

Bellamy (2005). A systematic review of educational interventions for promoting sun protection knowledge, attitudes and behaviour following the QUESTS approach. *Medical Teacher* 27, 3, pp XXX-XXX

Table 3: Extent, strength and target of studies

Study No.	Knowledge	Attitudes	Intended behaviour	Actual behaviour
1	Significant increase for all grades (P<0.001)	More favorable to sun protection for grades 4 and 5 only (P<0.01)	_____	Increase in reported sun protection for all grades (P<0.001)
2	No significant overall difference	No significant overall difference	Those watching either video had significant improvement in intended sun protection behaviour scores (P<0.001)	_____
3	_____	_____	_____	Significant increase in 2 or more protective behaviours for child (6.5% to 26.9%) and adult (22.0% to 37.9%) pool users Significant increase in all 4 behaviours for lifeguards (16.7% to 63.5%) (P values could not be calculated by me, due to the scoring method)
4	_____	_____	_____	Significant decrease in amount of time spent unprotected in direct sunlight for newborns (P<0.001) and mothers (P<0.001)
5	Knowledge improved significantly for both college (P<0.0001) and High School students (P<0.0001)	_____	_____	_____
6	Slight improvement reported without	No significant difference	No significant difference	_____

7	figures or statistics supplied Knowledge increased for intervention group (P<0.0001)	Perceived sunburn susceptibility increased (P<0.001)	No significant difference	_____
8	Increased knowledge for 1 st graders (P<0.01) and 3 rd – 5 th graders (P<0.01)	_____	_____	_____
9	_____	_____	_____	Improved sun protection behaviour for intensive group only (P<0.001)
10	Achievement score increased (P<0.01)	_____	_____	_____
11	All 4 intervention groups scored higher than control (P<0.001)	All 4 intervention groups scored higher than control (P<0.01)	_____	No significant difference between groups
12	Increased knowledge of link between sun exposure and skin cancer (P<0.05) and of relevant terms (P<0.05)	Less favourable attitudes towards suntanning (P<0.05)	_____	Increased reported use of sunscreen in winter (P<0.05), lip-balm (P<0.05) and protective clothing (P<0.05) and decreased frequency of sunbathing (P<0.05)
13	Significant increase in knowledge (P<0.01)	_____	_____	_____
14	_____	Concern about harmful effects of sun greater following appearance-based and control essays than for health-based essay (P<0.05)	For increasing intention to use sunscreen and decreasing intention to work on tan: Appearance-based essay significantly better than control or health-based essay for those with low appearance motivation (P<0.05) Control essay significantly better than appearance-based essay for those with high	_____

			appearance motivation (P<0.05)	
15	Better at selecting correct sunscreen for a light-skinned child (P<0.001), but not for other activities	_____	_____	_____
16	Greater increase in knowledge score (P<0.05)	No significant difference	_____	Greater increase in solar protection behaviour score (P=0.02)
17	_____	_____	_____	No significant difference in development of severe sunburn
18	Increase in knowledge score (P=0.01) and comprehension score (P=0.006) but no difference in application score	_____	_____	_____
19	Increase for patients (P=0.001) and helpers (P=0.001)	No significant difference in attitudes to a suntan	Improvement in intended sun protection behaviour for patients (P=0.001) and helpers (P=0.001)	For patients: improvements in hours spent unprotected outdoors (P=0.02) and sunblock use (P=0.01) For helpers: improvements in hours spent unprotected outdoors (P=0.02), indoor tanning (P=0.001) and sunblock use (P=0.01)
20	Increase in knowledge (P<0.01)	_____	_____	_____
21	Increase in knowledge (P<0.001)	Improvement in attitudes to sun protection (P<0.001)	_____	Increased reported use of sunscreen (P<0.001), hat use (P<0.001), sun-protective clothing (P<0.001) and avoidance of sun (P<0.001)
22	Both intervention groups showed increased knowledge (P<0.0001)	_____	Improvements for both intervention groups for both mother (P<0.001) and child (P<0.001)	Improvements for both intervention groups in children's sun protection (P<0.0001) but better maintained

				for comprehensive program (no P value available)
23	Increase in knowledge (P<0.005)	_____	_____	_____
24	Increase in knowledge (P<0.001)	Decrease in those favouring a tan (P=0.01) but no change in perceived barriers to sunscreen use	_____	No change in reported sun protection behaviour and inconsistent findings for changes in colorimeter measurements
25	_____	_____	Increase in intended sun protection (P<0.05)	_____
26	_____	_____	For both interventions intention to use sunscreen increased in older persons (P<0.05) but not in younger persons	No change in hours sunbathed. Non-significant lower melanin skin content in combined intervention groups (P=0.06)
27	Improved for all age groups (P<0.0005)	_____	_____	_____
28	Both interventions improved knowledge (P<0.05)	Both interventions improved attitude to tanning (P<0.05)	No change in intended use of hats, protective clothing or sunscreen	_____
29	_____	_____	_____	No change in solar protection score or use of sunscreen with SPF=15+ Reported increase in wearing hats (P=0.03)
30	_____	No differences in barriers to self protection Fewer perceived barriers to child sun-protection with low intensity inductive or high intensity deductive messages compared to other types (P=0.04)	More plans to protect self from sun in coming winter (P=0.005) with low intensity inductive or high intensity deductive messages compared to other types	Greater use of sunscreen (P=0.01) and protective clothing (P=0.04) with low intensity inductive or high intensity deductive messages compared to other types
31				Increase in body coverage (P=0.03) and

				uncertain increase in use of sunscreen (P=0.06) but no increase in use of shade
32	No increase in knowledge	Improvement in attitudes to sun protection among parents (P<0.05) and children (P<0.01) but no significant change among staff		
33	Increase in knowledge (P=0.007)	No significant change		No significant change
34			Among those without prior plan to use sunscreen there was an increase in intention to do so with gain-framed message (P<0.05)	
35	Improvement on 8 questions (P<0.001)	Increased willingness to wear a hat (P<0.01), shirt (P<0.01), sunscreen (P<0.001), but no significant change regarding playing in shade		
36				No significant change in head, arm or leg cover or time spent in shade
37	Increase in knowledge (P<0.05)	No significant change in attitudes	Improved intended sun protection behaviour (P<0.05)	Improved reported sun protection behaviour (P<0.05)
38				Decreased suntan on back (P=0.004) No significant difference in naevi Improved reported time outdoors at midday (P=0.001) and covering of back (P=0.01) but no significant difference in hat wearing or time spent in shade
39	Increased	Increased		No overall

	knowledge for grade 8 (P=0.002) and grade 9 (P<0.001)	concern about sun damage (P<0.001) but no significant change in attitude to suntan	_____	difference in sun protection behaviour
40	Increase in number who knew that sunlight can cause skin cancer (P<0.001)	_____	_____	Increase in hat (P=0.01) and sunscreen (P=0.03) use and avoidance of midday sun (P=0.02) Less time spent uncovered in sun (P<0.001)
41	No significant increase in knowledge about sun protective clothing for coaches or parents	No significant overall change in perceived difficulty of getting children to wear sunscreen	_____	_____
42	Increase for all 3 leaflets in ability to define melanoma (P<0.0001) and list risk factors (P=0.02)	_____	Among those receiving interventions 24% expressed an intention to change behaviour (no comparator)	_____
43	Improvement in questions which tested a mixture of knowledge and attitudes (P<0.001)		Improvement in 8 aspects of sun protection behaviour (P<0.001)	_____
44	Improvement in relevance of pictures using draw-and-write technique (P<0.05) but not for all questions	Improvement in attitude to suntan (P<0.05)	_____	_____
45	_____	_____	_____	Improvement in reported sun protection habits among education (P<0.001) and education/ environment groups (P<0.01) No significant differences between groups
46	Improvement for both intervention groups (P<0.001)	Improvement for both groups (P<0.001)	_____	No difference in hat use in summer but greater hat use in winter (P<0.01)
47	_____	_____	_____	Sun protection habits increased
48	Increase in knowledge for	Improved attitudes to sun		

	education (P<0.01) and education/environment (P<0.05)	protection for education (P<0.05) and education/environment (P<0.01)	_____	significantly for education group (P<0.05) but not for education/environment group
49	No significant change in knowledge	_____	_____	Decreased rates of sunburn (P=0.05) but no significant change in reported sun protection behaviours
50	Significant increase for workbook group only (P=0.01)	Improved attitudes with both interventions compared to controls (P=0.008)	Improved for both interventions compared to controls (P=0.003)	_____
51	_____	_____	_____	Sun protection behaviour score improved significantly more in the intervention group compared to the control group over a 24 month follow-up period (P<0.001)
52	Significant increase in knowledge of sun protection in intervention schools (P=0.001) but not control schools	Decrease in belief that a suntan is good in intervention schools (P<0.001) but not control schools	Intention to play in shade (P=0.001) and to use sunscreen (P<0.005) increased in intervention schools only	No significant change in use of sunscreen, long-sleeved shirts and hats
53	_____	_____	_____	For adults, fewer hours were spent in sun-exposing recreation activities post-intervention (P=0.02) but there was no change in use of sun protection. For children under 12 years no significant change in hours spent in sun-exposing activities
54	Increase in knowledge for all 4 groups (P<0.001) but no significant difference between groups	Improved attitudes towards sun-tan for all 4 groups (P<0.001) but no significant difference between groups	Decreased intention to sunbathe for all 4 groups (P<0.001) but no significant difference between groups	Frequency of sunbathing decreased (P<0.001) and use of sunscreen increased (P<0.01) for all 4

55	_____	_____	_____	groups but no significant difference between groups
56	Significant increase in knowledge about sun protection (P<0.0001)	_____	_____	Intervention group used more sunscreen (P<0.05) but no change in sun exposure
57	Significant increases in knowledge post-intervention and at 1 year follow-up (P<0.001)	Significant decrease in number who thought that a tan looked healthy (P<0.05)	Significant increase in intention to use sunscreen after intervention (P=0.01)	After 1 year follow-up there was a significant increase in use of sunscreen (P=0.001) and only half as many sun burns occurred compared to previous year
58	Significant increase in overall knowledge score (P<0.001)	Significant improvement in attitudes towards sun avoidance (P<0.05) and harmful effects of excessive sun (P<0.0001)	_____	_____
59	Increased knowledge among female students (P<0.005)	Less favourable attitudes to tanning (P<0.05) and increased interest in UV protection (P<0.001) after intervention	_____	_____

Study numbers are as shown in table 1. For controlled studies all comparisons quoted are with respect to the control group. For non-controlled studies comparisons are between the post- and pre-intervention findings. No significant change indicates $P>0.05$.

