$, $p<0.001$, with those reading the high threat message intending to take greater precautionary measures (than those in the low threat condition (M=34.93, SC=9.61 vs. M=24.90, SD=9.35). No effect of threat information was evident for either hopelessness or avoidance. Coping information was	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Baseline comparisons: not reported **Study sufficiently powered?:** Not stated.		marginally effective in increasing behavioural intentions, F(1,192)=3.03,p=0.08. Those exposed to higher levels of coping information were more likely to report precautionary intentions than their counterparts receiving low coping information (M=31.19, SD=10.13 vs. M=28.73, SD=11.18). the coping manipulation markedly effected hopelessness reports, F(1,192)=9.55, p=0.002. those who received higher coping information reported less hopelessness than those reading the low coping message (M=20.34, SD=7.43 vs. M=23.83, SD=8.30). There was no coping information effect on avoidance and no threat x coping information interactions for any measure. The assessment of the impact of the selected personality variables on behavioural intentions indicated appearance concern did not confer any additional effect; the need for cognition conferred a marginal effect; the coping x	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				unrealistic optimism interaction was significant; high levels of internality (internal locus of control) did not confer any additional effect; external (chance) locus of control was associated with a decrease in behavioural intentions to self protect; and external (powerful others) locus of control did not exert any significant additional effects. **Secondary outcomes:** N/A **Attrition details:** Eight female and four male participants excluded from data analysis as they correctly identified the experimental hypothesis on the post-study questionnaire.	

Table 64 Mermelstein

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Mermelstein et al.[67] **Year:** 1992	**Source population/s:** high school students **Country:** USA	**Method of allocation:** schools randomly assigned to intervention or control **Measures to minimise**	**Primary Outcomes:** Questionnaires approximately 2 weeks apart; in the curriculum arm 1 week before and	**Primary outcomes:** Baseline assessment of the entire sample is not reported in this table Knowledge – correct answers at follow-	**Limitations identified by author:** • No behavioural data collected

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Aim of study: "*(a) to gather baseline data on adolescents' knowledge, attitudes, and behaviours with regard to skin cancer, sun exposure, sunscreen use, and tanning booth use and (b) to evaluate the effectiveness of a brief, school-based intervention designed to increase teens' awareness, knowledge, and preventive attitudes and behaviours regarding sun exposure and skin cancer prevention.*" **Study design:** RCT **Internal**	**Study year:** not reported **Eligible population:** "*10 Chicago area suburban schools selected to maximise high risk population – White teenagers*" **Selected population:** *"903 female and 800 male high school students, of whom approximately half were in their freshman year and the other half were in their sophomore year"* **Age:** not reported; **Female:** 53% **Race/ethnicity:** 83% White 7.6% Asian 5.0% Hispanic 1.1% Black 3.3% other **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported	**confounding:** not reported **Intervention/s** *"A one-session (45 min) class consisting of a 12-min videotape explaining the dangers of skin cancer, the risk factors, and ways to take precautions, followed by an elaboration the important facts presented in the video. The students used worksheet to help them assess their personal risk of skin damage caused by sun exposure. Last, barriers to taking precautions were discussed. The intervention was conducted by one of the authors."* **Intervention category[¥]:** I **Intervention period:** 45 minutes **Comparator/s:** no intervention; 2 questionnaires approximately 2 weeks apart **Sample sizes:** **Total n =** 1703 participants; 10 schools	after intervention; Questionnaires assessed: • Skin type • Sun exposure – average number of daylight hours spent outside during the summer – weighed combination of questions asking about summer holidays, weekends and weekdays; • Sunscreen use – how often sunscreen or sunblock was used when outside (1 - never to 4 – always) and the SPF of sunscreen or sunblock • Indoor tanning frequency – 1 for 0 times to 5 for 21 times • Knowledge scores – at baseline derived from a nine-item scale; included true/false and multiple-choice items	up: 82.0% intervention; 56.8% control; F(1,1274)=577.5; p<0.0001 9th graders: 78.1% intervention; 46.7% control; 10th graders: 85.3% intervention; 62.1% control Susceptibility – mean (SD): 33.1 (SD 5.9) intervention; 31.1 (SD 5.7 control); F(1,1274)=46.4; p<0.001 Perceived benefits of sun exposure – no significant effect Likelihood of taking precautions - no significant effect (p<0.10) **Secondary outcomes:** N/A **Attrition details:** Not reported	• Short follow-up **Limitations identified by review team:** • Numbers of participants in groups not provided • Some demographic characteristics missing • No attrition details • Not reported if ITT was used • Baseline data not reported for study groups • Little information on the intervention • Results not (completely) reported for all outcomes assessed • No indication if clustering was considered **Evidence gaps and/or recommendations for future research:** Establish reliable and verifiable measures of sun exposure and

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
validity[§]: - **External validity[†]:** 4	**Setting:** school	**Intervention n =** number of participants not provided; 5 schools **Control n =** number of participants not provided; 5 schools **Baseline comparisons:** no baseline differences in knowledge and perceived susceptibility; further details not provided **Study sufficiently powered?:** no information on power calculation provided	asking about risk factors, SPF numbers and sunscreen use and seriousness and prevalence of skin cancer; 5 items were added to the follow-up questionnaire (no details provided) • Likelihood of taking precautions scale – 7-item scale measuring how likely it would be for participants to take precautions in the sun; measured on 4-point scales from 1 "not at all likely" to 4 "extremely likely" • Attitude – items measured on 4-point scales from 1 "definitely disagree" to 4 "definitely agree"; subscales included: 1. Perceived susceptibility (11 items) 2. Perceived benefits of sun exposure (14 items)		protection **Source of funding:** partly from the Arthur Rubloff Residuary Trust via the American Cancer Society, Illinois Division, Inc.

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
			3. Awareness of changing social norms (2 items) **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** questionnaire approximately one week before and after intervention; in control group two weeks apart **Method of analysis:** Not reported if ITT; Multivariate analysis of variance		

Table 65 Mickler

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Mickler et al.[68]	**Source population/s:** undergraduate students	**Method of allocation:** participants randomly assigned to intervention	**Primary Outcomes:** Skin Cancer Knowledge	**Primary outcomes:** Skin Cancer Knowledge Questionnaire	**Limitations identified by author:** o No pre-testing (it

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Year: 1999 **Aim of study:** *"to evaluate the effectiveness of three methods of teaching skin self-examination in increasing skin cancer knowledge, skin cancer detection skills, and self-examination techniques."* **Study design:** RCT **Internal validity[§]:** ++ **External validity[†]:** 2	**Country:** USA **Study year:** not reported **Eligible population:** undergraduate psychology research pool **Selected population:** 143 undergraduate psychology students **Age:** mean 18.47 (SD 1.80), range 17 to 31 **Female:** 59.4% **Race/ethnicity:** Caucasian 76.2% Hispanic-American 14.7% African-American 2.1% Asian-American 7.0% **History of skin cancer:** 28% family history; an indication that some of the participants had a personal history of skin cancer (exact data not provided) **Socioeconomic status: (annual income)** not reported	conditions with stratification on the basis of gender, skin type, and personal exposure to skin cancer (i.e., family history or knowing someone with skin cancer) **Measures to minimise confounding:** stratified randomisation **Intervention/s** Videotape: *"participants watched "Skin Cancer: Preventable and Curable (…), which included information about skin cancer, how to recognise it, and different skin types and their vulnerabilities to the sun. The videotape also included a demonstration of how to do a total-body skin exam and tips on prevention."* Brochures: *"participants received several commonly used written materials and were instructed to read them thoroughly. These brochures included "The Many Faces of Malignant Melanoma", "Skin Cancer: If You Can Spot It, You Can Stop It", "Basal Cell Carcinoma: The Most*	Questionnaire: *"20-item (7 multiple choice, 13 true/false) questionnaire is a revision of a measure initially reported by Katz and Jernigan (1991) and is designed to measure participant's knowledge about the seriousness and prevalence of skin cancer, skin cancer risk factors, and prevention techniques. Good internal consistency, 2 week test-retest reliability, and construct validity have been reported…"* Visual Picture Test: *"14-picture task designed for this study to assess participants' ability to discriminate visually skin cancers from non-cancerous (benign) moles/growths. Responses are scored as correct or incorrect. Pictures were selected by a licensed dermatologist to reflect "common" benign growths and early-stage skin cancers and to differ along the*	(mean (SD)): o Post-test 1: 16.28 (1.89) videotape, 16.00 (1.76) brochure, 14.63 (2.01) nurse, 13.54 (2.22) control; o Post-test 2: 15.94 (2.25) videotape, 16.02 (1.72) brochure, 15.37 (2.13) nurse, 14.15 (1.82) control; o Participants in all intervention arms had significantly more knowledge than those in the control arm in both tests; o At Post-test 1 videotape and brochure had a significantly higher knowledge than nurse group; Visual Picture Test: o Post-test 1: 11.00 (1.87) videotape, 10.54 (1.70) brochure, 11.66 (1.65) nurse, 9.66 (2.24) control; o Post-test 2: 10.92 (1.80) videotape, 10.45 (1.80) brochure, 11.21 (1.67) nurse, 9.51 (2.18) control; o Nurse arm had a significantly higher result than video; both were significantly better at this test than brochure and control group; finally brochure group was significantly better than control group Self Examination Rating Scale: o Post-test 1: 13.76 (4.43) videotape, 18.51 (4.78) brochure, 15.15 (3.55) nurse, 9.22 (4.42) control; o Post-test 2: 13.63 (4.27) videotape, 18.31 (4.45) brochure, 14.90 (4.62) nurse, 10.54 (6.08) control;	could focus participants attention on specific information) o Specific characteristics of study population which limit transferability o Short follow-up o Two of the measures were developed for the study and not validated in a wider population **Limitations identified by review team:** o Study does not measure changes in attitudes or behaviours o Not ITT analysis o Little information on interventions o Exact location not provided **Evidence gaps and/or recommendations for future research:** Longer follow-up studies with participants

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Excluded population: "*participants who had received explicit skin cancer detection or skin examination instruction in the past year from a health professional"* **Setting:** university/ college	*Common Cancer", and "Squamous Cell Carcinoma: The Second Most Common Skin Cancer"."* Nurse: "*involved providing participants with one-to-one training by a nurse practitioner. The nurse instructed participants on how to perform a skin self-examination and to visually recognise skin cancers. Participants had the opportunity to practice and receive feedback about their self-examination skills, and they were provided with the same brochures as those in the Brochures Condition. To ensure that the information provided by the nurse was comparable to that in the other conditions, a script was developed from the videotape described above. The nurse rehearsed the presentation of the scripted information in several training sessions prior to the start of the study and received corrective feedback until she achieved three perfect presentations of the material. She was periodically observed during the study to ensure maintenance of treatment*	*following dimensions: asymmetry, border regularity, colour, and diameter (…). Of the 14 pictures , 7 reflect benign growths and 7 are early stage skin cancers."* Self Examination Rating Scale: "*an observational measure that was developed for this study. Participants are instructed to conduct a self-examination and the 28-item (pass/fail)* scale *is used by an observer to assess proficiency of the skin self-examination."* This scale was developed based on American Cancer Society materials and other research. It was reviewed by a listed dermatologist and "*three dermatology professionals were than asked to describe a typical skin examination given to their patients."* On the basis of the above, the instrument "*required no revisions and was determined to have good construct*	o All intervention groups received significantly higher ratings than the control group o Brochure arm had a significantly higher rating than video and nurse conditions **Secondary outcomes:** N/A **Attrition details:** 97% (138) returned for the second test.	representative of the general population **Source of funding:** grant from American Cancer Society, Florida Division

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		integrity." **Intervention category[¥]:** I vs. II vs. III **Intervention period:** 15-20 minutes for all interventions **Comparator/s:** a wait-list with information about peer leadership skill development (to control for time spent with other participants); they were informed in advance that they will receive a skin cancer intervention (type was not specified) at the end of the study – they were given nurse-led education **Sample sizes:** **Total n =** 143 **Videotape n =** 39 **Brochures n =** 35 **Nurse-Led n =** 33 **Control n =** 36 **Baseline comparisons:** *"participants (…) did not differ significantly on any of the demographic or skin cancer/ sun exposure history variables."*	*validity."* **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** On arrival participants completed a demographic questionnaire and were randomised. Immediately after the intervention first post-test was carried out. The second post-test took place three weeks later. **Method of analysis:** not reported if ITT Analyses of variance (ANOVAs) to examine intervention effects		

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Study sufficiently powered?: no information on power calculation			

Table 66 Naldi

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Naldi et al.[75,76] **Year:** 2007 **Aim of study:** *"to evaluate the impact of an educational intervention to reduce sunburn episodes and to improve sun protection behaviour among Italian schoolchildren"* **Study design:** RCT	**Source population/s:** a convenience sample of Italian cities "*selected according to the presence of a dermatology centre participating in the clinical network of the Italian Group for Epidemiological Research in Dermatology (GISED).*" **Country:** Italy **Study year:** 2001-2003 (pilot phase with 51 schools); 2002-2004 (second phase with 71 schools) **Eligible population:**	**Method of allocation:** *"centralised randomisation with stratification by number of children per school (less or equal 100 vs. more than 100)"* **Measures to minimise confounding:** categorical variables were adjusted for "*gender and for other variables not uniformly distributed between groups at baseline (i.e., geographic area of residence, number of weeks spent on holiday in the sun during the previous year, and sun-protection behaviour at baseline)";* there was also adjustment for sampling design; **Intervention/s** *"The educational intervention was*	**Primary Outcomes:** Difference in sunburns (defined as *"an episode of intense erythema, with or without blisters, causing pain and discomfort lasting for at least 3 days"*) in children between the year preceding and following the intervention (reported by parents) Count of melanocytic naevi on upper limbs of a subsample of classes selected by the local investigator. **Adverse events:** Not reported	**Primary outcomes:** Child experienced sunburn episodes last year: Baseline: 783/5676 (82 unknown) intervention, 764/5554 (86 unknown) control; Follow-up: 579/4430 (125 unknown) intervention, 565/4181 (102 unknown) control; OR = 0.97 (95% CI: 0.84-1.13) Number of sunburns last year: 1-2: Baseline: 574/5676 intervention, 570/5554 control; Follow-up: 418/4430 intervention, 415/4181 control; OR = 0.96 (95% CI: 0.81-1.13) ≥3: Baseline: 87/5676 intervention, 87/5554 control; Follow-up: 74/4430 intervention, 68/4181	**Limitations identified by author:** *"Rate of sun protection was already high in the examined population;* *The expected size of effect was large;"* Drop-out rate: some schools were not able to comply with study requirements; Sunburn history was reported by parents (not objective); The intervention might have been too short Behavioural attitudes, reduction in sunburn cases and sun exposure are surrogate outcomes of incidence and mortality from skin cancer

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Internal validity[§]: + **External validity[†]:** 2	125 schools were contacted; within them *"all the children attending second or third years were eligible"* **Selected population:** 122 consenting elementary schools (11230 children); parents provided informed consent **Age:** mean 8 (SD 0.7) **Female:** 2765 (48.7%) in the intervention group (for 47 children this characteristic was missing); 2740 (49.3%) in the control group (for 24 children this characteristic was missing) **Race/ethnicity:** not reported **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported	*developed with the help of pedagogues and epidemiologists and was conducted during the first year of study. It involved the distribution of educational material to parents and their children, the development of a short curriculum at school, based on a resource developed for health teachers, and the projection of a short video at school."* **Intervention category[¥]:** I+III **Intervention period:** unclear, possibly 1 year **Comparator/s:** no intervention **Sample sizes:** **Total n =** 122 schools, 11230 children (4921 children nevi counted) **Intervention n =** 62 schools; 5676 children (2852 children naevi counted) **Control n =** 60 schools; 5554 children (2069 children naevi counted) **Baseline comparisons:** *"Skin, hair, and eye colour*	**Secondary outcomes:** Parents' knowledge concerning sun effects and sun exposure, behaviour of their children. **Follow-up periods:** 14 to 16 months **Method of analysis:** not reported if ITT; drop-outs were excluded from the analysis of follow-up data	control; OR = 1.10 (95% CI: 0.75-1.62) Naevi count: *"no differences emerged between the subgroups analysed. At baseline, the geometric mean of nevus count was 5.1 in both the intervention and the control group. At follow-up, the geometric means were 6.8 in the intervention and 6.4 in the control group. The ratio of relative change was 1.06 (95% confidence interval (CI) 1.02-1.10)."* **Secondary outcomes:** Child experienced intense sun exposure last year Baseline: 4484/5676 (145 unknown) intervention, 4355/5554 (163 unknown) control; Follow-up: 3562/4430 (172 unknown) intervention, 3297/4181 (137 unknown) control; OR = 0.88 (95% CI: 0.77-1.01) Parents believe child was adequately protected from the sun on the previous year: Baseline: 4937/5676 (111 unknown) intervention, 4762/5554 (118 unknown) control; Follow-up: 3863/4430 (136 unknown) intervention, 3622/4181 (131 unknown) control;	**Limitations identified by review team:** No additional limitations identified. **Evidence gaps and/or recommendations for future research:** Studies on alternative educational methods with more objective outcome measures; Interventions targeted at people who appear to not comply with sun-protective behaviour **Source of funding:** research grant form the Italian Cancer League and an unrestricted research grant from the L'Oréal Recherche

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Setting: elementary school	*distributions were similar in the two study arms."* It appears there was no significant difference in baseline results as well. **Study sufficiently powered?:** based on an expected effect of a 30% reduction in the rate of sunburns , assuming randomisation units of 40 individuals, a variability between clusters of around 20% and error levels α=0.05 and β=0.2 a sample of about 5000 children in each arm was calculated During the pilot phase a lower rate of sunburns than expected was observed; thus more clusters than originally planned were enrolled;		OR = 0.86 (95% CI: 0.71-1.04) Child regularly used sunscreen while in the sun during the previous year: Always: Baseline: 4059/5676 intervention, 3925/5554 control; Follow-up: 3284/4430 intervention, 3026/4181 control; OR not provided; used as a reference category Sometimes: Baseline: 930/5676 intervention, 967/5554 control; Follow-up: 699/4430 intervention, 771/4181 control; OR = 0.86 (95% CI: 0.75-0.98) Occasionally/ never: Baseline: 546/5676 intervention, 577/5554 control; Follow-up: 444/4430 intervention, 384/4181 control; OR = 1.11 (95% CI: 0.92-1.32) The child usually wore a hat while in the sun during the previous year: Always: Baseline: 2154/5676 intervention, 2082/5554	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				control; Follow-up: 1525/4430 intervention, 1404/4181 control; OR not provided; used as a reference category Sometimes: Baseline: 2263/5676 intervention, 2188/5554 control; Follow-up: 1884/4430 intervention, 1819/4181 control; OR = 0.96 (95% CI: 0.86-1.08) Occasionally/ never: Baseline: 1147/5676 intervention, 1202/5554 control; Follow-up: 1020/4430 intervention, 958/4181 control; OR = 1.021 (95% CI: 0.89-1.17) The child usually wore a long-sleeved shirt while in the sun last year: Always: Baseline: 1126/5676 intervention, 1089/5554 control; Follow-up: 901/4430 intervention, 776/4181 control; OR not provided; used as a reference category Sometimes: Baseline: 2339/5676 intervention, 2356/5554 control; Follow-up: 1902/4430 intervention, 1821/4181	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				control; OR = 0.91 (95% CI: 0.79-1.04) Occasionally/ never: Baseline: 2072/5676 intervention, 2026/5554 control; Follow-up: 1626/4430 intervention, 1584/4181 control; OR = 0.90 (95% CI: 0.78-1.03) **Attrition details:** In the intervention arm 3 schools did not return the follow up questionnaires. 1246 children were lost to follow up (580 from the naevi count subsample). In the control group 6 schools and a total of 1373 children (408 from the naevi count subsample) were lost to follow up.	

Table 67 Parrott

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Parrott et al.[79] **Year:** 1999 **Aim of study:**	**Source population/s:** soccer teams on sunny coast of Georgia between South Carolina and Florida	**Method of allocation:** coaches randomly assigned to intervention or control **Measures to minimise**	**Primary Outcomes:** Coaches and parents: • Knowledge • Outcome	**Primary outcomes:** exact scores for arms were not provided <u>Knowledge</u> *"Post-test all six coaches in the*	**Limitations identified by author:** • possible contamination of the control

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
to assess *"(1) what coaches and parents of soccer-playing youths know about sun protection, and perceive relating to self-efficacy to practice and promote sun protection; and (2) what impact a pilot health education programme developed around these findings has on coaches, parents and youths."* **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 3	**Country:** USA **Study year:** not reported **Eligible population:** coaches, parents and youths from soccer teams **Selected population:** *"12 coaches (75% response rate), 50 parents (62.5% response rate) and 61 youths (76% response rate) from eight teams in St. Simons Island's youth soccer association"* **Age:** coaches mean 43; range 33-64; **Female:** 25% coaches; 66% parents **Race/ethnicity:** 100% coaches Caucasian 98% parents Caucasian **History of skin cancer:** no coaches, 12% parents **Socioeconomic status: (annual income)** 10 coaches had an annual income of over	**confounding:** not reported **Intervention/s** A seminar about sun protection together with a *"booklet of prevention strategies and information about skin cancer and youth's risk."* The topics covered included skin cancer facts, skin cancer and youth, sun-smart strategies for soccer teams, how parents can protect youths' skin, sunscreen use, skin cancer prevention resources, skin cancer definitions, how to conduct a self-examination, and youth activities. The program included information on how to choose and use sunscreen, and the difference between sports sunscreen, waterproof sunscreen, and water-resistant sunscreen. The programme was reviewed by the steering committee and in a focus group meeting of coaches and parents. Afterwards revised. **Intervention category[¥]:** I **Intervention period:** not	expectancies • Self-efficacy • Behaviour relating to sun protection Youths: coaches' and parents' efforts to promote sun protection **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** not reported **Method of analysis:** not reported if ITT repeated measures analysis of variance	*intervention condition demonstrated understanding of the need to apply sunscreen 20 to 30 minutes before going into the sun. No change was observed in knowledge about sun-protective clothing. Nor did changes occur in understanding about the recommended frequency of obtaining a clinical skin exam. Not surprisingly, parents showed similar results, as the coaches' knowledge guided efforts to communicate with parents and youths about sun protection."* No other results reported for study arms. Findings of repeated-measures ANOVAs *"revealed no differences between control and intervention conditions; the only significant result occurred with regard pre-test post-test differences for knowledge, $F(1,35)=9.67$, $p<0.01$."* No indication if this change was in parents and/or coaches. results for youths not reported in study arms **Secondary outcomes:** N/A **Attrition details:** 75% coaches and 76% parents took part in the follow-up test	group • small sample • attrition • self-reported data • setting – soccer field with other teams present **Limitations identified by review team:** • results not reported for study arms • clustering not accounted for **Evidence gaps and/or recommendations for future research:** additional materials for parents **Source of funding:** supported by Cooperative Agreement from the Centers for Disease Control and Prevention and a fellowship from the University of Georgia's Institute of Behavioural Research to the author

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	$50,000 2 parents had an income of $22,000-$35,000 38 parents had an income equal or more than $50,000 **Excluded population:** not reported **Setting:** sports venue	reported **Comparator/s:** not reported; probably do nothing **Sample sizes:** **Total n =** 12 coaches, 50 parents, 61 youths **Intervention n =** 6 coaches; parents and youths not reported **Control n =** 6 coaches; parents and youths not reported **Baseline comparisons:** not reported **Study sufficiently powered?:** power calculation not reported			

Table 68 Prentice-Dunn

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Prentice-Dunn et al.[81]	**Source population/s:** undergraduate students	**Method of allocation:** *"subjects in each appearance group were randomly assigned to read*	**Primary Outcomes:** 10-point Likert scales were used to assess	**Primary outcomes:** Participants were not analysed in groups they were randomised to, but according to certain factors; results using high and	**Limitations identified by author:** Not reported

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Year: 1997 **Aim of study:** to modify the *"maladaptive intentions of people who are high in appearance concern."* It was sought to extend findings of earlier investigations by varying the components of an appearance-based essay (protection motivation theory variables). **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 4	**Country:** USA **Study year:** not reported **Eligible population:** *"undergraduate students who received class credit for participating in a study"* **Selected population:** *"56 male and 84 female undergraduate students who received class credit for participating in a study which ostensibly examined health beliefs;"* only data from Caucasian students was used (unclear if all 140 were Caucasian); participants having a high or low appearance concern were chosen from a mass testing session **Age:** not reported **Female:** 60% **Race/ethnicity:** 100% of analysed Caucasian **Socioeconomic status: (annual income)** not reported **Excluded population:** non-Caucasian;	*one of four essays"* **Measures to minimise confounding:** not reported **Intervention/s** *"2.5-page messages highlighted appearance-related issues such as wrinkling and leathering of the skin from ultraviolet exposure, the development of age spots, and the unsightly appearance of cancerous skin patches that have been removed. Each essay discussed reducing sun exposure and using sunscreen as preventive measures."* Participants were allocated to essays with different levels of benefits of a tan and efficacy of recommended behaviour. *"The low-benefits message emphasised how unattractive and unhealthy one is perceived with a tan in light of new norms; how having a tan might lower one's self-confidence because of the new public attitude toward tanning; and how unpleasant it is to work on a tan. The high-benefits message reversed this*	o beliefs about the beneficial effects of sun tanning (5 items), o efficacy of preventive measures to avoid sun damage (4 items), o likelihood of sun tanning and using sunscreen in the future (8 items). Afterwards a suspicion questionnaire was distributed. **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** immediately after intervention **Method of analysis:** Not reported if ITT 2x2x2 ANOVA on the benefits sum and efficacy sum	low baseline appearance concern as a predictor of benefits and efficacy are not reported in this evidence table, as they do not take into account the effectiveness of the interventions; believing in the benefits of tanning : high-benefits M=36.4; SD=8.7 low-benefits M=28.9, SD=10.6 believing that recommended actions are effective (significant main effect of efficacy manipulation, F (1,139)=21.50, p<0.001): low-efficacy: M=28.4, SD=7.2 high-efficacy: M=33.4, SD=5.6 intentions to take precautions (significant main effect of benefits manipulation; F(1.139)=4.31; p=0.04): low-benefits: M=46.9, SD=16.6 high-benefits: M=41.5, SD=14.8 None identified the study hypothesis or showed prior knowledge of the study. **Secondary outcomes:** N/A **Attrition details:** not reported; probably no attrition due to study duration	**Limitations identified by review team:** o No baseline outcome measurements o Little demographic information o Results for study groups not provided o Attrition details and ITT not reported o Short follow-up **Evidence gaps and/or recommendations for future research:** o Testing multiple session and other types of interventions (videos, posted goals and feedback, etc) o Impact of interventions on actual behaviour **Source of funding:** not reported

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	moderate appearance concern **Setting:** university/ college	*information."* *"The high-efficacy message highlighted the effectiveness of reducing the amount of time spent outside in the sun using sunscreen to prevent skin cancer and other skin damage. In particular, the ease of sunscreen application was emphasised. The low-efficacy message downplayed the effectiveness of such measures and the ease and convenience of putting them into practice."* **Intervention category[¥]:** III **Intervention period:** not reported **Comparator/s:** interventions compared with each other **Sample sizes:** **Total n =** 140 (although unclear if all participants were analysed) Numbers allocated to groups were not reported **Baseline comparisons:**			

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		not reported **Study sufficiently powered?:** not reported			

Table 69 Prochaska

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Prochaska et al.[82] **Year:** 2005 **Aim of study:** to recruit a majority of (…) patients and to significantly reduce each of the four targeted cancer behaviour risk factors: smoking, high-fat diet, sun exposure, and relapse from regular mammography screening	**Source population/s:** lists of patients from primary care practices provided by a large health insurance organisation **Country:** USA **Study year:** not reported **Eligible population:** *"practices were eligible if at least one practice physician: (1) was enrolled as a provider for the collaborating health insurance organisation; (2) identified his/her speciality as Family Medicine, Internal Medicine, or Obstetrics/ Gynaecology; (3) reported at least 25% of*	**Method of allocation:** practices randomised to intervention or control condition **Measures to minimise confounding:** not reported **Intervention/s** *"The Expert System Intervention Group was mailed three computer generated reports at 0, 6, and 12 months for each at-risk behaviour. The three- to five-page reports per behaviour were divided into five sections. First stage of change and readiness to change the behaviour was reported. Second, the pros and cons of changing were discussed with feedback,*	**Primary Outcomes:** (only relevant to sun protection are included in this evidence table) *"The Sun Protection Behaviour Scale (SPBS) is a brief inventory with two scales: Sunscreen Use and Sun Avoidance. Internal consistency for the total score and the two scales were excellent (…). The SPBS is strongly related to stage of change and sensitive to the effects of interventions for both adults and adolescents."*	**Primary outcomes:** (only sun-protection outcomes are reported) *"The Expert System Intervention resulted in significantly greater progress to the action or maintenance stage (percent not at risk) than the Assessment Only condition."* *"The rate of progress was higher in the Expert System condition for both 12 months [19.3% (263/1362) compared to 10.4% (173/1657)] and 24 months [23% (301/1284) compared to 12.5% (197/1581)]."* Raw scores (mean (SD)) were provided (without p values or CI) for: Avoidance of sun exposure: o Baseline: 12.7 (3.6) intervention;	**Limitations identified by author:** o Low recruitment rate (69% of contacted patients) o Participants were recruited from practices participating in a trial testing policy-changing interventions o Physicians enrolled in the trial were volunteers – might represent a subset of practices active in promoting cancer prevention **Limitations identified by review team:** o Multiple cancers

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Study design: RCT **Internal validity[§]:** - **External validity[†]:** 3	*their patients were seen for regular ongoing care; (4) was not hospital-based; and (5) was not planning on retiring or relocating in the 4-year study period"* **Selected population:** 80 practices (one dropped out before randomisation leaving 79 in the study); a total of 5407 patients who consented and were "*at risk for at least one of the four health risk behaviours targeted for intervention in this study"* **Age:** mean 44.7 (SD 12.7) for all participants including those not at risk for sun exposure **Female:** 69.9% for all participants including those not at risk for sun exposure **Race/ethnicity:** for all participants including those not at risk for sun exposure White: 96.7% African American: 1.1% Asian: 0.4% Other: 1.8% Hispanic: 1.3%	*when necessary, about under-evaluating the pros of change and/or over-evaluating the cons. Third, feedback was given on the participants' use of up to six change processes relevant to their stage of change. Participants were compared normatively on each process to peers in the same stage of change who were successful self-changers. In the last two reports they were also compared ipsatively to their prior assessment. The fourth section focused on feedback on how to enhance self-efficacy in the most tempting situations. The last section consisted of strategies for taking small steps to progress to the next stage. The reports also referred participants to sections of an integrated multiple risk behaviour stage-matched self-help manual that were most relevant to their individual progress."* *"Intervention materials were provided for each risk only when the subject was identified as at-risk (…). The responses to the baseline phone survey generated the expert system report for the*	**Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** questionnaires mailed at 12 and 24 months; intervention group additionally at 6 months **Method of analysis:** ITT: participants with missing follow-up data were included Generalised Estimating Equation method; the model *"included parameter estimates for the Intercept, for treatment effects (Intervention vs. Control), for the temporal effects at each follow-up assessment (12 and 24 months), and a term for the patterns of missing data…"*	12.4 (3.7) control; o 12 months: 13.5 (3.5) intervention; 12.9 (3.6) control; o 24 months: 13.7 (3.5) intervention; 12.9 (3.6) control; o Reported in the discussion as significantly better in intervention group compared to control <u>Sunscreen:</u> o Baseline: 8.6 (3.9) intervention; 8.5 (3.9) control; o 12 months: 9.8 (3.8) intervention; 8.9 (3.9) control; o 24 months: 10.0 (3.9) intervention; 9.2 (3.9) control; o Reported in the discussion as significantly better in intervention group compared to control **Secondary outcomes:** N/A **Attrition details:** For the whole sample of 5407 patients: o At 6 months: 79% of the intervention group were followed-up (no data for control) o At 12 months 75% of the intervention and 82% of the control group were followed-up o At 24 months 71% of the intervention and 78% of the control group were	targeted o Some measures were given only to the intervention group to generate reports o Additional questionnaire at 6 months for intervention group o High loss to follow-up o Reliance on self-reported measures **Evidence gaps and/or recommendations for future research:** o Investigating if participation and efficacy could be increased by primary care physicians initiating change process o Replicating, extending, and enhancing types of results demonstrated by this study **Source of funding:** grants from the National Cancer Institute

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Socioeconomic status: (annual income) not reported **Excluded population:** not at risk for any of the risk factors **Setting:** domicile	*intervention group."* Some measures were given only to the intervention group and only to participants at risk for a risk factor. **Intervention category[¥]:** III **Intervention period:** N/A **Comparator/s:** no intervention **Sample sizes:** **Total n =** 5407 (3834 at risk for sun exposure) **Intervention n =** 2667 (1822 at risk for sun exposure) **Control n =** 2740 (2012 at risk for sun exposure) **Baseline comparisons:** not reported **Study sufficiently powered?:** power calculation not reported		followed up	

Table 70 Rasmussen

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Rasmussen et al.[83] **Year:** 2005 **Aim of study:** To examine influences on the decision-making processes relevant to sun-damage preventive behaviour **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 3	**Source population/s:** Staff in industrial companies **Country:** UK **Study year:** not reported **Eligible population:** Staff in industrial companies from a specific region **Selected population:** One hundred and seventy-one participants were recruited from two industrial companies in central Scotland **Age:** mean (SD) = 41.25 (12.38) years, range (18 to 73 years) **Female:** 58% **Race/ethnicity:** Not report	**Method of allocation:** Participants were randomly allocated to positive information, negative information, and control information manipulation groups **Measures to minimise confounding:** adjustment for any important baseline factors **Intervention/s** Positive information: included description of the efficacy of sunscreen use, the different types of sunscreens and how a history of sunscreen usage can dramatically reduce skin cancer Negative information: outlined the problems with sunscreen usage and that most sunscreens still allow some UV rays through Control information manipulation: received sunscreen irrelevant information describing the characteristics of the common cold **Intervention category[¥]:** III **Intervention period:** not reported	**Primary Outcomes:** Likelihood of sunscreen use expressed as reflected logs, therefore, a lower score represents higher sunscreen use. At baseline, those who agreed to take part were provided with basic information about the prevalence of skin cancer and then asked to give ratings anticipated likelihood of using sunscreen (decision 1). After intervention, the two experimental groups were asked a second rating about the likelihood of using sunscreen in future (decision 2). After participants were asked to rate 10 replies to a statement relevant to each group, they were asked again to rate likelihood of using sunscreen. **Adverse events:** Not reported **Secondary outcomes:** Likelihood of sunscreen use for subgroups **Follow-up periods:** Not reported	**Primary outcomes:** There was a significant main effect of decision (decision 1 versus decision 2 versus decision 3, $p < 0.001$, F test), suggesting that there was a significant increase in ratings of likelihood of using sunscreen. There was a main effect of group: individuals in the negative group (M=2.61) indicated a lower likelihood of using sunscreen than individuals in the positive group (M=2.05), $p < 0.05$ (F test). Significant increase in likelihood of using sunscreen in positive and negative group and no significant increase in control group; in negative group there was a decrease in decision 3	**Limitations identified by author:** o Based on self-reported data o Participants already had some knowledge about skin cancer **Limitations identified by review team:** o Exact results not reported for study arms o No information on race/ ethnicity o No information on losses to follow-up **Evidence gaps and/or recommendations for future research:** Future research should incorporate past behaviour, proximal risk, level of future risk, self-efficacy and other social cognitive factors **Source of funding:** Not report

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Socioeconomic status: Not report **Excluded population:** Not report **Setting:** workplace	**Comparator/s** Participants received sunscreen irrelevant information describing the characteristics of the common cold. **Sample sizes:** **Total n =** 171 **Intervention1 n =** 62 **Intervention2 n =** 55 **Control n =** 54 **Baseline comparisons:** There was a significant difference between the three groups in the initial estimation of likelihood of using sunscreen, $p < 0.01$ (F test). Post hoc tests found that the difference was entirely accounted for by the negative group and control group comparison. Therefore, there was no significant difference between the positive and the negative groups. **Study sufficiently powered?:** Not report	**Method of analysis:** ITT used: not reported Adjustments made for any baseline differences in important confounders: not report	**Secondary outcomes:** There was a main effect of gender: female had higher likelihood of using sunscreen than male, $p < 0.05$ (F test) **Attrition details:** Not report	

Table 71 Reding

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors:	**Source population/s:**	**Method of allocation:**	**Primary Outcomes:**	**Primary outcomes:**	**Limitations identified**

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Reding et al [84] **Year:** 1994 **Aim of study:** to assess the effectiveness of the 4-H Youth Development Project, a delivered sun protection education programme, to youth and their families via the Cloverbud programme **Study design:** controlled before & after **Internal validity[§]:** - **External validity[†]:** 3	Few details reported - assume children aged 5-7 years residing in northern rural Wisconsin. **Country:** USA **Study year:** 1992 **Eligible population:** Few details reported - assume children aged 5-7 years residing in northern rural Wisconsin. Recruitment details were not provided. **Selected population:** This pilot project occurred in the spring and summer of 1992, in two rural northern Wisconsin counties. A convenience sample that randomly matched two intervention groups and two control groups was selected. No further details on study methodology were provided. **Age:** 5-7 years **Female:** not reported	The authors stated the study design "*used a convenience sample that randomly matched two intervention groups with two control groups."* No further details are reported and, in view of the lack of clarity on the methods used to allocate the groups, we have assessed this study as a controlled before and after design. **Measures to minimise confounding:** not reported **Intervention/s** *"The 4-H Youth Development project has an emphasis on family involvement, with a mix of adult and youth volunteers working together. The Wisconsin 4-H goals for the 1990s include programme expansion to include health education, and coalition to increase the visibility and scope of programmes."* *"The 4-H coalition included county and state 4-H youth agents; the youth education assistant director from the American Cancer Society (ACS), Wisconsin division; and Wisconsin Farmers' Cancer Control Programme*	Sun protection knowledge gain. <u>Pilot project evaluation</u> For some of the intervention groups, presentations were made to the Cloverbuds at a 1-day summer camp. Surveys were given before and after this session. Control groups received only pre-post surveys (times surveyed not reported). Knowledge gain was measured using a ten-question sun protection knowledge survey. A knowledge gain was defined as a correct response on the post-survey after an incorrect response on the pre-survey. **Adverse events:** none reported **Secondary outcomes:** none reported **Follow-up periods:** Follow-up was immediate for those receiving the educational session.	Pre-post evaluation of the intervention and control sites demonstrated a significant pre-post knowledge gain in the pilot intervention groups ($p<0.01$). The intervention group displayed significantly higher knowledge gains ($p<0.01$) than the control group in their answers to the following questions: 1. When should you protect yourself from the sun (summer only, spring and summer, or the whole year)? Intervention 70% vs. control 0% 2. What is the best lotion to use to protect yourself from the sun (baby oil, sunblock or tanning lotion)? Intervention 85% vs. control 13% 3. What is the correct sunblock number to wear when outside (10, 12 or 15 or greater)? Intervention 90% vs. control 14% 4. What does A mean in the ABC of skin protection (away, after or above)? Intervention 88% vs. control 10% 5. What does B mean in the ABC of skin protection (block, baby oil or burn)? Intervention 81% vs. control 0% 6. What SPF number should be on the sunblock your family buys (10, 12 or 15 or greater)? Intervention 90% vs. control 18% 7. Which of the three items, long sleeved shirt, baby oil or sunblock, does not provide sun protection? Intervention 80% vs. control 27% Non significant improvements in knowledge were seen in the following items amongst the intervention group	**by author:** The long-term effects of the study are unknown. There is no guarantee that short-term knowledge gain will translate to desired behaviour. Long term follow-up is needed to observe a decrease in skin cancer incidence rates. **Limitations identified by review team:** Key information, such as the numbers assessed in the pilot study, is not reported. The authors did not explicitly state who (children, parents) completed the pre-post evaluations. **Evidence gaps and/or recommendations for future research:** Studies of better methodological quality (possibly in the form of cluster randomised RCTs) assessing the impact of this type of programme in the longer would be useful.

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Race/ethnicity: not reported **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported **Setting:** community	*(WFCCP) staff."* <u>Project overview</u> *"This project targeted the Cloverbud programme, an introduction to the 4-H programme for children aged 5-7 years. The 4-H coalition developed a booklet, 'Hands-on Activities', with a sun-protection theme to be used with the Cloverbuds. The booklet includes family surveys, science projects, arts activities, and board games to be used by the family and club leaders. Educational sessions were provided by WFCCP staff to 4-H leaders with a packet of information on skin cancer and sun protection and methods to deliver the education. The 'Children's Guide to Sun Protection K-3' curriculum developed by the ACS in conjunction with the American Academy of Dermatology (ADD) was used along with the 'Hands-on Activities' booklet."* <u>Intervention</u> *"The 'Cloverbuds' participated in the sun protection exercises from the 'Hands-on Activities' booklet at spring monthly meetings or summer day*	However the time frame for pre-post assessment of the control group was not reported. **Method of analysis:** Evaluation done at the time of the educational sessions included analysis of paired pre/post surveys for the intervention and control groups with chi-square tests.	compared with the control group: 1. At what time of day is the sun at its strongest (early morning, noon, or late afternoon)? Intervention 78% vs. control 33% 2. What skin type needs the most protection (light, medium or dark coloured skin)? Intervention 50% vs. control 15% 3. What does C mean in the ABC of skin protection (check, colour or cover-up)? Intervention 68% vs. control 26% (NB figures read from chart) **Secondary outcomes:** none reported **Attrition details:** not reported	**Source of funding:** not reported

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		camps. Due to the organisational structure of 4-H, it was not possible to standardise delivery of the interventions, and the children received the education module in different ways." **Intervention category[¥]:** I **Intervention period:** spring to summer 1992 **Comparator/s:** control group/no intervention **Sample sizes:** not reported **Total n =** **Intervention n =** **Control n =** **Baseline comparisons:** not reported **Study sufficiently powered?:** power calculation not reported			

Table 72 Richard

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Richard et al.[86] **Year:** 1999 **Aim of study:** "*to evaluate how much the tone of presentation of the message could influence the effect of the campaign positively or negatively.*" **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 3	**Source population/s:** population of the "Region Provence-Alpes-Côte d' Azur" in the South of France **Country:** France **Study year:** 1996 **Eligible population:** adults in the "Region Provence-Alpes-Côte d' Azur" in the South of France **Selected population:** representative samples of the *"socio-demographic distribution of adults (>18) in the "Region Provence-Alpes-Côte d' Azur" in the South of France were selected, using data from IPSOS (a French survey institute)"* **Age:** >18 **Female:** not reported **Race/ethnicity:** not reported	**Method of allocation:** participants "*selected, using data from IPSOS (a French survey institute)"* **Measures to minimise confounding:** not reported **Intervention/s** *"Three different leaflets were designed by a panel of medical experts, a psychologist, a publicist and a graphic art specialist. The three types of leaflet contained exactly the same message. This was a concise and simple information about what melanoma is, describing the early signs which should prompt consultation, how to assess one's sun sensitivity on the basis of one's skin type, how to assess one's melanoma risk (on the basis of number of naevi and skin type), and how to adapt one's sun exposure and sun protection measures to one's risk. The title, the presentation and the tone of the leaflet, including drawing, figures, colour and vocabulary were chosen to be funny in the H-leaflet,*	**Primary Outcomes:** 2 weeks after mailing the leaflets, a telephone interview was conducted to assess: o Participants' phenotype o Knowledge o If they consider their sun exposure low, normal or excessive in relation to their skin type o If they received the leaflet o If they have shown it to any other family member o If they were going to change their behaviour towards sun **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** 2 weeks	**Primary outcomes:** Knowledge (assessed only in participants in the intervention arms who have read the leaflet – 128 in A, 155 in N and 160 in H group and the whole control group - 300): o Ability to define melanoma: 82 (64%) A, 98 (63%) N, 86 (54%) H – lower than in two other intervention groups ($p<0.05$), 128 (42%) control All intervention compared to control – 60% vs. 42% ($p<0.0001$) o Knowledge of early signs of melanoma: 31 (24%) A, 44 (28%) N, 44 (28%) H, 39 (13%) control All intervention compared to control (at least two signs) – 27% vs. 13% ($p<0.0001$) o Knowledge of melanoma risk factors: 45 (35%) A, 58 (37%) N, 62 (39%) H, 86 (29%) control All intervention compared to control (at least three risk factors) – 37% vs. 29% ($p<0.02$) o Ability to evaluate one's skin type: 90 (70%) A, 110 (71%) N, 99 (62%) H, 191 (64%) control o Ability to assess one's risk: 50 (39%) A, 65 (42%) N, 66 (41%) H, 138 (46%) control o Ability to assess whether one's behaviour is adapted to one's skin type: 95 (74%) A, 124 (80%) N, 121 (75%) H, 228 (76%) control	**Limitations identified by author:** Not reported **Limitations identified by review team:** o Outcomes assessed in participants who have read the leaflets in the intervention groups – possibly different from the ones who did not read materials o No baseline measurements o No demographic characteristics **Evidence gaps and/or recommendations for future research:** *"Other randomised controlled studies are needed to assess correctly the influence of the content and the tone of the messages, the respective impact of the different media, the social and psychological predictors of behaviour intentions,*

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Socioeconomic status: (annual income) not reported **Excluded population:** not reported **Setting:** domicile	*worrisome and foreboding in the A-leaflet and as neutral as possible in the N-leaflet. In the H-leaflet multiple bright colours, funny slogans and comic strips were used and the word cancer was never mentioned in the information text. The slogan was "some skins cannot stand a quick cooking". In the A-leaflet only purple colour was used, anxiety and worry were suggested by a blurred photograph of a mother protecting her child and the word cancer was repeated in each title. The slogan was "2 times more skin cancers than 10 tears before". In the N-leaflet the slogan was "a sun for each skin"."* Leaflets were mailed in easily identifiable pink envelopes of the National Health Insurance to avoid them being taken for commercial advertisements. **Intervention category[¥]:** III **Intervention period:** N/A **Comparator/s:**	**Method of analysis:** Not reported if ITT Analysis used the Chi-squared test	24% (107/443) participants who read the leaflet intended to change their behaviour and 20% (87/443) to have their skin examined by a physician. 57% (513 out of 900) remembered receiving and 49% reading the leaflet. The rate was significantly lower in the A group (50%) than in the H (61%) and N (60%) group (p<0.005). Leaflets were also read by other family members: 49% A, 56% H, 63% N (p=0.034 – not clear, probably for difference between three groups) Leaflets were considered useful by 94% of participants: 91% H, 97% N, 95% A (p<0.04 for difference). 40% declared that they had improved their knowledge. 93% A, 97% N and 93% H said they liked the leaflet (difference not significant). **Secondary outcomes:** N/A **Attrition details:** not reported	*and the factors limiting behaviour changes."* **Source of funding:** grant from Sanofi "Vaincre le mélanome" and help from "Caisse Régionale d'Assurance Maladie du Sud-Est."

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		No leaflet was sent to the control group **Sample sizes:** **Total n =** 1200 **Intervention H-leaflet =** 300 **Intervention A-leaflet =** 300 **Intervention N-leaflet =** 300 **Control n =** 300 **Baseline comparisons:** not reported **Study sufficiently powered?:** power calculation not reported			

Table 73 Rodrigue

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Rodrigue & James [87] **Year:** 1996	**Source population/s:** Parents (mothers) who were affiliated with the Parent-Teacher Association of the local county schools. Precise details not reported but	**Method of allocation:** Participants were assigned to the comprehensive prevention programme (CPP), an information only condition (IOC) or a no information control (NIC).	**Primary Outcomes:** Changes in knowledge of skin cancer and sun exposure, sun-safe behaviours, and attitudes and beliefs (secondary outcomes-	**Primary outcomes:** ***Knowledge*** Mean (SD) KQ scores for the three groups were as follows: <u>baseline</u>: CPP: 14.7(2.7) vs. IOC: 13.5(2.2) vs. NIC:	**Limitations identified by author:** The study relied on mothers' report of sun-safe behaviours. The study is limited by

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Aim of study: to examine the short-term efficacy of a programme to modify high-risk sun exposure behaviours, beliefs and attitudes amongst the mothers of young children **Study design:** controlled before & after **Internal validity[§]:** - **External validity[†]:** 3	assume schools were local to the research centre in Gainesville, Florida. **Country:** USA **Study year:** not reported **Eligible population:** Participants were recruited by mailing letters to parents who were affiliated with the Parent-Teacher Association of the local county schools. Parents expressing an interest in the study were scheduled for a telephone interview, at which time the Knowledge Questionnaire and Sun Safe Behaviours Questionnaire were administered. Participants scoring below the 60th percentile on both measures were eligible for participation. **Selected population:** A total of 98 (49%) parents responded to the initial request for participation; 66 (67%) were deemed eligible to participate.	Assignment to either an intervention or control group was random; however once participants were assigned to an intervention, their proximity to location of the group session was used in determining which intervention condition they were assigned to (i.e. partial randomisation). **Measures to minimise confounding:** none reported **Intervention/s** Both the comprehensive prevention programme (CPP), and information only condition (IOC) intervention included a didactic component but parents in the CPP arm also engaged in an experimental session designed to focus on changing behaviour patterns, attitudes and beliefs related to skin cancer prevention. The didactic component involved the presentation of information regarding skin cancer facts and myths, risk factors and precautionary actions one can take to reduce risk. Special emphasis was placed on	see below) were examined using three questionnaires (KQ, SSBQ & SEAB) which were administered to the mothers at baseline, 2 weeks post-intervention and 12 weeks post-intervention. In addition to responding to items based on their own attitudes, beliefs, and behaviours, mothers were asked to identify one child in their family between the ages of 6 months and 10 years who would serve as the target child for purposes of responding to some of the questionnaire items. KQ is a 26-item questionnaire designed to capture respondents' knowledge of the seriousness and prevalence of skin cancer, risk factors for skin cancer, and knowledge of sunscreen use. To test the hypothesis that the CPP and IOC groups would show improvements in knowledge of skin cancer and sun exposure relative to the	13.8(2.6) 2-weeks post-intervention: CPP: 21.8(3.0) vs. IOC: 20.9(2.9) vs. NIC: 14.0(2.2) 12-weeks post-intervention: CPP: 21.6(2.6) vs. IOC: 20.9(2.8) vs. NIC: 14.3(1.9) The 3 x 3 ANOVA on KQ total score revealed a significant effect for Time, $p<0.001$, and a significant effect for Group, $p<0.0001$, modified by a significant Group x Time interaction, $p<0.0001$. Simple effects of assessment time were significant for the CPP & IOC groups, $p<0.0001$. Post hoc tests showed significantly more knowledge in the two groups between baseline assessment and both the 2-week and 12-week post-intervention assessments. Also the CPP & IOC groups showed significantly more knowledge than the NIC group at both 2 and 12 weeks. ***Behaviour*** Mean (SD) SSBQ scores for the three groups were as follows: baseline: CPP: 23.7(4.4) vs. IOC: 21.3(3.2) vs. NIC: 21.9(3.3) 2-weeks post-intervention: CPP: 32.6(8.8) vs. IOC: 26.6(8.7) vs. NIC: 19.8(2.9) 12-weeks post-intervention: CPP: 42.2(7.3) vs. IOC: 23.7(5.9) vs. NIC: 19.4(2.8)	its relatively small sample size. The demographic parameters of the study preclude generalisation of its findings beyond this highly self-selected sample (i.e. white, well-educated, and very well motivated mothers of young children). **Limitations identified by review team:** Nothing to add. **Evidence gaps and/or recommendations for future research:** A larger higher quality trial (preferably in the form of an RCT) would be beneficial. **Source of funding:** The research was supported by a grant from the American Cancer Society, Florida Division.

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Age: mothers were targeted as an agent of change for their children amongst whom the mean (±SD) age was 6.4 (±2.5) years **Female:** mothers were targeted as an agent of change for their children of whom 43.6% were female **Race/ethnicity:** only Caucasian mothers were recruited due to the significantly higher incidence of skin cancer amongst individuals with light complexions **Socioeconomic status: (annual income)** not reported **Excluded population:** Non-Caucasian mothers **Setting:** details of meeting site not reported	children as a high risk group. An additional 45-minute experimental component for parents in the CPP arm included videotapes designed to encourage discussion, role playing the proper application of sunscreens on children, and discussion of the barriers to preventive behaviours and ways to overcome them. Family discussions about the value of skin cancer prevention measures were encouraged and the group was led in a discussion of ways to incorporate them in family activities. Additionally a young female adult with a history of malignant melanoma was present to discuss her personal experience of cancer. For parents in the IOC arm the remaining 45 minutes involved viewing an informational videotape describing other common types of cancer, their aetiology, symptoms and treatments. **Intervention category[¥]:** I **Intervention period:** The authors state the baseline assessments were	NIC group, a 3 (Group) x 3 (Assessment Time) ANOVA with assessment time as a repeated measure was conducted. SSBQ was developed as a retrospective measure of sun protection and skin cancer prevention behaviours exhibited by parents on behalf of their children. A 3 (Group) x 3 (Assessment Time) ANOVA, with assessment time as a repeated measure was conducted to test the hypotheses that the CPP group report more sun-safe behaviours post-intervention compared with the other groups and these behaviours would be maintained over time. **Adverse events:** none reported **Secondary outcomes:** Changes in attitudes and beliefs were examined using the SEAB.	The 3 x 3 ANOVA on SSBQ total score revealed a significant effect for Time, $p<0.0001$, and a significant effect for Group, $p<0.0001$, modified by a significant Group x Time interaction, $p<0.0001$. Simple effects of assessment time were significant for the CPP group, $p<0.0001$; IOC group, $p<0.0001$; and NIC group, $p<0.01$. Post hoc tests showed significant improvements in sun-safe behaviours from the baseline assessment to the 2-week post-intervention assessment for both the CPP & IOC groups; however the CPP group showed continued improvements in sun-safe behaviours from the 2-week post-intervention assessment to the 12-week post-intervention assessment, whereas the IOC group showed a significant decline. The NIC group reported significantly fewer sun-safe behaviours from the baseline assessment to both the 2 and 12-week assessments. Regarding group effects, post hoc analyses revealed that at the 2-week post-intervention assessment the CPP & IOC groups reported more sun-safe behaviours than the NIC group and the CPP group had higher scores than the IOC group, $p<0.001$. The similar between-groups pattern was observed at 12 weeks. **Secondary outcomes:** ***Sun Exposure Attitudes & Beliefs*** Mean (SD) SEAB-mother total scores for the three groups were as follows: baseline: CPP: 43.8(10.8) vs. IOC: 43.4(9.6) vs.	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		conducted in August and the final assessment was completed in November – the study year is not reported. **Comparator/s:** no intervention **Sample sizes:** **Total n =** 66 **Intervention (CPP) n =** **Intervention (IOC) n =** **Control (NIC) n =** NB: the numbers assigned to CPP, IOC and NIC were not reported **Baseline comparisons:** There were no significant differences between the groups in terms of the mothers' educational status, skin type, history of sunburns and sunscreen use, and the target children's skin type, history of sunburns and sunscreen use. **Study sufficiently powered?:** power calculation not reported	SEAB (Sun Exposure Attitudes & Beliefs) was designed to assess various constructs deemed important within the health belief model, self-efficacy theory, and response motivation theory. Mothers responded to questions twice (for self & child). 3 (Group) x 3 (Assessment Time) ANOVAs, with assessment time as a repeated measure were conducted for both sets of responses. **Follow-up periods:** 12 weeks **Method of analysis:** Analysis appears to be based on the 55 (83%) participants who completed all three assessments.	NIC: 43.4(9.2) 2-weeks post-intervention: CPP: 61.0(9.0) vs. IOC: 50.0(8.0) vs. NIC: 44.0(10.3) 12-weeks post-intervention: CPP: 66.8(8.5) vs. IOC: 47.7(10.4) vs. NIC: 42.6(9.2) The 3 x 3 ANOVA on SEAB-mother total score revealed a significant effect for Time, $p<0.0001$, and a significant effect for Group, $p<0.001$, modified by a significant Group x Time interaction, $p<0.0001$. Simple effects of assessment time were significant for the CPP & IOC groups, $p< 0.0001$ and $p<0.001$ respectively. Post hoc tests revealed significant differences in the CPP & IOC groups between the baseline assessment and both the 2-week and 12-week post-intervention assessments. Regarding group effects, the CPP group differed significantly from both the IOC & NIC groups at the 2-week post-intervention, $p<0.0001$, and at the 12-week post-intervention assessment, $p<0.0001$. Mean (SD) SEAB-target child total scores for the three groups were as follows: baseline: CPP: 39.3(8.3) vs. IOC: 39.2(7.9) vs. NIC: 43.8(9.9) 2-weeks post-intervention: CPP: 59.7(6.9) vs. IOC: 48.8(7.8) vs. NIC: 42.9(10.4) 12-weeks post-intervention: CPP: 64.8(8.9) vs. IOC: 48.3(9.1) vs. NIC:	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
				42.6(7.8) The 3 x 3 ANOVA on SEAB-target child total score revealed a significant effect for Time, $p<0.0001$, and a significant effect for Group, $p<0.001$, modified by a significant Group x Time interaction, $p<0.0001$. Simple effects of assessment time were significant for the CPP & IOC groups, $p<0.0001$. Post hoc tests revealed significant differences in the CPP & IOC groups between the baseline assessment and both the 2-week and 12-week post-intervention assessments, and significant differences for the CPP group between the 2-week and 12-week post-intervention assessments. Post hoc analyses indicated that at the 2-week post-intervention assessment the CPP group differed significantly from both the IOC & NOC groups and the IOC group differed significantly from the NIC group, $p<0.0001$. Also the CPP group differed significantly from both the IOC & NIC groups at the 12-week post-intervention assessment, $p<0.0001$. none reported **Attrition details:** Of the 66 mothers deemed eligible to participate, 55 (83%) completed all assessments.	

Table 74 Rothman

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Rothman et al.[88] **Year:** 1993 **Aim of study:** to examine "*the influence of message framing on prevention behaviours related to skin cancer"* **Study design:** RCT **Internal validity[§]:** + **External validity[†]:** 4	**Source population/s:** undergraduates **Country:** USA **Study year:** not reported **Eligible population:** Caucasian undergraduates **Selected population:** 146 Caucasian undergraduates: 90 from introductory psychology class (received credit for participation) and 56 responded to recruitment posters (received $5 for participation); probably from Yale University **Age:** not reported **Female:** 50% **Race/ethnicity:** 100% Caucasian **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported	**Method of allocation:** female and male subjects randomly assigned to either positive or negative frame condition **Measures to minimise confounding:** not reported **Intervention/s** *"Subjects participated in groups and were seated around a large table. A female experimenter explained that the experiment concerned the evaluation of health education materials. After signing a consent form, subjects read either a positively or negatively framed pamphlet. The pamphlets were then collected, and the first set of measures distributed. For each set of questions, the experimenter read the directions and waited for every subject to finish each section before proceeding. Finally, subjects were given postcards to mail in for informational pamphlets and/or sunscreen samples."*	**Primary Outcomes:** Affective reactions to pamphlets (10 items) with ratings on 10-point scales (1 "not at all" to 10 "very much"); a priori divided into three subscales: o Negative reactions o Positive reactions o Interest in the pamphlet Risk perceptions (4 items) assessed perceptions of the likelihood that they or the "average Yale student" would experience or die from skin cancer; ratings on 5-point scales from 1 "not at all" to 5 "very much" Knowledge about skin cancer – 7 multiple-choice questions on facts presented in pamphlets Demographics Free sample of	**Primary outcomes:** Affective reactions – mean (SD): Positive reactions: 4.83 (SD 1.48) positive, 3.61 (SD 1.40) negative; p<0.0001 Negative reactions: 3.67 (SD 1.47) positive, 4.60 (SD 1.70) negative; p<0.001 Interest in pamphlet: 6.84 (SD 1.54) positive; 7.20 (SD 1.09) negative; not significant (p not reported) Perceptions of risk – mean (SD): Risk to self: 2.91 (SD 1.30) positive, 3.42 (SD 1.62) negative; p<0.05 Risk to others: 3.77 (SD 1.06) positive, 4.67 (SD 1.03) negative; p<0.0001 Knowledge not reported **Secondary outcomes:** N/A **Attrition details:** Data from 3 subjects could not be used due to experimenter error	**Limitations identified by author:** not reported **Limitations identified by review team:** No baseline measurements Poor reporting of characteristics Short follow-up Not reported if ITT Baseline comparisons not reported **Evidence gaps and/or recommendations for future research:** not reported **Source of funding:** National Cancer Institute Grant; Schering-Plough and Johnson & Johnson provided sunscreen samples

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Setting: university	*"Pamphlets were professionally designed, printed and reported."* A previously used pamphlet was converted from one to four-page brochure. It contained information on incidence, aetiology, and how to detect and prevent the disease. *"The positively framed handout described the statistics, facts, and arrangements by emphasising benefits rather than risks, and focusing on the positive aspects of being concerned about skin cancer."* *"The negatively framed pamphlet described the same information but emphasised losses rather than gains, and focused on the risks of not performing cancer-related behaviours."* **Intervention category[¥]:** III **Intervention period:** not reported **Comparator/s:** different	sunscreen and information request – measured in the study, but provision of a postcard which could be used to obtain sunscreen makes it a mixed intervention **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** immediate post-test; further follow-up is in a mixed phase **Method of analysis:** Not reported if ITT Two-way MANOVA		

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		content of intervention compared **Sample sizes:** **Total n =** 146 Numbers in groups not reported **Baseline comparisons:** not reported **Study sufficiently powered?:** not reported			

Table 75 Segan

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Segan et al.[92] **Year:** 1999 **Aim of study:** *"development and evaluation of a brochure designed to reduce sun exposure in tourists*	**Source population/s:** Australian tourists **Country:** Australia **Study year:** 1993 **Eligible population:** tourists recruited in gate lounges at Melbourne Airport across 21 flights **Selected population:**	**Method of allocation:** *"flights were allocated to the control or intervention condition using a quasi-random technique involving coin tosses, and then alternating the condition for subsequent same-time flights"* **Measures to minimise confounding:** adjusting for variables that were	**Primary Outcomes:** *"The <u>pre-holiday questionnaire</u> assessed:* o *length and destination of the holiday (south vs. north Queensland),* o *whether eight prompted reasons for holiday applied,* o *sun tanning aspirations (none,*	**Primary outcomes:** <u>PRE-HOLIDAY</u> <u>Destination of holiday:</u> 77% southern Queensland 23% northern Queensland <u>Length of holiday:</u> 3-7 days: 41% 8-14 days: 50% 15-30 days: 8%	**Limitations identified by author:** o Possibility that reported differences do not reflect actual behaviour – reading the brochure might have had impact on awareness of time spent in the sun; social desirability might have also

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
travelling to high-risk destinations" **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 3	*"373 adults departing by air to the southern or northern coast of Queensland for a spring holiday in November 1993"* **Age:** Mean: 32.2 intervention, 33.4 control arm 41% 17-29 years old 38% 30-39 years old 13% 40-49 years old 8% were over 50 **Female:** 64% **Race/ethnicity:** not reported **Socioeconomic status: (annual income)** not reported **Excluded population:** passengers looking 50 or older **Setting:** airport	significantly different between groups at baseline **Intervention/s** The leaflet was a *"full-colour six-page (21 cm-square) fold-out brochure entitled "The SunSmart Holiday Guide: How to enjoy your holiday in the sun without getting burnt". The target audience for the brochure was all fair-skinned tourists holidaying in northern Australia. The brochure was designed, and focus group pre-tested, to ensure that it particularly appealed to young people (…) while also having a broad appeal. This was achieved via the use of young models within the brochure. The front cover promised answers to a series of "burning" questions: "Will I burn more quickly up north? What's the most dangerous time to be in the sun? If I use a SPF 15 sunscreen, can I stay in the sun all day without burning? Can I get burnt if it's cloudy or cool? Will I still get a suntan?" Inside, answers to questions presented factual information in conjunction with sun-protection strategies reflecting the*	*light, moderate, dark),* o *dichotomous measures of weather a hat and sunscreen have been packed for the holiday,* o *a four-point rating of how careful respondents generally are to protect themselves from the sun,* o *and a five-point rating of how often they will take steps to protect themselves from the sun while on holiday."* <u>Post-holiday measures</u> included o frequency of sunburn (*"any amount of reddening of the skin after being in the sun"*) and location, o eight-point sunburn measure: number of times burnt (range 0 – no burn to 3 – 3+ burns), extent (strip 0, in-between area 1,	more than 30 days: 1% 73% packed some form of a sun hat 92% packed sunscreen (of these 87% with an SPF of 15+) <u>Intention to</u> take special steps to <u>protect</u> themselves: o Always 36% o When outside for more than a few minutes 26% o When outside for more than half an hour 26% o When outside for long periods 12% o Rarely or never – less than 1% 73% reported that they would try to get a suntan <u>POST-HOLIDAY</u> (Results reported for all participants without relating them to study arms were not included in the evidence table) <u>Holiday behaviours:</u> o Days outside for >2 hours between 10 am and 2 pm: 3.24 intervention, 3.71 control; F=14.11, p<0.001 o Wear a hat: 3.47 intervention, 3.56 control; F=0.45, p=0.51 o Use SPF 15+ sunscreen: 3.97 intervention, 4.01 control; F=0.13,	played an important role o Baseline differences between groups o Lack of differences in most of the measures o Sample is not representative of all the tourists to Queensland (may use alternative transport) o Tourists who did not return questionnaires might have differed from the ones who did o Population already exposed to the SunSmart campaign **Limitations identified by review team:** o Participants in the intervention arm were given the baseline questionnaire and brochure (in a sealed envelope) at the same time with instructions to first answer the

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		solution-oriented rather than warning-oriented approach. Of particular emphasis was the "SunSmart Siesta Plan": to wear SPF 15+ sunscreen and stay out of the sun for at least two hours between 10am and 2 pm. This strategy was developed to enable tourists to maximise their time outdoors, while minimising the risk of sunburn (…). Sun-protection hints were also provided for risky situations (such as all-day boat trips) and a highlighted section was devoted to getting the most out of your sunscreen. The treatment of sunburn was also addressed." *"The brochure's approach was one of harm minimisation as some sun exposure is intrinsic to the holiday experience."* **Intervention category[¥]:** III **Intervention period:** N/A **Comparator/s:** no information **Sample sizes:** **Total n =** 373	large area 2) and severity of the worst burn (red not tender 0, red and tender 1, blistered 2), o reasons for sunburn; o suntan acquired (none, light, moderate, dark); o number of days with more than two hours in the sun between 10am and 2pm (every, most, half, few, no days); o frequency of sun-related behaviours (wearing a hat, using sunscreen, using shade, wearing covering clothing, wearing less clothing so as to expose skin) when outside for more than 15 minutes between 10am and 2pm – each measured on a 5 point scale (never, rarely, sometimes, usually, always) – mean outdoor sun protection calculated after	p=0.72 o Use shade: 3.38 intervention, 3.47 control; F=0.96, p=0.33 o Wearing clothes covering most of the body (including arms and legs): 2.13 intervention, 2.26 control; F=1.32; p=0.25 o Deliberately wearing less to expose skin to the sun: 2.69 intervention, 2.82 control; F=1.56, p=0.21 o Composite outdoor sun protection variable: 3.26 intervention, 3.30 control; F=0.53, p=0.47 *"There were no differences in <u>sunburn</u> between the control and intervention groups (control mean 1.57; 1.61 intervention; F(1,363)=0.000, p=0.99). There were also no differences in whether respondents were trying to <u>protect themselves when they were sunburnt</u> (Chi-square = 0.86, df=1, p=0.35)."* **Secondary outcomes:** o 95% of the 168 tourists who received the leaflet reported reading at least a part of it; o Tourists who have packed a hat and those aged 30 and over were more likely to read the brochure thoroughly; o 70% reported learning new things; o 94% said that the brochure provided at least some useful information; o 65% of those who read the brochure	questionnaire and then read the leaflet – possible that some participants first read the leaflet and than completed the baseline questionnaire o Potential clustering effect not investigated **Evidence gaps and/or recommendations for future research:** o The same intervention investigated in populations not previously exposed to sun awareness campaigns o Multiple strategies to reduce sunburn risk **Source of funding:** Anti Cancer Council of Victoria; the Australian Cancer Society provided financial support for the production of the SunSmart Holiday Guide

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Intervention n = 168 (10 flights) **Control n =** 205 (11 flights) **Baseline comparisons:** significant differences ($p<0.05$) between groups in: suntan that they intended to attain: o None – 29% intervention, 26% control o Light – 39% intervention, 47% control o Moderate – 21% intervention, 24% control o Dark – 11% intervention, 3% control There was also a significant difference ($p<0.05$) in the percentage of participants who packed a hat for holiday (68% intervention, 78% control) **Study sufficiently powered?:** no information on power calculation	reversing the deliberate skin exposure measure; **Adverse events:** not reported **Secondary outcomes:** in the intervention group additional questions evaluated the leaflet **Follow-up periods:** depending on the length of holiday (probably from 3 to up to over 30 days) – tourists sent a questionnaire home so that it would wait for them when they arrive back **Method of analysis:** not reported if ITT – probably not (only participants who returned both questionnaires were analysed) Analysis of covariance adjusting for factors that were not equally	reported that they have made extra efforts to protect their skin as a result of the intervention; **Attrition details:** 909 baseline questionnaires distributed 446 baseline questionnaires returned (48% in the control and 51% in the intervention arm) 373 usable follow-up questionnaires returned (85% in the control and 82% in the intervention arm)	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
			distributed between groups at baseline		

Table 76 Stephenson

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Stephenson et al.[93] **Year:** 1998 **Aim of study:** to test four hypotheses: *(1) "high threat, high efficacy messages will produce more positive attitudes and intentions toward skin cancer protection measures than high threat, low efficacy messages."* *(2) "High threat, low efficacy messages will produce greater defensive*	**Source population/s:** college students **Country:** USA **Study year:** not reported **Eligible population:** college students in the South-western USA **Selected population:** 92 undergraduates received extra credit for participating in this study **Age:** median 21 years; 2% over 26 years **Female:** 55% **Race/ethnicity:** 13% non-white **Socioeconomic status: (annual income)** not	**Method of allocation:** participants run in groups of up to six persons and randomly assigned to one of four conditions **Measures to minimise confounding:** not reported **Intervention/s** Participants were told that they are *"evaluating messages for skin cancer advertisement campaigns"* and their input is necessary for their refinement. The four messages were combinations of: o text only vs. text and pictures o high vs. low efficacy only high threat messages were used, as a previous study showed that low-	**Primary Outcomes:** Demographic variables Perceptions (on 7-point Likert-type scales) o Threat measured by severity (3 items) and susceptibility (3 items) and combined into one score o Efficacy measured by self-efficacy (4 items) and response efficacy (3 items) and combined into one score Fear assessed *"by having participants rate ("not at all" to "extremely") the following five mood adjectives: frightened,*	**Primary outcomes:** Hypothesis 1: high threat high efficacy messages lead to danger control – confirmed by results Participants reading a high efficacy message had more positive attitudes towards protective behaviours (M=6.47) than reading low efficacy (M=5.58) High efficacy groups had stronger intentions to follow recommended behaviours (M=5.29) than low efficacy (M=4.58). Hypothesis 2: High threat low efficacy lead to fear control – no clear statement if hypothesis confirmed Low efficacy groups perceived more manipulation (M=4.20) than high efficacy (M=2.97) Low efficacy groups perceived more derogation (M=4.16) than high efficacy (M=2.98) Participants reading the low efficacy message showed a higher level of defensive avoidance (M=4.35) than	**Limitations identified by author:** o No long-term effects assessed o Setting limits applicability o Student population – limits applicability **Limitations identified by review team:** Baseline comparisons not reported **Evidence gaps and/or recommendations for future research:** o Long-term effects o Applied research field study o No baseline outcome assessment o ITT not reported

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
avoidance, perceived manipulation, and message derogation than high threat, high efficacy messages" (3) *"The more one perceives the threat of skin cancer, the more one will be motivated to accept the message's skin protection recommendations"* (4) *"Fear appeals containing pictures will lead to stronger perceptions of fear and threat, and thus greater message acceptance than those fear appeals without pictures."* **Study design:** RCT	reported **Excluded population:** not reported **Setting:** university/ college	threat messages *"produce no effect;"* Messages were pre-validated. Participants read messages consisting of: 1) A threatening message which *"emphasised (a) the target population's susceptibility to skin cancer and (b) the severity of skin cancer with graphic language."* Two versions of a threat message were used: o containing only written text, o combining written text from other messages with four pictures of individuals in advanced stages of skin cancer on the page opposite to the text 2) a message about the effectiveness of skin-protective behaviours; *"tagged to the end of the high threat base*	*tense, anxious, comfortable, nervous."* Dependent variables (on 7-point Likert-type scales): o Attitudes toward skin protective behaviours, o Intentions to use skin protective behaviours, o Defensive avoidance, o Perceived manipulation, o Message derogation. Participants were also asked about the purpose of the study. **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** immediately after completion of the intervention	high efficacy (M=4.74). The difference was not significant. <u>Hypothesis 3:</u> perceived threat motivates action – generally confirmed by results Further data not reported in this evidence table, as it is not relevant to study arms <u>Hypothesis 4:</u> pictures are more persuasive Participants reading the message with text and pictures perceived higher levels of fear (M=4.12) than text only (M=3.86) Message with text and pictures (M=5.36) was associated with similar level of threat as text only (M=5.15) Text and pictures was associated with more favourable attitudes toward skin protective responses (M=6.20) than text only (M=5.95) Text and pictures was associated with significantly more perceived manipulation (M=4.10) than text only (M=3.17) Text and pictures made individuals feel the message was more derogated (M=4.12) than text only (M=3.16). No significant univariate effect was detected for defensive avoidance.	o Results not provided for each group separately **Source of funding:** not reported

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Internal validity[§]: - **External validity[†]:** 3		*message was one of two efficacy messages:"* o high efficacy message *"emphasising the effectiveness of sun block in preventing skin cancer, as well as the ease with which sun block can be used."* o low efficacy message *"discussed detection, specifically stating that while sun block is effective in preventing any future skin damage, it is impossible to undo any past skin damage."* Description of validation of messages provides information on the use of five high threat pictures.	**Method of analysis:** Not reported if ITT For hypothesis 1,2, 4 Multilevel Analysis of Variance (MANOVA) with influence from demographic variables or prior experience variables on outcomes removed Hypothesis 3 tested with Pearson correlations to examine the relationship between constructs. Defensive avoidance is reported as a one-item measure and not included in the multivariate analysis.	**Secondary outcomes:** N/A **Attrition details:** not reported (probably none)	

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Four show *"individuals with red, open skin, yellow infected excretions on the forehead, an exposed nasal cavity and eye socket where the skin cancer has eaten away the skin, and an ear that is infected with dark, black scars and is decaying away."* The fifth was a before-after picture of Bridgette Bardot: showing her young and unwrinkled next to very wrinkled, with damaged and leathery skin. **Intervention category[¥]:** III **Intervention period:** N/A **Comparator/s:** different content was compared **Sample sizes:** **Total n =** 92 **Intervention n =** *"approximately 23 in each condition"* **Baseline comparisons:** not reported **Study sufficiently**			

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		powered?: not reported			

Table 77 Syson-Nibbs

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Syson-Nibbs[94] **Year:** 1996 **Aim of study:** *"to test the applicability of their findings* [refers to result of a previous study on the same intervention], *and also to evaluate public health work with pupils from a local secondary school. The objectives of the study were to reduce the year-to-year*	**Source population/s:** **Country:** UK **Study year:** not reported **Eligible population:** pupils in a secondary school in a rural area of Derbyshire **Selected population:** 200 pupils from eight year seven tutor groups in a secondary school, in a rural area of Derbyshire **Age:** not reported **Female:** 35 – 50% of the analysed sample in the experimental group 41 - 55% of the analysed sample in the control group	**Method of allocation:** *"groups were randomly assigned to either immediate or delayed sun safety education"* **Measures to minimise confounding:** not reported **Intervention/s** *"The education materials used (…) consisted of:* o *a 'Suncool' leaflet, published by the Imperial Cancer Research Fund in conjunction with the London Hospital. This aimed to promote covering up in the sun and also provided information about sun exposure* o *a workbook containing information about the sun, ultraviolet*	**Primary Outcomes:** A questionnaire based on the one used in a previous study. It contained 29 questions assessing knowledge and 15 assessing attitude. Further details were not provided. **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** over 3 months **Method of analysis:** not reported if ITT; probably not – non-responders excluded from the analysis	**Primary outcomes:** <u>Mean knowledge scores</u> (range not provided, a higher score probably indicates a higher level of knowledge): Pre-test 18.5 (SD 3.2) intervention; 18.9 (SD 2.9) control; difference not significant (p not reported) Post-test 24.0 (SD 3.2) intervention; 20.00 (3.4) control The increase in the experimental group was statistically significant ($p<0.0005$); the increase in the control group was not statistically significant (p not reported). Increase was not compared between groups. <u>Attitude</u> Changes were reported for every single item in the questionnaire. Significance tests were performed only for within-group differences. No between-group differences were investigated. Therefore	**Limitations identified by author:** o Pre-intervention knowledge scores were found to be generally high o There might have been some variation in the way the intervention was delivered to groups o Pupils arrived for the intervention from a variety of other classes (like physical education which meant more time was needed for them to settle down) o Differing classroom environments o In school students had to spend every midday break in the playground where

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
increase in malignant melanoma through prevention and early detection." **Study design:** RCT **Internal validity[§]:** - **External validity[†]:** 2	**Race/ethnicity:** not reported **Socioeconomic status: (annual income)** not reported **Excluded population:** not reported **Setting:** school	*radiation and cancer which could be photocopied by the school* o *a 'Suncool' video in which the actress Melanie Hill (from the television programme 'Bread') discusses attitudes to sunbathing and skin cancer with a school class.* *Pupils (…) received three 40 minute education sessions, led by the author and supported by each group's year tutor. In session one the pupils completed a pre-intervention questionnaire, and then watched the 'Suncool' video, with an opportunity for informal questions afterwards. They were encouraged to read the 'Suncool' leaflet and to take it home, to share with parents and carers. Session two took place several weeks later. This involved reading through the workbook in the classroom and informal discussion of issues raised in the video. In session three, three months later after the summer holidays, children again completed the original questionnaire."*	*The association between categorical variables was examined using a chi-square test and differences between groups were examined using the 'Student test'.*	results are not reported. A significant attitude improvement was reported for 3 items in the experimental group: avoiding trying to go out in the sun when it is hottest, a lot of sun throughout life ages the skin, there is little chance that the respondent will get skin cancer. There were no significant changes in the control group. **Secondary outcomes:** N/A **Attrition details:** 200 students were initially enrolled in the trial. Of these 195 completed both the pre- and post- intervention test. *"One control and one experimental group were removed from the analysis because of the temporary loss of one group's second questionnaires. Results therefore relate to the total achieved sample of 145 pupils."*	there was minimal shade; might have influenced their attitudes about avoiding midday sun **Limitations identified by review team:** o High loss to follow-up o Based on self-reported outcomes o No comparison of between-group differences for any of the results o Possible contamination – classes from the same school **Evidence gaps and/or recommendations for future research:** Performing between group comparisons **Source of funding:** not reported

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Intervention category[¥]: I **Intervention period:** three sessions of 40 minutes – it is unclear over what time they were delivered, but it was more than 3 months **Comparator/s:** *"Pupils (…) completed the questionnaire at the same time as the immediate intervention groups, but received no educational information until after the second questionnaire."* **Sample sizes:** **Total n =** 145 analysed (200 initially enrolled; 195 completed the baseline test) **Intervention n =** 70 analysed (further details not provided) **Control n =** 75 analysed (further details not provided) **Baseline comparisons:** The author reports that there are no significant differences between groups in terms of gender and			

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		baseline knowledge. **Study sufficiently powered?:** power calculation not reported			

Table 78 Turrisi

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Turrisi et al.[95,96] **Year:** 2004 **Aim of study:** To estimate the effect of an intervention strategy designed to prevent skin cancer in young adolescents **Study design:** RCT **Internal validity[§]:** +	**Source population/s:** Elementary and middle school children with age of 9 to 12 years **Country:** USA **Study year:** not reported **Eligible population:** Elementary and middle school children with age of 9 to 12 years in specific regions **Selected population:** Students were	**Method of allocation:** Schools were randomly assigned across three conditions, with a small amount of over sampling to pre-post experimental group **Measures to minimise confounding:** Not reported **Intervention/s** (1) Pre-post test intervention group (2) Post-test intervention group Parents in the intervention groups were given the intervention materials at the start of the study, and were then asked to read all the materials and implement the intervention with their children. The materials contained a handbook (approximately 25 pages) with an introduction to the problem of skin cancer and UV exposure. "*It also*	**Primary Outcomes:** (1) Sun burn frequencies which asked the participants to estimate the number of times in 30 days their skin had become red because of sun exposure (2) Sunburn severity was assessed by four items inquiring the general severity of the sunburn, the degree that sunburn peeled, pain associated with sunburn, and the amount of difficulty the child had sleeping due to the sunburn. All items were measured in a 4-point scale (1 = not all, and 4 = extremely) (3) Sunbathing tendencies were evaluated using six items which were in relation to intentional sunbathing,	**Primary outcomes:** (1) Sunburn frequencies in the intervention group, mean (SD) = 0.816 (1.53), in the control group, mean (SD) = 1.74 (3.13), the mean difference = -0.923, with 95%CI (-1.45 to -0.401) (2) Sunburn severity in the intervention group, mean (SD) = 1.82 (6.09), in the control group, 1.97 (0.723), the mean difference = -0.152, with 95%CI (-0.288 to -0.015) (3) Sunbathing tendencies in the	**Limitations identified by author:** The present study only evaluated short-term effects of the parent-based intervention. The study did not evaluate the effect of the intervention for subgroups **Limitations identified by review team:** Nothing to add **Evidence gaps and/or recommendations for future research:** Future research should be conducted to assess whether the observed results from the short-term effects will be long lasting. Future studies also need to identify demographic and

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
External validity[†]: 3	randomly selected from elementary and middle schools in Boise, Idaho, and Johnson City, Tennessee **Age:** Range 9 to 12 years **Female:** 51% **Race/ethnicity:** White 94% **Socioeconomic status:** Parent's socioeconomic status Much higher than most families 5% Moderately higher than most families 29% About average 59% Much lower than most families 7% Moderately lower than most families 0% **Excluded population:**	*helped motivate parents to talk with their children by emphasising that such discussions could make a difference in both improving their relationship and reducing their child's susceptibility to skin cancer."* **Intervention category[¥]:** I **Intervention period:** 30 days **Comparator/s** Current information provision or do nothing **Sample sizes:** **Total n =** 469 **Intervention1 n =** 234 **Intervention2 n =** 106 **Control n =** 129 **Baseline comparisons:** No significant difference for background characteristics **Study sufficiently powered?:** Not reported	lying out in the sun to get a tan, and lying out in the sun to get colour in the skin (4)Appearance attitudes were assessed using nice items how much a child associated a tanned complexion with attractiveness. All items were measured on a 5-point scale ranging from strongly disagree to strongly agree. (5) Attitudes about tanning were assessed using five items about approval or disapproval of tanning and sunbathing activities (6) Attitudes about sunscreen were assessed using five items which asked how a child would feel about wearing sunscreen if outside for 2 hours in five different climate situations. All items were measured on a 5-point scale ranging from very bad (1) to very good (5) (7) Attitudes about sunblock were assessed using five items which asked how a child would feel about wearing sunblock if outside for 2 hours in five different climate situations. All items were measured on a 5-	intervention group, mean (SD) = 1.12 (0.890), in the control group mean (SD) = 1.49 (1.08), the mean difference = -0.365, with 95%CI (-0.560 to -0.170) (4) Appearance attitudes in the intervention group, mean (SD) = 2.72 (0.690), in the control group mean (SD) = 3.01 (0.694), the mean difference = -0.286, with 95%CI (-0.428 to -0.144) (5) Attitudes about tanning in the intervention group, mean (SD) = 2.23 (0.870), in the control group mean (SD) = 2.68 (0.861), the mean difference = -0.449, with 95%CI (-0.627 to -0.270) (6) Attitudes about sunscreen in the intervention group, mean (SD) = 3.74 (0.966), in the control group mean (SD) = 3.52 (1.05), the mean difference	psychological profiles of parents and children for who the intervention seemed to be relatively successful versus those for whom the intervention was relatively ineffective. **Source of funding:** The study was supported by grant RPG00-128-01-PBP from American Cancer Society

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
	Not reported **Setting:** place of domicile		point scale ranging from very bad (1) to very good (5) **Adverse events:** Not report **Secondary outcomes:** Parental willingness to implement the content of the intervention **Follow-up periods:** 45 days **Method of analysis:** ITT used: no Adjustments made for any baseline differences in important confounders: No significant differences in baseline characteristics	= 0.215, with 95%CI (0.014 to 0.417) (7) Attitudes about sunblock in the intervention group, mean (SD) = 3.78 (0.924), in the control group mean (SD) = 3.50 (1.11), the mean difference = 0.285, with 95%CI (0.086 to 0.484) **Secondary outcomes:** On average more than 96% of the parents indicated that they had discussed preventing skin cancer. Only 3.3% of parents indicated that they had “not at all” discussed preventing skin cancer. **Attrition details:** Not reported	

Table 79 Walkosz

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
Authors: Walkosz et al.[97] **Year:** 2008 **Aim of study:** to test the hypotheses that: "*(A) guests at ski areas assigned to implement Go Sun Smart would engage in more sun protection than guests at ski areas in the control group; (B) express more favourable attitudes toward sun safety than guests with less exposure to Go Sun Smart."* **Study design:** RCT with cross-sectional outcome	**Source population/s:** adult guests at ski resorts **Country:** USA, Canada **Study year:** 2001-2002 **Eligible population:** *"adult guests at 26 western US and Canadian ski areas"* **Selected population:** *"6516 adult guests at 26 western US and Canadian ski areas, who were recruited, consented, and interviewed on chairlifts;"* locations were: Alaska, California, Colorado, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, and British Columbia **Age:** 18-25: 15.5% baseline; 16.4% follow-up 26-35: 25.6% baseline; 24.2% follow-up; 36-45: 28.0% baseline; 27.0% follow-up 46-55: 19.3% baseline;	**Method of allocation:** ski areas randomly assigned to intervention or control arm **Measures to minimise confounding:** *"significant covariates related to each outcome were included in the regression analysis"* **Intervention/s** *"Go Sun Smart, created by this study's researchers, consisted of print, electronic, and interpersonal messages. Employees were the primary audience, but some employee-targeted messages were simultaneously communicated to guests. Guest materials included posters and brochures for ski and snowboard schools, signage at the base of chairlifts and on chairlift poles, electronic signs and grooming reports, brochures, and table tents and posters in lodges. An employee-training program advocated that employees advise guests against excessive sun exposure. The Go Sun Smart logo*	**Primary Outcomes:** *"Trained staff interviewed guests on chairlifts with a minimum run time of 4 minutes during 3-day periods (1 weekend day and 2 weekdays);"* only one interview was completed per chair-ride; *"Sun-protection behaviours were ascertained by asking if the guest was wearing sunscreen (yes/ no or don't know; and if so, the sun-protection factor [SPF], the parts of the body on which it had been applied, the time it had been applied, and whether it had been reapplied that day) and sunscreen lip balm ((yes/ no or don't know; and if so, SPF) and observing if the guests wore a head cover, neck cover, face cover, gloves and eyewear. Two unweighted summed composite scores were created: (1) sunscreen*	**Primary outcomes:** Hypothesis A - that guests at ski areas assigned to use Go Sun Smart would report more sun protection – was not supported. Hypothesis B – association between the level of exposure to Sun-Smart materials and outcomes Results are not included in this evidence table, as they are not directly relevant to the review and this type of analysis does not preserve randomisation. **Secondary outcomes:** N/A **Attrition details:** N/A	**Limitations identified by author:** o In the intervention areas *"at least 40% of guests did not encounter, pay attention to, or remember the sun-safety messages"* o *"Extent of message exposure was not randomly assigned"* (dependent on staff in the areas) o *"Chairlifts' run times limited the number of measures"* o *"Western North America ski areas limited generalisability"* o Use of self-reported measures o Social desirability, demand effects, and memory errors were possible o Contamination of the control group **Limitations identified by review team:** o Participants not

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
assessment **Internal validity[§]:** ++ **External validity[†]:** 3	18.5% follow-up Over 55: 11.6% baseline; 13.9% follow-up **Female:** not reported **Race/ethnicity:** White: 96.0% baseline; 95.4% follow-up; Hispanic: 2.5% baseline; 4.2% follow-up **Socioeconomic status: (annual income)** not reported **Excluded population:** aged <18, ski area employees, previously interviewed, non English speakers **Setting:** ski resorts	*branded all materials, and the mention of three key behaviours appeared in all messages: wear sunscreen, sunglasses, and a hat.* *Ski-area contact personnel received three sets of program materials at intervention areas (…) from late December to early March to rotate messages and to address the increased UVR in spring. Contact personnel met with investigators in August 2001 and received Go Sun Smart program guides. Investigators visited contact personnel in November and December 2001 to review the program implementation protocol, and Go Sun Smart was implemented from January to April 2002."* **Intervention category[¥]:** I+III+IV **Intervention period:** January to April 2002 **Comparator/s:** do nothing **Sample sizes:** **Total n =** 2991 baseline; 3525 follow-up	*SPF 15+ and lip balm SPF 15+ (range=0-2); and sunscreen SPF 15+; lip balm SPF 15+; goggles; gloves; face cover; neck cover; and hand cover (range=0-7)."* *"Sunburning was measured by asking if the guest had ever been sunburned while skiing or snowboarding (yes/ no or don't know; and if so, whether the guest had been sunburned that winter [yes/ no or don't know]). (…) Sunburn was defined as skin that was red or painful, or both, from sun exposure but not exposure to wind or cold. The period was shortened to winter season (rather than a year) to focus on the intervention period, but it was believed to be sufficiently long enough to capture this somewhat rare event."* *"Likert-type items (strongly agree [5] – strongly disagree [1])*		followed over time o Samples in arms not compared o No numbers of participants in study arms provided o No indication of including clustering effects in the analysis **Evidence gaps and/or recommendations for future research:** Longitudinal studies, use of more objective measures **Source of funding:** National Cancer Institute

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
		Intervention n = not reported **Control n =** not reported **Baseline comparisons:** participants were not followed from baseline to post-test; both samples were reported as mostly similar, but no comparisons between samples in study arms were made **Study sufficiently powered?:** power calculation not reported	*measured attitudes toward sun protection, self-efficacy expectations, sensation-seeking and scepticism."* Exposure to sun-protection messages was also measured. In the post-test survey questions were asked about seeing the Go Sun Smart logo and other ski resorts visited that winter (to determine potential contamination). Demographic characteristics were also collected. **Adverse events:** not reported **Secondary outcomes:** not reported **Follow-up periods:** baseline interviews in January to April 2001 and post-test interviews in January to March		

Study details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis	Results	Notes
			2002 **Method of analysis:** Not ITT		

Appendix 12: Economic evidence tables

Table 80 Hocking

Study details	Population and setting	Intervention/comparator	Outcomes and methods of analysis	Results	Notes

Study details	Population and setting	Intervention/comparator	Outcomes and methods of analysis	Results	Notes
Authors: Hocking[49] **Year:** 1991 **Aim of study:** To assess the cost effectiveness of a marketing technique for skin cancer protection and estimate the cost and benefits associated with this programme **Type of Economic Analysis:** Cost minimisation analysis; Cost benefit analysis	**Source population/s:** Australia (developed, public health care system) **Setting:** Telecom outdoor workers **Data Sources:** Data obtained from a quasi-experimental study††††††††††, author's estimations and assumptions	**Intervention/s description:** A marketing approach that involved provision of material for each depot of workers (posters and video) and each worker (brochures). This was supplemented by information provided by occupational health nurses[1] **Comparator/Control/s description:** Provision of information by occupational health nurses **Sample sizes:** **Total n =** the analysis assumes a population of 20 000 outdoor workers	**Primary Outcomes:** Cost per worker educated; Net present value of the intervention over a 40-year period **Secondary outcomes** Not reported **Time Horizon:** 40 years (for the cost benefit analysis) **Discount Rates:** Benefits: 15% Costs: 15% **Modelling Method:** No modelling methods were utilised.	**Primary analysis:** **Benefits** The author stated that the intervention is at least as effective as the control programme in encouraging outdoor workers to protect themselves from exposure to sun **Costs** Costs were estimated to be: Intervention: $80 000 ($4 per person) Control: $100 000 to $200 000 ($5 to $10 per person) **Incremental Cost-Effectiveness Ratio:** Net Present Value over 40 years from the Telecom's perspective is -$126.79 per outdoor worker informed (the costs of intervention exceed the monetary value of the	**Limitations identified by author:** o Potential savings do not include savings due to prevention of death from melanoma or containment of possible common law. o Cost and benefits vary greatly with latitude/geographical area o In estimating costs and benefits, intangibles such as staff relations and meeting a duty of care were not included **Limitations identified by review team:** o The employed effectiveness estimates for the cost-benefit analysis are based on authors guess (no reference to published evidence was given). o The cost for the control programme is based on assumptions and vary from $100 000 to $200 000. This variation was

†††††††††† Borland R, Hocking B, Godkin G, Gibbs A, Hill D. The impact of a skin cancer control education package for outdoor workers. *Med J Aust* 1991; 154:686-688

Study details	Population and setting	Intervention/comparator	Outcomes and methods of analysis	Results	Notes
Economic Perspective: Telecom company, Australia **Study Quality:**- **Applicability:** Not applicable				benefit gained) **Secondary analysis:** N/A	not taken into account in the reported results of the cost minimisation analysis. **Evidence gaps and/or recommendations for future research:** Further research to translate UV exposure to skin cancer-related outcomes. **Source of funding:** Not reported

Table 81 Kyle

Study details	Population and setting	Intervention/comparator	Outcomes and methods of analysis	Results	Notes
Authors: Kyle et al.[58] **Year:** 2008 **Aim of study:** To assess the	**Source population/s:** US (developed; private health care system) **Setting:** 12 100 public elementary and middle schools in the United States. **Data Sources:**	**Intervention/s description:** The intervention involved a classroom lesson focused on 3 areas: effect of UV radiation, risk factors for overexposure and sun protection habits The intervention was delivered	**Primary Outcomes:** o The following health outcomes were calculated for basal cell carcinoma (BCC), squamous cell carcinoma (SCC) and cutaneous malignant melanoma (CMM): o Skin cancer cases	**Primary analysis:** **Benefits** Under current level of funding (base case scenario): >50 deaths averted 11000 cases averted 960 QALY losses averted (159 discounted)	**Limitations identified by author:** o Outcomes are based on student self-reporting of sun protection forms o The modelling process introduces further uncertainty o Health outcomes other

Study details	Population and setting	Intervention/comparator	Outcomes and methods of analysis	Results	Notes
health benefits and cost-effectiveness of a school based sun safety educational programme (SunWise School Program) assuming that the programme continues through 2015. **Type of Economic Analysis:** Cost-Benefit analysis; Cost-effectiveness analysis **Economic Perspective:** US Government **Study Quality:**+ (potentially serious limitations)	Primary research (survey) and decision-analytic techniques.	by primary school teachers and nurses in primary and middle schools and lasted for 1 to 2 hours **Comparator/Control/s description:** No-intervention The costs and benefits associated with alternative scenarios were also explored: Low funding scenario: No further schools will register for the intervention from 2008 through 2015. Increased funding scenario: Schools register are assumed to be twice the number of schools registered annually under current scenario **Sample sizes:** **Total n =** 12000 schools Unclear number of students Intervention n= Approximately 730 schools participated in the survey, completing pre-intervention and post-intervention tests. (13791 students completed the pre-intervention assessment; 10299 completed the post-intervention assessment). **Control n =** NA	averted o Premature mortality o Quality-Adjusted Life-Years (QALYs) **Secondary outcomes** Not reported **Time Horizon:** 101 years (1999-2100) **Discount Rates:** Benefits: 3% Costs: 3% **Modelling Method:** Mathematical/statistical models used to estimate annual baseline UV exposure dose for children before participation in SunWise and UV exposure dose for children the three years immediately after SunWise. In addition, a previously developed model (AHEF) was employed to translate percentage reduction in cumulative lifetime UV exposure to reduced incidence of skin cancer and premature deaths.	Increased funding scenario: >70 deaths averted 15200 cases averted 1335 QALY losses averted (217 discounted) Low funding scenario: 14 deaths averted 3100 cases averted 274 QALY losses averted (52 discounted) **Costs** Under current level of Funding (base case scenario): cost saving (cost averted minus intervention cost) of $31,197,100. Increased funding scenario: Cost saving of $44,572,500 Low funding scenario: Cost saving of $6,866,350 **Incremental Cost-Effectiveness Ratio:** ICER was not reported because dominance relationship established. Authors report that each $1 spent on the programme	than skin cancer-related are not taken into account o Factors other than the intervention may have impact on outcomes o Participants private cost due to complying with intervention not included **Limitations identified by review team:** Assessment of uncertainty limited to deterministic univariate sensitivity analysis. No multivariate or probabilistic sensitivity analysis was performed. **Evidence gaps and/or recommendations for future research:** Further research to quantify the relationship between UV exposure and increase in risk of skin cancer **Source of funding:** US Environmental Protection Agency

Study details	Population and setting	Intervention/comparator	Outcomes and methods of analysis	Results	Notes
Applicability: Partially applicable				generates $1.95 to $4.02 in cost savings **Secondary analysis:** N/A	

Appendix 13: Studies analysed in the report

Study	Design	Citation
Barankin	CBA	Barankin B, Liu K, Howard J, Guenther L, Barankin B, Liu K, et al. Effects of a sun protection program targeting elementary school children and their parents. Journal of Cutaneous Medicine & Surgery 2001; 5(1):2-7.
Bauer	RCT	Bauer J, Buttner P, Wiecker TS, Luther H, Garbe C, Bauer J, et al. Interventional study in 1,232 young German children to prevent the development of melanocytic nevi failed to change sun exposure and sun protective behavior. International Journal of Cancer 2005; 116(5):755-761.
Benjes	RCT	Benjes LS, Brooks DR, Zhang Z, Livstone L, Sayers L, Powers C, et al. Changing patterns of sun protection between the first and second summers for very young children. Archives of Dermatology 2004; 140(8):925-930.
Bernhardt	RCT	Bernhardt JM. Tailoring messages and design in a Web-based skin cancer prevention intervention. International Electronic Journal of Health Education 2001; 4: 290-7(31 ref).
Boer	RCT	Boer H, Ter HE, Taal E, Boer H, Ter Huurne E, Taal E. Effects of pictures and textual arguments in sun protection public service announcements. Cancer Detection & Prevention 2006; 30(5):432-438.
Bolognia	CBA	Bolognia,JL, Berwick,M, Fine,JA, Simpson,P, et al. Sun protection in newborns: a comparison of educational methods. American Journal of Disease of Children [145], 1125-1129.1991
Borland	RCT	Borland RM, Hocking B, Godkin GA, Gibbs AF, Hill DJ. The impact of a skin cancer control education package for outdoor workers. Medical Journal of Australia 1991; 154(10):686-688.
Brandstrom	RCT	Branstrom R, Ullen H, Brandberg Y, Branstrom R, Ullen H, Brandberg Y. A randomised population-based intervention to examine the effects of the ultraviolet index on tanning behaviour. European Journal of Cancer 2003; 39(7):968-974.
Buller 1994	RCT	Buller MK, Loescher LJ, Buller DB, Buller MK, Loescher LJ, Buller DB. "Sunshine and skin health": a curriculum for skin cancer prevention education. Journal of Cancer Education 1994; 9(3):155-162.
Buller 1997	RCT	Buller MK, Goldberg G, Buller DB, Buller MK, Goldberg G, Buller DB. Sun Smart Day: a pilot program for photoprotection education. Pediatric Dermatology 1997; 14(4):257-263.
Buller 1998	RCT	Buller,DB, Borland,R, Burgoon,M. Impact of behavioral intention on effectiveness of message features: evidence from the Family Sun Safety Project. Human

		Communication Research [24], 433-453.1998 Buller,DB, Burgoon,M, Hall,JR, et al. Long-term effects of language intensity in preventive messages on planned family solar protection. Health Communication [12], 261-275.2000 Buller DB, Burgoon M, Hall JR, Levine N, Taylor AM, Beach BH, et al. Using language intensity to increase the success of a family intervention to protect children from ultraviolet radiation: predictions from language expectancy theory. Preventive Medicine 2000; 30(2):103-113.
Buller 2006a	RCT, CBA	Buller DB, Taylor AM, Buller MK, Powers PJ, Maloy JA, Beach BH. Evaluation of the Sunny Days, Healthy Ways sun safety curriculum for children in kindergarten through fifth grade. Pediatric Dermatology 2006; 23(4):321-329.
Buller 2006b	RCT	Buller DB, Reynolds KD, Yaroch A, Cutter GR, Hines JM, Geno CR, et al. Effects of the Sunny Days, Healthy Ways curriculum on students in grades 6 to 8. American Journal of Preventive Medicine 2006; 30(1):13-22. Reynolds KD, Buller DB, Yaroch AL, Maloy JA, Cutter GR, Reynolds KD, et al. Mediation of a middle school skin cancer prevention program. Health Psychology 2006; 25(5):616-625.
Castle	RCT	Castle CM, Skinner TC, Hampson SE. Young women and suntanning: an evaluation of a health education leaflet. Psychology & Health 1999; 14(3: 517-27 ,(40 ref):517-527.
Cho	RCT	Cho H, Salmon CT. Fear appeals for individuals in different stages of change: intended and unintended effects and implications on public health campaigns. Health Communication 2006; 20(1: 91-9 ,(31 ref):91-99.
Clowers-Webb	RCT	Clowers-Webb HE, Christenson LJ, Phillips PK, Roenigk RK, Nguyen TH, Weaver AL, et al. Educational outcomes regarding skin cancer in organ transplant recipients: Randomized intervention of intensive vs standard education. Archives of Dermatology 2006; 142(6):712-718.
Cody	RCT	Cody,R, Lee,C. Behaviors, beliefs and intentions in skin cancer prevention. Journal of Behavioral Medicine [13], 373-389.1990
Dey	RCT	Dey P, Collins S, Will S, Woodman CB, Dey P, Collins S, et al. Randomised controlled trial assessing effectiveness of health education leaflets in reducing incidence of sunburn. BMJ 1995; 311(7012):1062-1063.
Dixon	RCT	Dixon HG, Hill DJ, Karoly DJ, Jolley DJ, Aden SM, Dixon HG, et al. Solar UV forecasts: a randomized trial assessing their impact on adults' sun-protection behavior. Health Education & Behavior 2007; 34(3):486-502.
Geller 2003	CBA	Geller AC, Cantor M, Miller DR, Kenausis K, Rosseel K, Rutsch L, et al. The Environmental Protection Agency's National Sunwise School Program: Sun protection education in US schools (1999-2000). Journal of the American Academy of Dermatology 2002; 46(5):683-689. Geller AC, Rutsch L, Kenausis K, Selzer P, Zhang Z. Can an hour or two of sun protection education keep the sunburn away? Evaluation of the Environmental Protection Agency's Sunwise School Program. Environmental Health: A Global Access Science Source 2003; 2(pp 1-9). Geller,A, Rutsch,L, Kenausis,K, Zhang,Z. Evaluation of the SunWise school programme. Journal of School Nursing 19, 93-99.2003

Geller 2006	RCT	Geller AC, Emmons KM, Brooks DR, Powers C, Zhang Z, Koh HK, et al. A randomized trial to improve early detection and prevention practices among siblings of melanoma patients. Cancer 2006; 107(4):806-814. Geller A, Gilchrest B. A randomized trial to improve skin cancer detection and prevention practices among siblings of melanoma patients [abstract 296]. Journal of Investigative Dermatology 2006; 126:50.
Gerbert	RCT	Gerbert B, Wolff M, Tschann JM, McPhee SJ, Caspers NM, Martin MJ, et al. Activating patients to practice skin cancer prevention: Response to mailed materials from physicians versus HMOs. American Journal of Preventive Medicine 1997; 13(3):214-220.
Girgis	RCT	Girgis A, Sanson-Fisher RW, Tripodi DA, Golding T. Evaluation of interventions to improve solar protection in primary schools. Health Education Quarterly 1993; 20(2):275-287.
Glanz	RCT	Glanz K, Maddock JE, Lew RA, Murakami-Akatsuka L, Glanz K, Maddock JE, et al. A randomized trial of the Hawaii SunSmart program's impact on outdoor recreation staff. Journal of the American Academy of Dermatology 2001; 44(6):973-978.
Glazebrook	RCT	Glazebrook C, Garrud P, Avery A, Coupland C, Williams H, Glazebrook C, et al. Impact of a multimedia intervention "Skinsafe" on patients' knowledge and protective behaviors. Preventive Medicine 2006; 42(6):449-454.
Greene	CBA	Greene K, Brinn LS, Greene K, Brinn LS. Messages influencing college women's tanning bed use: statistical versus narrative evidence format and a self-assessment to increase perceived susceptibility. Journal of Health Communication 2003; 8(5):443-461.
Hanrahan	RCT	Hanrahan PF, Hersey P, Watson AB, Callaghan TM, Hanrahan PF, Hersey P, et al. The effect of an educational brochure on knowledge and early detection of melanoma. Australian Journal of Public Health 1995; 19(3):270-274.
Hewitt	CBA	Hewitt M, Denman S, Hayes L, Pearson J, Wallbanks C, Hewitt M, et al. Evaluation of 'Sun-safe': a health education resource for primary schools. Health Education Research 2001; 16(5):623-633.
Hornung	RCT	Hornung RL, Lennon PA, Garrett JM, DeVellis RF, Weinberg PD, Strecher VJ, et al. Interactive computer technology for skin cancer prevention targeting children. American Journal of Preventive Medicine 2000; 18(1):69-76.
Hughes	RCT	Hughes BR, Altman DG, Newton JA, Hughes BR, Altman DG, Newton JA. Melanoma and skin cancer: evaluation of a health education programme for secondary schools. British Journal of Dermatology 1993; 128(4):412-417.
Jackson	RCT	Jackson KM, Aiken LS, Jackson KM, Aiken LS. Evaluation of a multicomponent appearance-based sun-protective intervention for young women: uncovering the mechanisms of program efficacy. Health Psychology 2006; 25(1):34-46.
Jones 1994	RCT	Jones JL. Effects of appearance-based admonitions against sun exposure on tanning intentions in young adults. [References]. Health Psychology 1994; 13(1):Jan-90.
Jones 2007	CBA	Jones B, Oh C, Corkery E, Hanley R, Egan CA. Attitudes and perceptions regarding skin cancer and sun protection behaviour in an Irish population. Journal of the European Academy of Dermatology and Venereology 2007; 21(8):1097-

		1101.
Katz	RCT	Katz RC, Jernigan S, Katz RC, Jernigan S. Brief report: an empirically derived educational program for detecting and preventing skin cancer. Journal of Behavioral Medicine 1991; 14(4):421-428.
Kidskin	CBA	English DR, Milne E, Jacoby P, Giles-Corti B, Cross D, Johnston R, et al. The effect of a school-based sun protection intervention on the development of melanocytic nevi in children: 6-year follow-up. Cancer Epidemiology, Biomarkers & Prevention 2005; 14(4):977-980. English DR, Milne E, Simpson JA. Sun protection and the development of melanocytic nevi in children. Cancer Epidemiology Biomarkers and Prevention 2005; 14(12):2873-2876. Milne E, English DR, Cross D, Corti B, Costa C, Johnston R. Evaluation of an intervention to reduce sun exposure in children. Design and baseline results. American Journal of Epidemiology 1999; 150(2):164-173. Milne E, English DR, Johnston R, Cross D, Borland R, Costa C, et al. Improved sun protection behaviour in children after two years of the Kidskin intervention. Australian & New Zealand Journal of Public Health 2000; 24(5):481-487. Milne,E, English,D, Corti,B, Cross,D, Borland,R, Gies,P, et al. Direct measurement of sun protection in primary schools. Preventive Medicine 29, 45-52.2008 Milne E, English DR, Johnston R, Cross D, Borland R, Giles-Corti B, et al. Reduced sun exposure and tanning in children after 2 years of a school-based intervention (Australia). Cancer Causes and Control 2001; 12(5):387-393. Milne E, Johnston R, Cross D, Giles-Corti B, English DR, Milne E, et al. Effect of a school-based sun-protection intervention on the development of melanocytic nevi in children. American Journal of Epidemiology 2002; 155(8):739-745.
Kristjánsson	RCT	Kristjansson S, Helgason AR, Mansson-Brahme E, Widlund-Ivarson B, Ullen H. 'You and Your Skin': A short-duration presentation of skin cancer prevention for teenagers. Health Education Research 2003; 18(1):88-97.
Loescher	RCT	Loescher LJ, Emerson J, Taylor A, Christensen DH, McKinney M, Loescher LJ, et al. Educating preschoolers about sun safety. American Journal of Public Health 1995; 85(7):939-943.
Mahler 2005	RCT	Mahler HI, Kulik JA, Harrell J, Correa A, Gibbons FX, Gerrard M, et al. Effects of UV photographs, photoaging information, and use of sunless tanning lotion on sun protection behaviors. Archives of Dermatology 2005; 141(3):373-380.
Mahler 2007	RCT	Mahler HIM, Kulik JA, Gerrard M, Gibbons FX. Long-term effects of appearance-based interventions on sun protection behaviors. Health Psychology 2007; 26(3):350-360.
Mayer	RCT	Mayer JA, Slymen DJ, Eckhardt L, Johnston MR, Elder JP, Sallis JF, et al. Reducing ultraviolet radiation exposure in children. Preventive Medicine 1997; 26(4):516-522.
McClendon	RCT	McClendon BT, Prentice-Dunn S. Reducing skin cancer risk: An intervention based on protection motivation theory. Journal of Health Psychology 2001; 6(3):321-328.
McMath	RCT	McMath BF, Prentice-Dunn Ssuae. Protection Motivation Theory and Skin Cancer Risk: The Role of Individual Differences in Responses to Persuasive Appeals.

		[References]. Journal of Applied Social Psychology 2005; 35(3):Mar-643.
Mermelstein	RCT	Mermelstein,RJ, Riesenberg,LA. Changing knowledge and attitudes about skin cancer risk factors in adolescents. Health Psychology [11], 371-376.1992
Mickler	RCT	Mickler TJ. A comparison of three methods of teaching skin self-examinations. Journal of Clinical Psychology in Medical Settings 1999; 6(3):Sep-286.
Naldi	RCT	Naldi L, Chatenoud L, Bertuccio P, Zinetti C, Di LA, Scotti L, et al. Improving sun-protection behavior among children: results of a cluster-randomized trial in Italian elementary schools. The "SoleSi SoleNo-GISED" Project. Journal of Investigative Dermatology 2007; 127(8):1871-1877. Naldi L, Di LA, Zinetti C, Chatenoud L, Cellini A, Simonetti O, et al. Improving sun protection behaviour in children: Study design and baseline results of a randomized trial in Italian Elementary Schools: The 'Sole Si Sole No GISED' Project. Dermatology 2003; 207(3):291-297.
Parrott	RCT	Parrott R, Duggan A, Cremo J, Eckles A, Jones K, Steiner C. Communicating about youth's sun exposure risk to soccer coaches and parents: a pilot study in Georgia. Health Education and Behavior 1999;385-395.
Prentice-Dunn	RCT	Prentice-Dunn,D, Jones,JL, Floyd,DL. Persuasive appeals and the reduction of skin cancer risk: the roles of apperances convrtn, perceived benefits of a tan, and efficacy information. Journal of applied Soc Psychol [27], 1041-1047.1997
Prochaska	RCT	Prochaska JO, Prochaska JO. Stage-based expert systems to guide a population of primary care patients to quit smoking, eat healthier, prevent skin cancer, and receive regular mammograms. [References]. Preventive Medicine: An International Journal Devoted to Practice and Theory 2005; 41(2):Aug-416.
Rasmussen	RCT	Rasmussen S, Rasmussen Ss. Factors Influencing Anticipated Decisions about Sunscreen Use. [References]. Journal of Health Psychology 2005; 10(4):Jul-595.
Reding	CBA	Reding,DJ. Cancer education interventions for rural populations. Cancer Practice [2], 353-358.1994
Richard	RCT	Richard MA, Martin S, Gouvernet J, Folchetti G, Bonerandi JJ, Grob JJ, et al. Humour and alarmism in melanoma prevention: a randomized controlled study of three types of information leaflet. British Journal of Dermatology 1999; 140(5):909-914.
Rodrigue	CBA	Rodrigue JR. Promoting healthier behaviors, attitudes, and beliefs toward sun exposure in parents of young children. Journal of Consulting & Clinical Psychology 1996; 64(6):1431-1436.
Rothman	RCT	Rothman,AJ. The influence of message framing on intentions to perform health behaviors. Journal of Exp Soc Psychol [29], 408-433.1993
Segan	RCT	Segan CJ, Borland R, Hill DJ. Development and evaluation of a brochure on sun protection and sun exposure for tourists. Health Education Journal 1999; 58(2: 177-91 ,(29 ref):177-191.
Stephenson	RCT	Stephenson,MT, Witte,K. Fear, threat and perceptions of efficacy from frightening skin cancer messages. Public Health Review [26], 147-174.1998
Syson-Nibbs	RCT	Syson-Nibbs L. Measuring the effectiveness of sun safety messages. Health Visitor 1996; 69(7: 274-7 ,(16 ref):274-277.

Turrisi	RCT	Turrisi R, Hillhouse J, Robinson J, Stapleton J, Adams M, Turrisi R, et al. Influence of parent and child characteristics on a parent-based intervention to reduce unsafe sun practices in children 9 to 12 years old. Archives of Dermatology 2006; 142(8):1009-1014. Turrisi R, Turrisi Rr. Examination of the short-term efficacy of a parent-based intervention to prevent skin cancer. [References]. Journal of Behavioral Medicine 2004; 27(4):Aug-412.
Walkosz	RCT	Walkosz BJ, Buller DB, Andersen PA, Scott MD, Dignan MB, Cutter GR, et al. Increasing sun protection in winter outdoor recreation a theory-based health communication program. American Journal of Preventive Medicine 2008; 34(6):502-509.

Appendix 14: Numbers of studies reporting outcomes included in the analytical framework

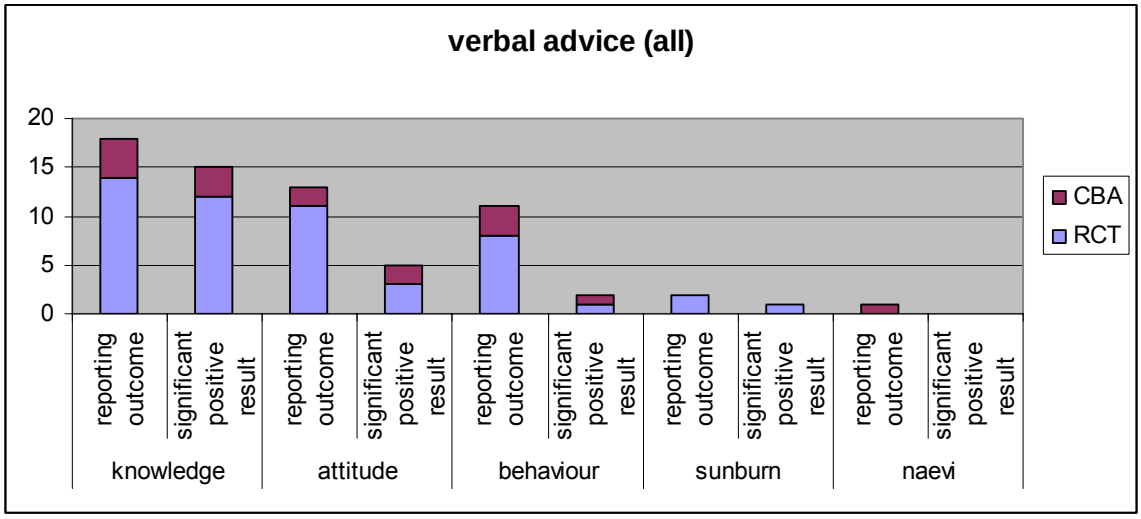
To aid the reader an indication of the number of studies measuring each outcome in the analytical framework for this report (knowledge, attitude, behaviour, and markers for sun exposure) for each theme (verbal advice, mass media, printed materials, new media and combinations thereof) are provided in this appendix.

Furthermore simplistic vote counting of significant findings for each outcome is also presented. It should be borne in mind that vote counting significant findings across heterogeneous studies (design, population, intervention, comparator, outcome measure, duration of follow up etc) is crude and can be misleading. All studies are given equal weighting irrespective of, for example, sample size and the magnitude of any effect is not considered. There may be underlying trends which are not observed using this method. However it is presented here for illustrative means given the diversity of the studies

For vote counting only studies comparing an intervention to do nothing/current practice were taken into account. To undertake this, a few assumptions were needed.

- studies that did not report results for study arms (but for example as regression analysis) were not included
- when a study reported the same outcome using 2 measures, a significant positive result counted only if the study showed an increase in at least one of the outcome measures

- one study (verbal advice, children) showed an increase in one age group and a decrease in another; it was counted as not significant
- when only significance for items within scales was reported, a significant positive result was only counted if an increase could be observed in more than 50% of the items
- if a finding was not significant at first post-test and significant at the second, it was treated as significant positive result
- if a study had more than one intervention arm compared to do nothing/current practice then the study could only contribute one vote for each outcome
- no distinction was made between settings for each theme.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reporting outcome
significant positive result
knowledge
attitude
behaviour
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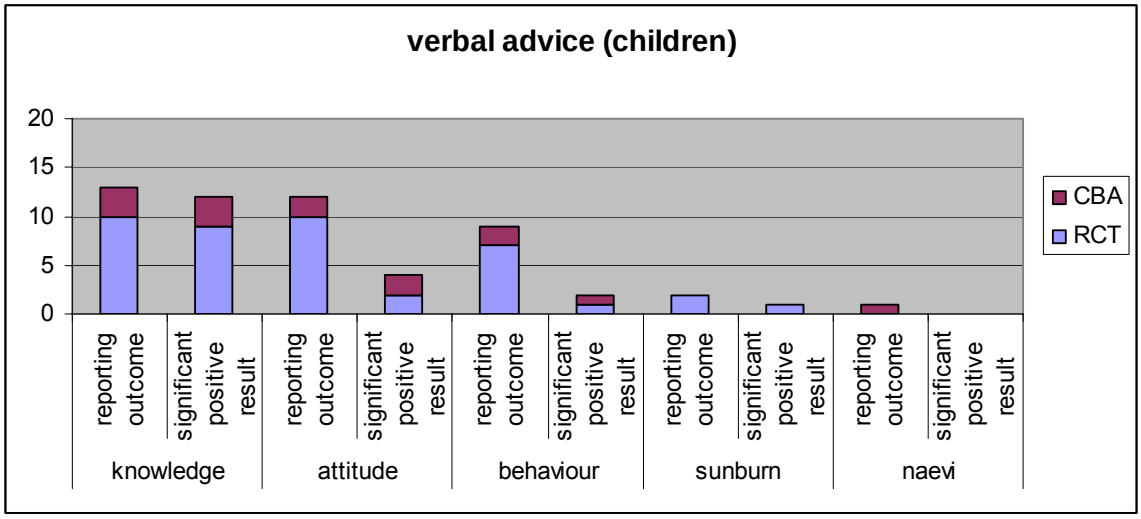
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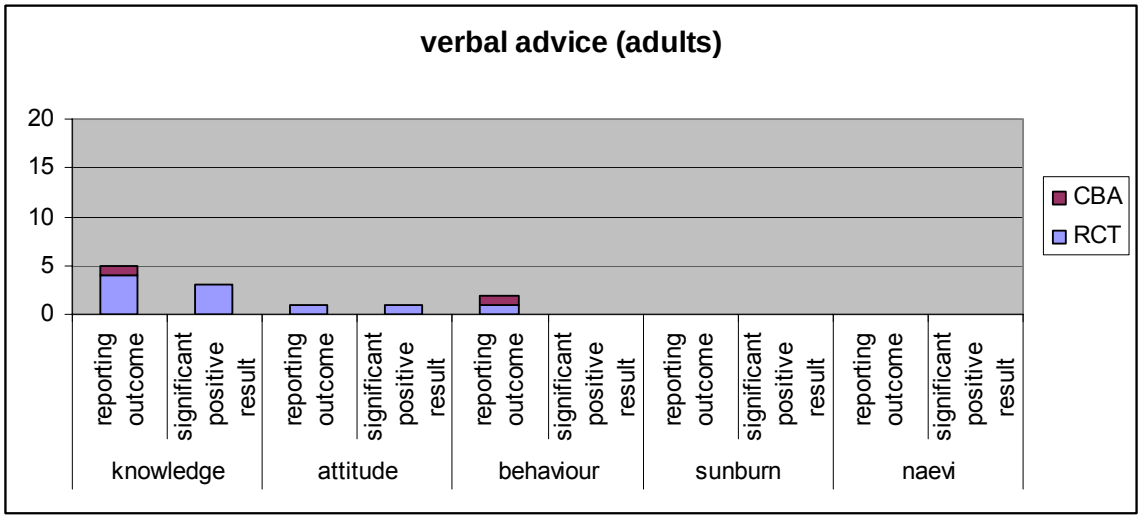
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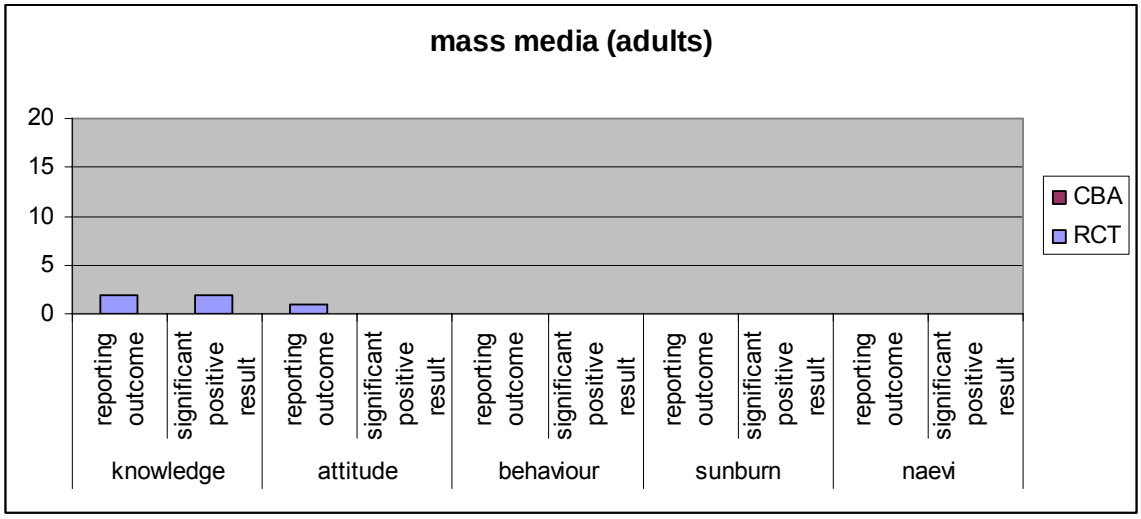
mass media (adults)
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reporting outcome
significant positive result
reporting outcome
significant positive result
reporting outcome
significant positive result
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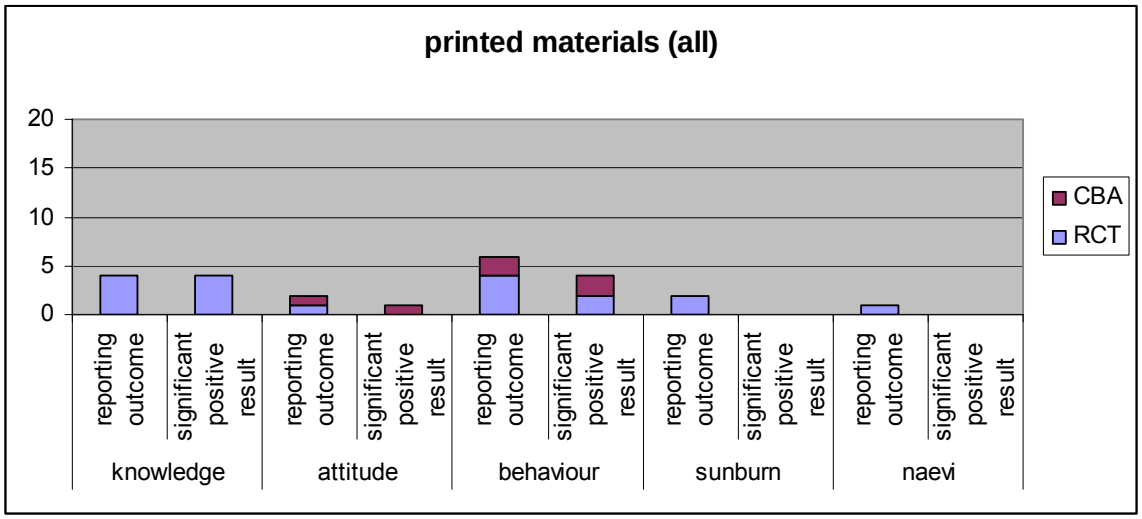
knowledge
attitude
behaviour
sunburn
naevi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reporting outcome
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knowledge
attitude
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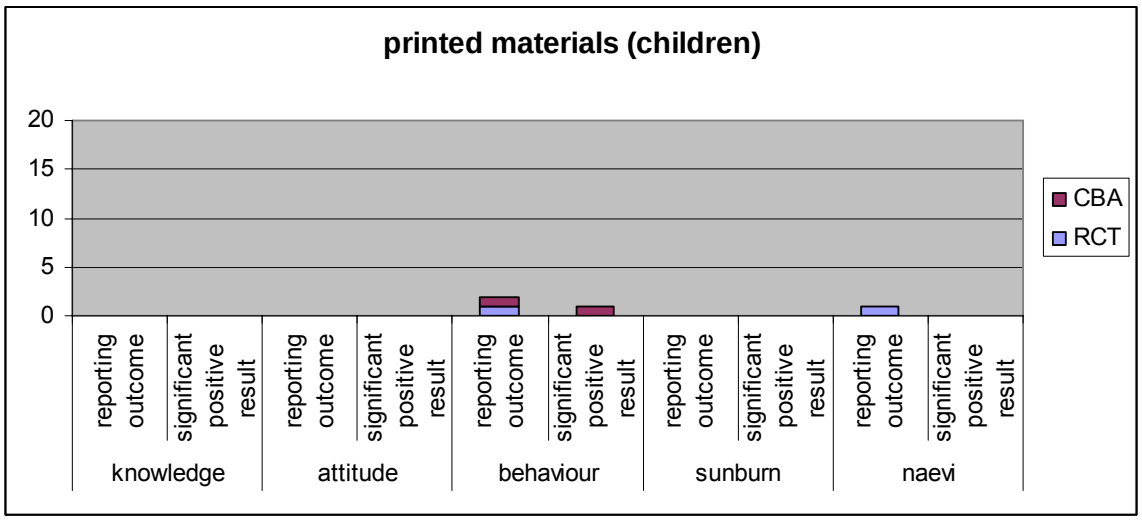
naevi
CBA
RCT


printed materials (children)
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reporting outcome
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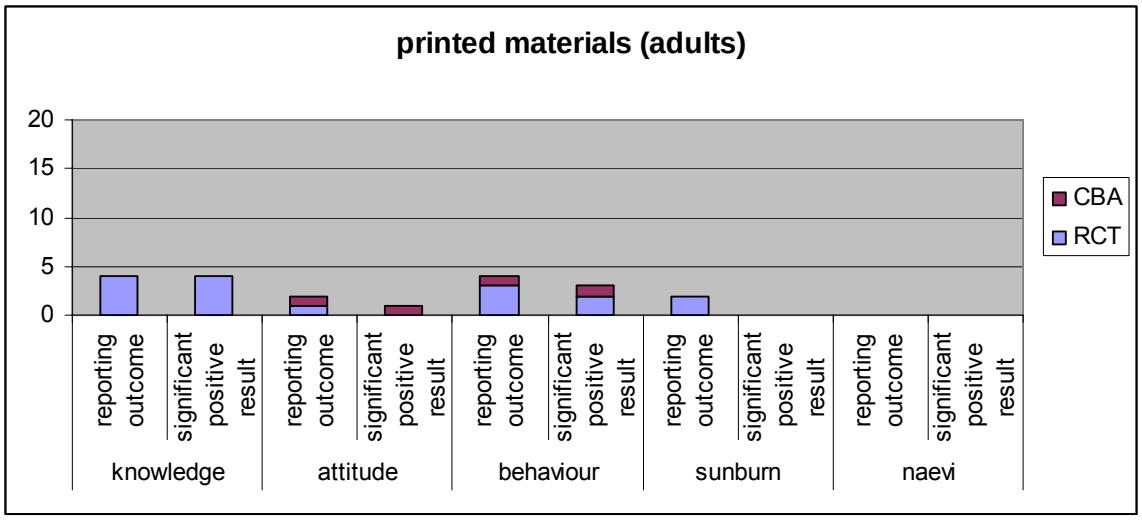
RCT


printed materials (adults)
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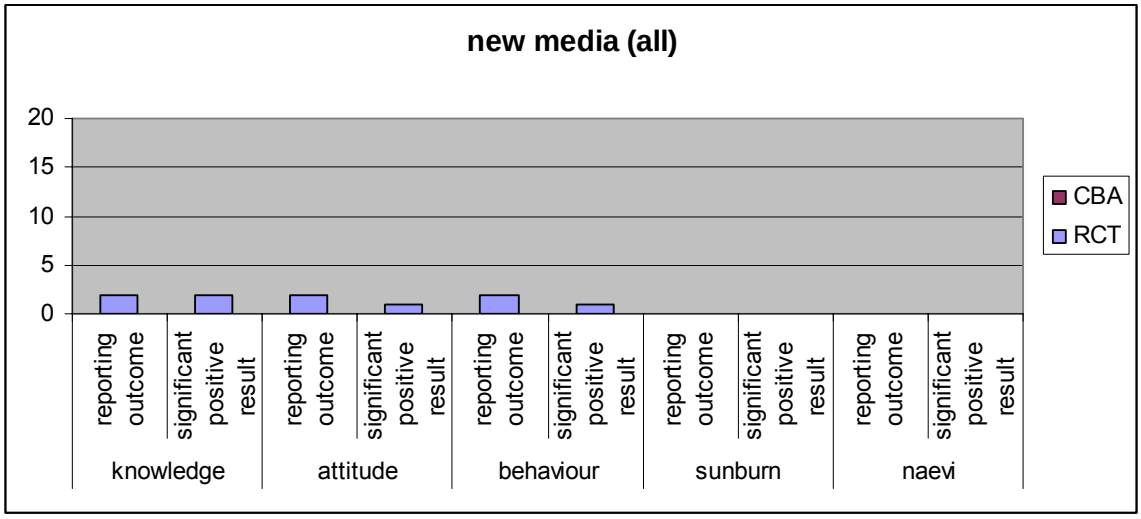
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reporting outcome
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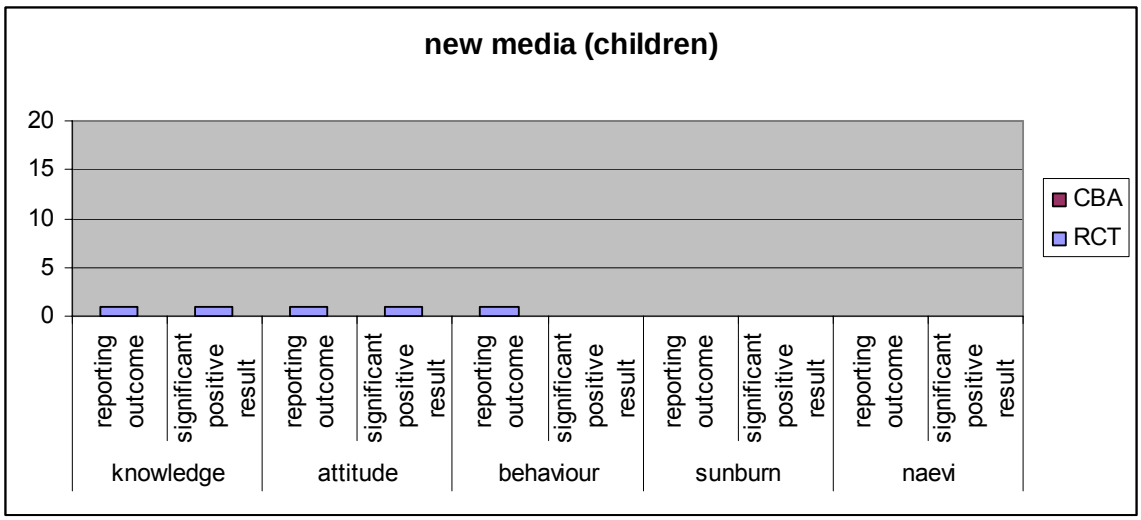
new media (children)
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reporting outcome
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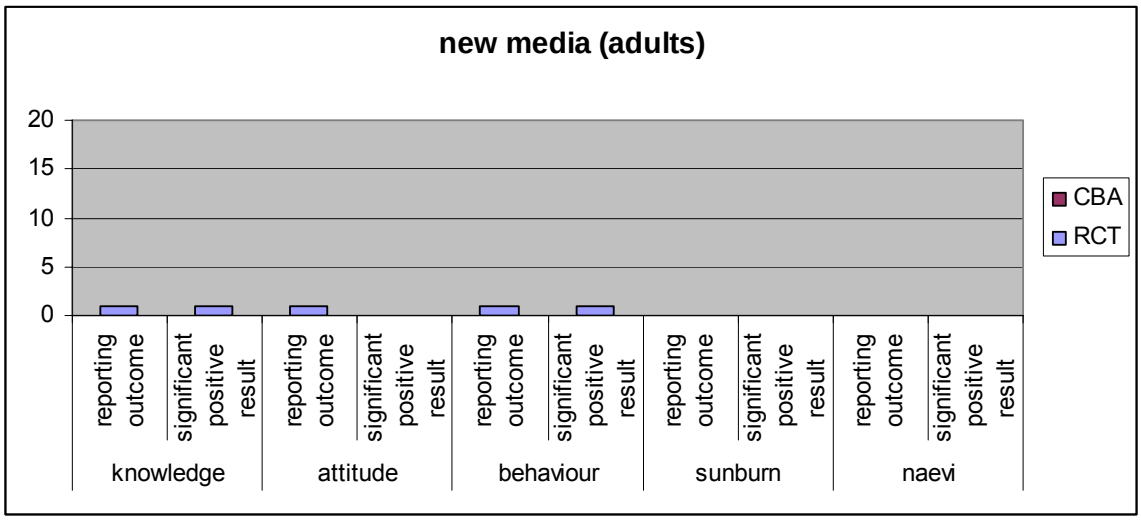
new media (adults)
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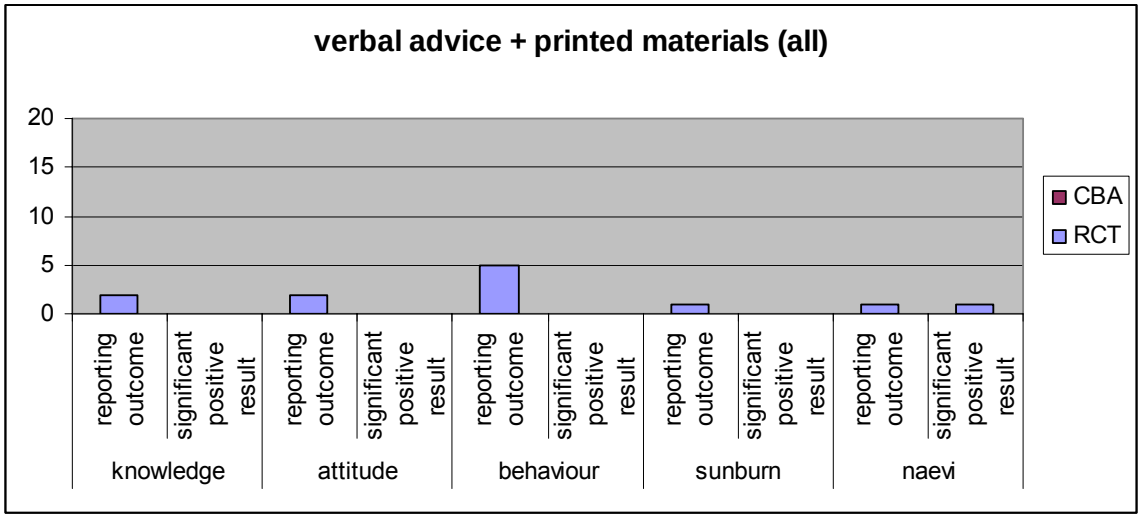
verbal advice + printed materials (all)
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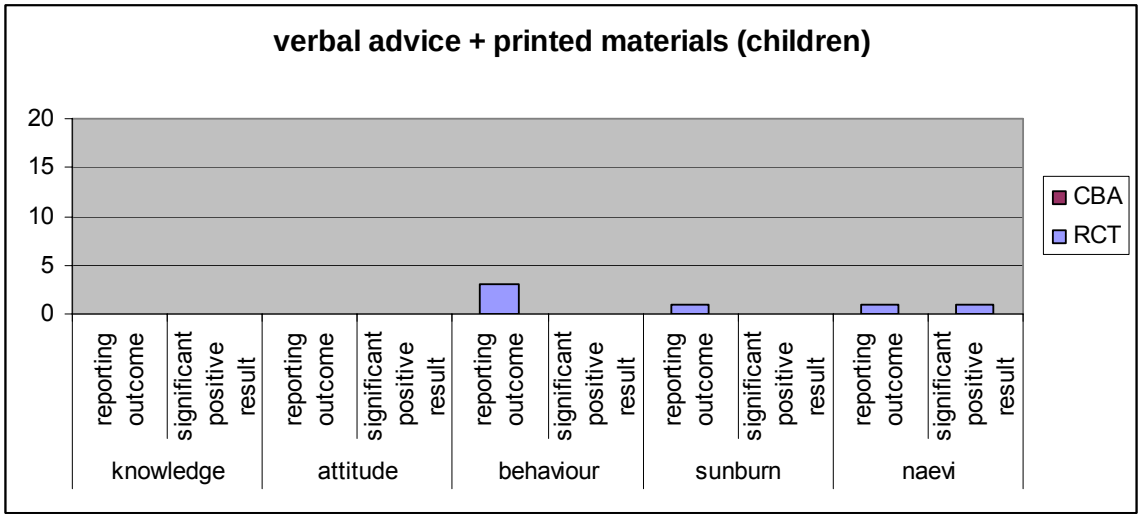
verbal advice + printed materials (children)
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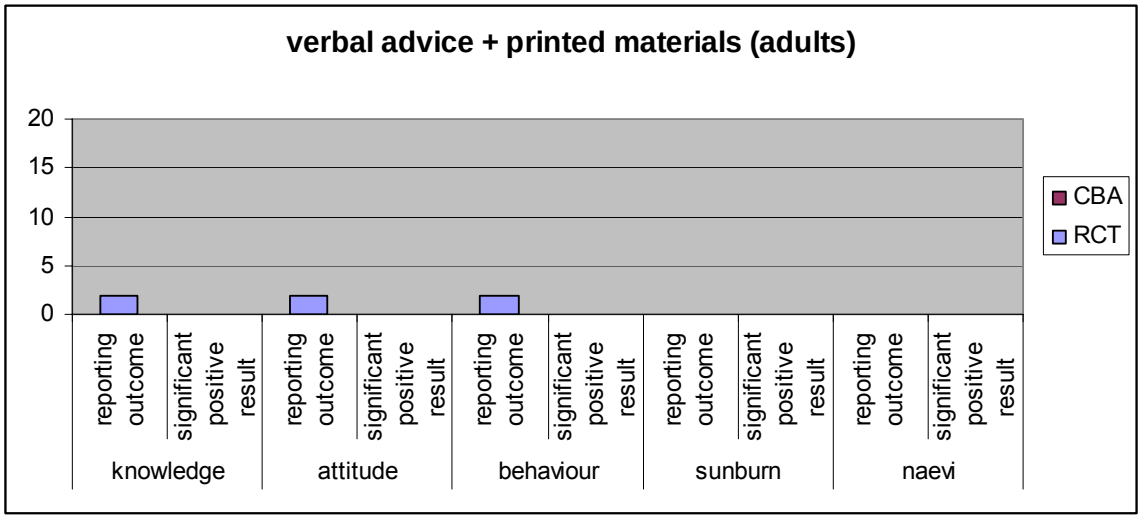
verbal advice + printed materials (adults)
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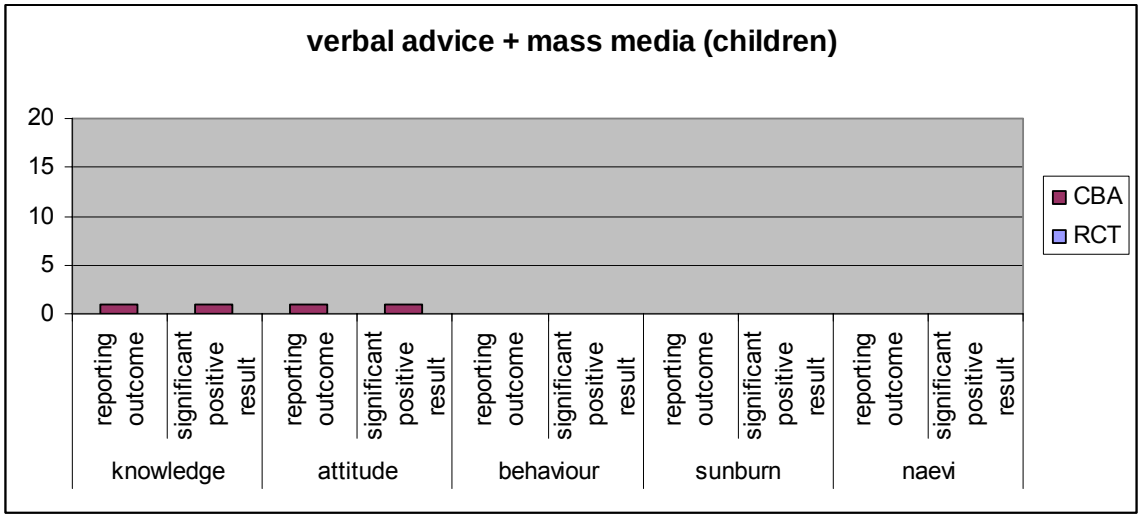
verbal advice + mass media (children)
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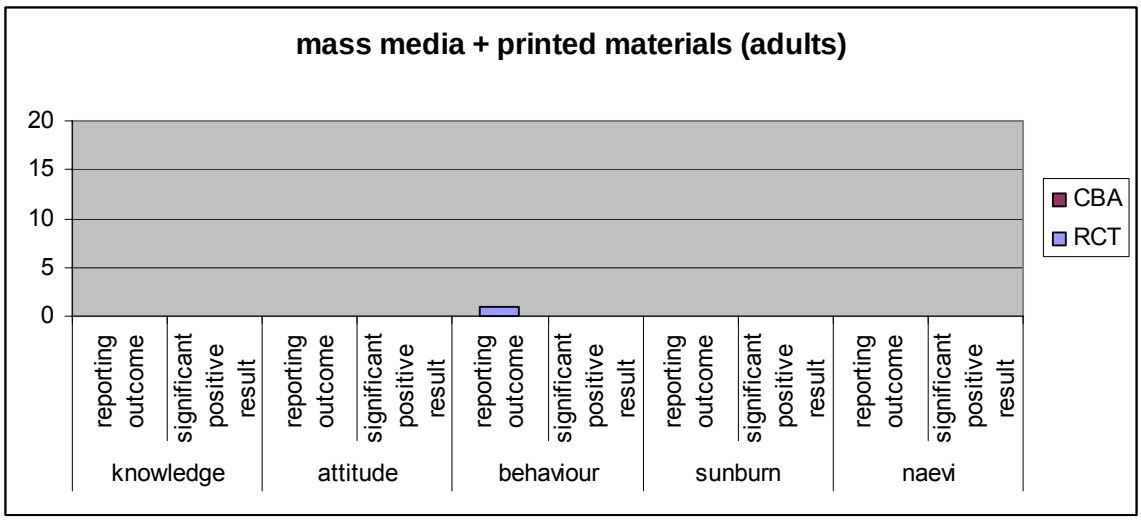
mass media + printed materials (adults)
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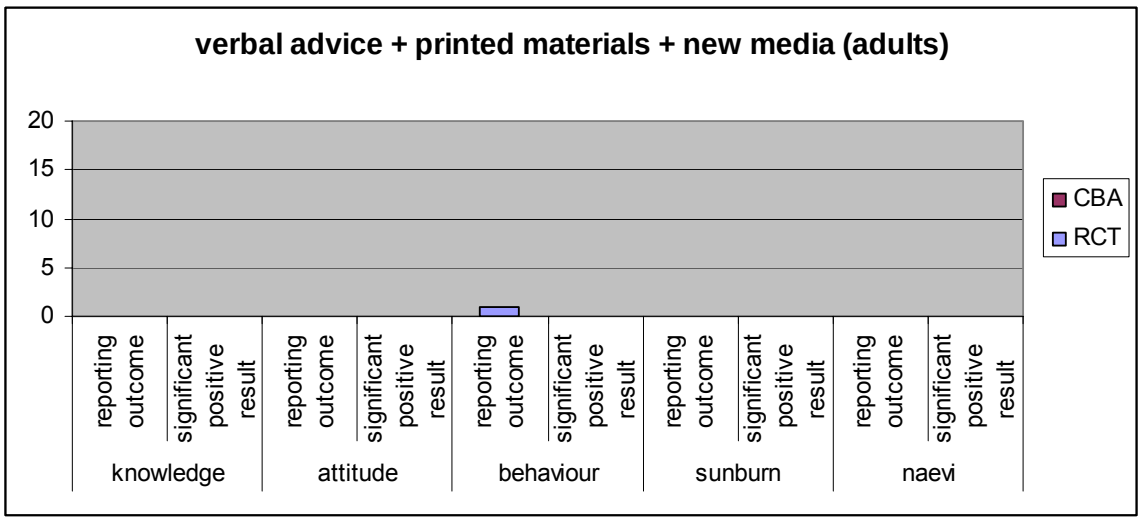
verbal advice + printed materials + new media (adults)
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reporting outcome
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knowledge
attitude
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CBA
RCT

Appendix 15: Studies not analysed

Mixed-intervention effectiveness studies in which data could not be disaggregated:

1 1 Buller DB, Andersen PA, Walkosz BJ, Scott MD, Cutter GR, Dignan MB, *et al*. Randomized trial testing a worksite sun protection program in an outdoor recreation industry. *Health Education & Behavior* 2005; **32**(4):514-535.

2 Correia O, Barros AM, Rocha N, Quirino P, Fernandes JC, Tavares C, *et al*. Skin cancer primary prevention programme for schoolchildren. Analysis of behavioural practices. *Skin Cancer* 2006; **21**(2):67-76.

3 Crane LA, Schneider LS, Yohn JJ, Morelli JG, Plomer KD, Crane LA, *et al*. "Block the sun, not the fun": evaluation of a skin cancer prevention program for child care centers. *American Journal of Preventive Medicine* 1999; **17**(1):31-37.

4 Crane LA, Deas A, Mokrohisky ST, Ehrsam G, Jones RH, Dellavalle R, *et al*. A randomized intervention study of sun protection promotion in well-child care. *Preventive Medicine* 2006; **42**(3):162-170.

5 Detweiler JB, Bedell BT, Salovey P, Pronin E, Rothman AJ, Detweiler JB, *et al*. Message framing and sunscreen use: gain-framed messages motivate beach-goers. *Health Psychology* 1999; **18**(2):189-196.

6 Dietrich AJ, Olson AL, Sox CH, Stevens M, Tosteson TD, Ahles T, *et al*. A community-based randomized trial encouraging sun protection for children. *Pediatrics* 1998; **102**(6):E64.

7 Dietrich AJ, Olson AL, Sox CH, Tosteson TD, Grant-Petersson J, Dietrich AJ, *et al*. Persistent increase in children's sun protection in a randomized controlled community trial. *Preventive Medicine* 2000; **31**(5):569-574.

8 Franklin G, Coggin C, Lykens K, Mains D. A sun awareness pilot project in Texas. *International Quarterly of Community Health Education* 2002; **21**(4: 323-41 ,(40 ref):323-341.

9 Geller AC, Glanz K, Shigaki D, Isnec MR, Sun T, Maddock J, *et al*. Impact of skin cancer prevention on outdoor aquatics staff: the Pool Cool program in Hawaii and Massachusetts. *Preventive Medicine* 2001; **33**(3):155-161.

10 Gillespie AM, Lowe JB, O'Connor Fleming ML, Stanton WR, Balanda KP, Del Mar CB, *et al*. The development of a school-based teaching resource package for adolescent skin cancer prevention. *Health Promot J Aust* 1998; **8**(2):151-156.

11 Girgis A, Sanson-Fisher RW, Watson A, Girgis A, Sanson-Fisher RW, Watson A. A workplace intervention for increasing outdoor workers' use of solar protection. *American Journal of Public Health* 1994; **84**(1):77-81.

12 Glanz K, Chang L, Song V, Silverio R, Muneoka L. Skin cancer prevention for children, parents, and caregivers: A field test of Hawaii's SunSmart program. *Journal of the American Academy of Dermatology* 1998; **38**(3):413-417.
13 Glanz K, Lew RA, Song V, Murakami-Akatsuka L, Glanz K, Lew RA, *et al*. Skin cancer prevention in outdoor recreation settings: effects of the Hawaii SunSmart Program. *Effective Clinical Practice* 2000; **3**(2):53-61.
14 Glanz K, Geller AC, Shigaki D, Maddock JE, Isnec MR, Glanz K, *et al*. A randomized trial of skin cancer prevention in aquatics settings: the Pool Cool program. *Health Psychology* 2002; **21**(6):579-587.
15 Grant-Petersson J, Dietrich AJ, Sox CH, Winchell CW, Stevens MM, Grant-Petersson J, *et al*. Promoting sun protection in elementary schools and child care settings: the SunSafe Project. *Journal of School Health* 1999; **69**(3):100-106.
16 Gritz ER, Tripp MK, James AS, Carvajal SC, Harrist RB, Mueller NH, *et al*. An intervention for parents to promote preschool children's sun protection: effects of Sun Protection is Fun! *Preventive Medicine* 2005; **41**(2):357-366.
17 Gritz ER, Tripp MK, James AS, Harrist RB, Mueller NH, Chamberlain RM, *et al*. Effects of a preschool staff intervention on children's sun protection: outcomes of sun protection is fun! *Health Education & Behavior* 2007; **34**(4):562-577.
18 Hancock L, Sanson-Fisher R, Redman S, Burton R, Burton L, Butler J, *et al*. Community action for cancer prevention: Overview of the cancer action in rural towns (CART) project, Australia. *Health Promotion International* 1996; **11**(4):277-290.
19 Hoffmann III RG, Rodrigue JR, Johnson JH. Effectiveness of a school-based program to enhance knowledge of sun exposure: Attitudes toward sun exposure and sunscreen use among children. *Children's Health Care* 1999; **28**(1):69-86.
20 Keesling,B, Friedman,HS. Interventions to prevent skin cancer: experiemental evaluation of informational and fear appeals. *Psychol Health* [10], 477-490.1995
21 Lombard,D, Neubauer,TE, Canfield,D, et al. Behavioral community intervention to reduce the risk of skin cancer. *Journal of Applied Behavior Analysis* [24], 677-686.1991
22 Lowe JB, Balanda KP, Stanton WR, Gillespie A, Lowe JB, Balanda KP, *et al*. Evaluation of a three-year school-based intervention to increase adolescent sun protection. *Health Education & Behavior* 1999; **26**(3):396-408.
23 Mahler HIM. The relative effects of a health-based versus an appearance-based intervention designed to increase sunscreen use. *American Journal of Health Promotion* 1997; **11**(6):Jul-Aug.
24 Mayer JA, Slymen DJ, Eckhardt L, Rosenberg C, Stepanski BM, Creech L, *et al*. Skin cancer prevention counseling by pharmacists: specific outcomes of an intervention trial. *Cancer Detection & Prevention* 1998; **22**(4):367-375.
25 Mayer JA, Eckhardt L, Stepanski BM, Sallis JF, Elder JP, Slymen DJ, *et al*. Promoting skin cancer prevention counseling by pharmacists. *American Journal of Public Health* 1998; **88**(7):1096-1099.
26 Mayer JA, Lewis EC, Eckhardt L, Slymen D, Belch G, Elder J, *et al*. Promoting sun safety among zoo visitors. *Preventive Medicine* 2001; **33**(3):162-169.
27 Mayer JA, Slymen DJ, Clapp EJ, Pichon LC, Eckhardt L, Eichenfield LF, *et al*. Promoting sun safety among US Postal Service letter carriers: impact of a 2-year intervention. *American Journal of Public Health* 2007; **97**(3):559-565.

28 Mermelstein R, Weeks K, Turner L, Cobb J. When tailored feedback backfires: A skin cancer prevention intervention for adolescents. *Cancer Research Therapy and Control* 1999; **8**(1-2):69-79.
29 Norman GJ, Adams MA, Calfas KJ, Covin J, Sallis JF, Rossi JS, *et al*. A randomized trial of a multicomponent intervention for adolescent sun protection behaviors. *Archives of Pediatrics & Adolescent Medicine* 2007; **161**(2):146-152.
30 Olson AL, Gaffney C, Starr P, Gibson JJ, Cole BF, Dietrich AJ, *et al*. SunSafe in the Middle School Years: a community-wide intervention to change early-adolescent sun protection. *Pediatrics* 2007; **119**(1):e247-e256.
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