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Sun protection resources and changes to the environment to prevent skin cancer: qualitative evidence review

Final Report

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Theo Lorenc, Farah Jamal, Chris Cooper

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Declaration of authors' competing interests

No authors have competing interests.

Contents

1.0 Executive summary

1.1 Introduction

This report presents the findings of a systematic review of qualitative evidence concerning the prevention of skin cancer, with particular reference to the following intervention types: the provision of sun protection resources; changes to the physical environment; and multi-component interventions.

The primary research question for the review was:

- What factors help or hinder the provision or use of the following to prevent the first occurrence of skin cancer attributable to UV exposure?
  - sun protection resources;
  - physical changes to the natural or built environment; and
  - multi-component interventions.

The secondary questions included the following:

- What are the views of people who may use prevention services?
- What are the views of service providers?
- How do these views differ by population characteristics (e.g. age, ethnicity)?
- What environmental, social or cultural factors may prevent or support the uptake or effective use of sun protection resources or use of physical environmental changes made to help prevent skin cancer?
- To what extent are such interventions available and accessible to different groups in the population?

1.2 Methods

To locate evidence, a range of databases and websites indexing relevant literature were searched. Study reports were included if they:

- addressed the primary prevention of skin cancer due to UV exposure, or views relating to skin cancer, sunbathing or tanning;
- presented qualitative research;
- were published in 1990 or later;
- were published in English;
- presented views relating to resource provision, environmental change or multi-component interventions;
- were conducted in an OECD country.

The quality of included studies was assessed, and data were extracted, using the standard tools for NICE public health evidence reviews. Study findings were synthesised thematically using a framework based on the Health Belief Model.

1.3 Findings

Twenty-three study reports, referring to 22 distinct studies, were included in the review. Of these, six came from the UK. The findings of the studies are summarised in the evidence statements below, with the overall quality rating for each study: (++), high quality; (+), medium quality; or (-), low quality.

Evidence statement 1: perceived susceptibility
ES 1.1 Two studies report that the experience of melanoma or pre-cancerous moles by participants or people they know, or a family history of malignant melanoma, increase perceived risk (Gerbert et al. 1996 [++]; Hay et al. 2009 [++]). ES 1.2 Five studies report that the risk of skin cancer is not appreciated or is seen as not of immediate concern (CRUK n.d.b (*SunSmart*) [-]; Curtis and Pollock 2009 [-]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]). This perception is particularly stated by children (aged 6-8 years) and young people (aged 12-25 years approximately), who view the risk as too distant to be a serious concern. ES 1.3 One study reports that fathers thought that children had a greater risk of developing skin cancer than adults because their skin is more “delicate” (CRUK n.d.c (*Outoor workers*) [-]). ES 1.4 Three studies of adult participants report that people are aware of the risks of skin cancer, but avoid thinking about them, or adopt an optimistic framing that minimises their own perceived susceptibility, such as assuming that others’ exposure to risk factors must be higher than their own (Calder and Aitken 2008 [++]; CRUK n.d.c (*Outdoor workers*) [-]; Murray and Turner 2004 [+]). ES 1.5 One US study discusses the communication of risks within families where a member has had an experience of skin cancer, finding that people diagnosed with cancer usually discussed risk with their families, and that women took a leading role in communication (Hay et al. 2009 [++]). ES 1.6 Five studies of young people and adults report the belief that sun exposure provides “resistance” to skin damage, burning or cancer in the future (CRUK n.d.c (*Outdoor workers*) [-]; Glanz et al. 1999 [++]; Parrott et al. 1996 [+]; Murray and Turner 2004 [+]; Shoveller et al. 2003 [++]). In particular, outdoor workers reported such beliefs in two studies (CRUK n.d.c (*Outdoor workers*) [-]; Parrott et al. 1996 [+]), and parents in one (Glanz et al. 1999 [++]). ES 1.7 Three studies identify other factors that affect perceived susceptibility to skin cancer. Two studies report the perception that a darker skin colour decreased risk level (CRUK n.d.c *(Outdoor workers)* [-]; Gillespie et al. 1993 [-]). One study finds that participants of higher socioeconomic status were more aware of the risks (CRUK n.d.a (*Sunburn*) [-]). *Applicability* Eight of twelve studies that reported data on perceived susceptibility to skin cancer or skin

damage were from countries other than the UK. Most of the factors identified did not appear to vary substantially between countries. However, it is possible that people in the UK may have lower perceived susceptibility than elsewhere because of differences in climate (see Evidence Statement 14).

Evidence statement 2: perceived severity

ES 2.1 Perceived severity of skin cancer was low in seven studies across a wide range of age groups (aged 6 years to over 60 years): Calder and Aitken 2008 [++]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]; Murray and Turner 2004 [+]; Parrott et al. 1996 [+]; Paul et al. 2008 [++]). In three studies participants thought that skin cancer was easy to treat (Calder and Aitken 2008 [++]; Glanz et al. 1999 [++]; Paul et al. 2008 [++]). In one study with participants aged 6-8 years, there was a lack of understanding about what skin cancer was or the risks of skin cancer (Glanz et al. 1999 [++]). A study of farmers in the USA finds that they did not see skin cancer affecting their day-to-day work (Parrott et al. 1996 [+]).

ES 2.2 Seven studies report that skin aging was seen as a serious consequence of sun exposure (Abroms et al. 2003 [+]; Clarke and Korotchenko 2009 [+]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Lupton and Gaffney 1996 [++]; Murray and Turner 2004 [+]; Paul et al. 2008 [++]). Two studies find that skin aging is perceived as a more serious consequence of sun exposure than is skin cancer (Gerbert et al. 1996 [++]; Murray and Turner 2004 [+]). Four studies report that skin aging is seen as a more serious consequence by women than it is by men (Abroms et al. 2003 [+]; Lupton and Gaffney 1996 [++]; Murray and Turner 2004 [+]; Paul et al. 2008 [++]).

Applicability

Only one study in this group (Murray and Turner 2004 [+]) was conducted in the UK. All other studies were conducted in the USA, New Zealand or Australia. It is possible that knowledge about the severity of skin cancer may be greater in the latter countries than the UK due to previous information campaigns.

Evidence statement 3: perceived benefits of sun protection

ES 3.1 Participants in most studies used sun protection, principally sunscreen, in order to offset the perceived risks of sun exposure including skin cancer (Abroms et al. 2003 [+]; Clarke and Korotchenko 2009 [+]; Hay et al. 2009 [++]; Paul et al. 2008 [++]) and skin aging (Abroms et al. 2003 [+]; Clarke and Korotchenko 2009 [+]; Paul et al. 2008 [++]). Avoiding sunburn and the sun's heat and glare were mentioned as a benefit of sun protection in three studies (Abroms et al. 2003 [+]; Gillespie et al. 1993 [-]; Paul et al. 2008 [++]).

ES 3.2 Participants in two studies said that using sun protection enabled them to stay in the sun for longer when playing sports (Abroms et al. 2003 [+]) or at the beach (Paul et al. 2008 [++]).

ES 3.3 Two studies of parents and school staff stated the benefits of promoting sun protection to young people to help them acquire positive long-term habits (Collins et al. 2006 [-]; Glanz et

al. 1999 [++]).

Applicability
None of the studies in this section were conducted in the UK or Europe. Hence, it is unclear to what extent findings about the perceived benefits of sun protection may be applicable in the UK context.

Evidence statement 4: Perceived barriers - positive perceptions of a tanned appearance
ES 4.1 Twelve studies report positive perceptions of a tanned appearance, i.e. that a tanned appearance is perceived as attractive (Calder and Aitken 2008 [++]; Clarke and Korotchenko 2009 [+]; Curtis and Pollock 2009 [-]; Lupton and Gaffney 1996 [++]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Grey 1998 [-]; Murray and Turner 2004 [+]; Paul et al. 2008 [++]; Reeder et al. 2000 [+]; Shoveller et al. 2003 [++]; Young et al. 2005 [++]). Two studies report that a tanned appearance increases confidence and self-esteem (Gerbert et al. 1996 [++]; Murray and Turner 2004 [+]). ES 4.2 Three studies report that the degree of tan colour was important in shaping perceptions of tanned appearance, with a deep tan not necessarily seen as desirable (Clarke and Korotchenko 2009 [+]; Lupton and Gaffney 1996 [++]; Shoveller et al. 2003 [++]). ES 4.3 Nine studies find that a tanned appearance is seen as healthy (Calder and Aitken 2008 [++]; Clarke and Korotchenko 2009 [+]; Curtis and Pollock 2009 [-]; Gerbert et al. 1996 [++]; Grey 2008 [-]; Lupton and Gaffney 1996 [++]; Murray and Turner 2004 [+]; Shoveller et al. 2003 [++]; Young et al. 2005 [++]). Of these, three studies note that a tanned appearance indicates an active, outdoors lifestyle (Calder and Aitken 2008 [++]; Lupton and Gaffney 1996 [++]; Shoveller et al. 2003 [++]). *Applicability* Although only two studies reporting a positive perception of a tanned appearance were conducted in the UK (Curtis and Pollock 2009 [-]; Murray and Turner 2004 [+]), these perceptions appear to be consistent across countries.

Evidence statement 5: Perceived barriers - perceived health benefits of sun exposure
ES 5.1 Three studies report the belief that ultraviolet exposure is beneficial because it provides vitamin D (Clarke and Korotchenko 2009 [+]; Gerbert et al. 1996 [++]; Murray and Turner 2004 [+]). ES 5.2 Two studies report that sun exposure is believed to protect against future skin damage or cancer by increasing “resistance” (Glanz et al. 1999 [++]; Parrott et al. 1996 [+]). ES 5.3 Three study reports discuss the perception that outdoor activities which involve sun exposure are healthier than indoor activities, both among adults (Bergenmar and Brandberg 2001 [++]; Gerbert et al. 1996 [++]) and children (Gillespie et al. 1993 [-]). One study finds this

perception to be linked to the freedom to play actively for children (Gillespie et al. 1993 [-]).

Applicability
Only one of the studies in this group was conducted in the UK (Murray and Turner 2004 [+]). It is unclear whether perceptions of the health benefits of sun exposure are generalisable between countries.

Evidence statement 6: Perceived barriers - routes to tanning
ES 6.1 Participants in three studies distinguished deliberate from incidental tanning, and expressed the belief that incidental tanning was less dangerous or less likely to require protection (Bergenmar and Brandberg 2001 [++]; Lupton and Gaffney 1996 [++]; Shoveller et al. 2003 [++]). ES 6.2 One study finds that participants preferred to see themselves as tanning incidentally, rather than deliberately (Bergenmar and Brandberg 2001 [++]). This may be because deliberate tanning has 'unhealthy' connotations but incidental tanning from outdoor activities does not. ES 6.3 Three studies compared sunbed use to sun exposure. Most of the participants in these studies believed that sunbeds were more dangerous than sun exposure (Clarke and Korotchenko 2009 [+]; Murray and Turner 2004 [+]; Shoveller et al. 2003 [+]). *Applicability* Most of the findings in this section come from studies conducted outside the UK. Because of climatic differences, findings regarding incidental tanning may not be readily applicable to the UK context.

Evidence statement 7: Perceived barriers - social barriers
ES 7.1 Six studies identify the unfashionable or unattractive appearance of protective clothing as a barrier to their use among children and young people (aged 6-20: Calder and Aitken 2008 [++]; Gillespie et al. 2003 [-]; Glanz et al. 1999 [++]; Lupton and Gaffney 1996 [++]; Paul et al. 2008 [++]; Shoveller et al. 2003 [++]). Two studies find that protective clothing, such as hats, would be more acceptable if they were fashionable and attractive (Gillespie et al. 2003 [-]; Lupton and Gaffney 1996 [++]). ES 7.2 Three studies find that young adult and adult participants see sun protection behaviour as not strongly supported by social norms within their communities (Abroms et al. 2003 [+]; Glanz et al. 1999 [++]; Parrott et al. 1996 [+]). ES 7.3 Five studies describe a strong association between sunscreen use and particular contexts, such as the beach and being on holiday (Abroms et al. 2003 [+]; CRUK n.d.c (*Outdoor workers*) [-]; Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]; Parrott et al. 1996 [+]). ES 7.4 One study finds that young people (ages 12-17 years) see media messages and

parental behaviours regarding sun protection as focused on young children and not relevant to themselves (Paul et al. 2008 [++]).

ES 7.5 One study finds that men see sunscreen use as unmasculine (Abroms et al. 2003 [+]).

Applicability
Most studies in this section were carried out outside the UK, and it is unclear to what extent the findings are generalisable. However, there is no specific reason to think that the social barriers identified are not applicable to the UK.

Evidence statement 8: Perceived barriers - practical barriers

ES 8.1 Ten study reports described the inconvenience of sun protection resources as barriers to their use (Abroms et al. 2003 [+]; CRUK n.d.c (*Outdoor workers*) [-]; Curtis and Pollock 2009 [-]; Geller et al. 2008 [++]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]; Parrott et al. 1996 [+]; Paul et al. 2008 [++]; Reeder et al. 2000 [+]). The particular issues which contribute to the perception of inconvenience are: the need to carry and remember sun protection resources (three studies: Abroms et al. 2003 [+]; Gillespie et al. 1993 [-]; Paul et al. 2008 [++]); the 'messiness' of sunscreen (six studies: Abroms et al. 2003 [+]; CRUK n.d.c (*Outdoor workers*) [-]; Curtis and Pollock 2009 [-]; Gerbert et al. 1996 [++]; Parrott et al. 1996 [+]; Reeder et al. 2000 [+]); the awkwardness of hats and sunglasses which may fall off or interfere with activities (three studies: Glanz et al. 1999 [++]; Parrott et al. 1996 [+]; Paul et al. 2008 [++]); and the inconvenience of making use of shade structures by children and young people (one study: Gillespie et al. 1993 [-]).

ES 8.2 Four study reports describe physical discomfort as a barrier to the use of protective clothing (Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]; Parrott et al. 1996 [+]; Paul et al. 2008 [++]).

ES 8.3 One study finds that school staff see a number of practical barriers to encouraging children to use sunscreen before outdoor activities, including monitoring application, touching children to help with application, students sharing sunscreen, and parental permission (Geller et al. 2008 [++]).

ES 8.4 Six study reports said that the cost of sun protection resources was a barrier to their use (Abroms et al. 1999 [+]; Collins et al. 2006 [-]; Geller et al. 2008 [++]; Glanz et al. 1999 [++]; Paul et al. 2008 [++]; Reeder et al. 2000 [+]). This primarily concerned sunscreen purchased by individuals, with one study mentioning the cost of hats as a barrier to implementing compulsory hat policies in low-SES schools (Collins et al. 2006 [-]), and one the cost of installing shade structures in schools (Geller et al. 2008 [++]). However, one study that focused on farmers in the USA said that cost was not a barrier (Parrott et al. 1996 [+]).

ES 8.5 Other practical barriers to sun protection are: children being uncooperative with the application of sunscreen (two studies: Glanz et al. 1999 [++]; Reeder et al. 2000 [+]); the perceived ineffectiveness of sunscreen in stopping burning (one study: Abroms et al. 2003 [+]);

and the perception of adverse health consequences of sunscreen use such as acne (two studies: Abroms et al. 2003 [+]; Lupton and Gaffney 1996 [++]), allergic reactions (one study: Geller et al. 2008 [++]), and potential long-term toxicity (two studies: Gerbert et al. 1996 [++]; Reeder et al. 2000 [+]).

Applicability
Most studies in this section were carried out outside the UK, and it is unclear to what extent the findings are generalisable. However, there is no specific reason to think that the social barriers identified are not applicable to the UK.

Evidence statement 9: Perceived barriers - institutional barriers

ES 9.1One study reports potential institutional barriers to sun protection in schools, including: the cost of implementing new policies for schools; time constraints on school staff; the difficulty of changing outdoor structures to provide shade; concerns about liability; and the need for staff training (Geller et al. 2008 [++]).

ES 9.2 Two studies find that some school staff felt that sun protection was not a high-priority issue, because of the limited time children spent outdoors (Geller et al. 2008 [++]; Collins et al. 2006 [-]). Participants in one study felt that sun protection detracted from teaching (Collins et al. 2006 [-]) and in one other study, school staff said they felt overwhelmed with policies and initiatives on a wide range of issues (Geller et al. 2008 [++]).

ES 9.3 Effective communication with parents was identified as a potential barrier in one study (Geller et al. 2008 [++]). The cost to parents was also mentioned as a concern relating to compulsory hat regulations in one study (Collins et al. 2006 [-]).

Applicability
The two studies (Collins et al. 2006 [-]; Geller et al. 2008 [++]) described in this section were conducted in New Zealand and the USA respectively. Due to differences in school governance and funding systems between countries, the findings may not be readily applicable to the UK.

Evidence statement 10: Cues to action - sources of positive influence

ES 10.1 Six studies, most in school settings, find that children aged 6-8 years (Glanz et al. 1999 [++]), young people aged 12-17 years (Paul et al. 2008 [++]; Shoveller et al. 2003 [++]; Young et al. 2005 [++]; Gillespie et al. 1993 [-]), and young adults aged 18-25 years (Abroms et al. 2003 [+]) identified parents, especially mothers, as important sources of positive encouragement and practical support for adopting sun protective behaviours. One further study of older women aged 75 to 90 years found that as children, they had also been positively influenced by parents (Clarke and Korotchenko 2009 [+]). Other adults, such as teachers and lifeguards, were identified as sources of positive encouragement for children aged 6-8 years (Glanz et al. 1999 [++]) and young people aged 8-17 years (Gillespie et al. 1993 [-]; Paul et al. 2008 [++]) to adopt sun protective behaviours.

ES 10.2 Seven study reports find differences between children (approximately 8-13 years) and older young people (approximately 14-17 years) in sources of positive encouragement to use various forms of sun protection. One study found that parents or carers apply sunscreen more often to younger children, while older children are more likely to apply it themselves (Glanz et al. 1999 [++]). Five studies find that younger children are more likely to listen to parents', or other adults such as teachers' advice to use sun protection such as sunscreen or clothing, because of their role as authority figures, while older young people are more likely to be influenced by their peers (CRUK n.d.a (*Sunburn*) [-]; Gillespie et al. 1993 [-]; Lupton and Gaffney 1996 [++]; Shoveller et al. 2003 [++]; Young et al. 2005 [++]). Young people in these studies described the shift towards peer influence as part of a process of asserting their independence from authority. However, the remaining one study found that older young people (aged 16-17 years) felt themselves to be more receptive to health messages than younger children (Paul et al. 2008 [++]).

ES 10.3 One US study which interviewed recreation staff finds that they felt that they had not been an effective source of encouragement to encourage positive sun protective behaviour such as wearing clothes or applying sunscreen (Glanz et al. 1999 [++]. Another study of farmers in the USA notes that doctors rarely acted as a source of encouragement for positive sun protection behaviour (Parrott et al. 1996 [+]).

Applicability

Most of the studies in this section were not conducted in the UK. However, findings regarding sources of influence appear to be consistent across countries, and there are no specific reasons to think that these findings may not be generalisable to the UK context.

Evidence statement 11: Cues to action - knowing people that have had skin cancer
ES 11.1 Adults and young people in five study reports stated that knowing someone with skin cancer may act as a cue to adopt sun protection behaviours in general (Calder and Aitken 2008 [++]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Hay et al. 2009 [++]; Paul et al. 2008 [++]). *Applicability* None of the studies in this section were conducted in the UK. It is unclear to what extent the findings may be generalisable to the UK context.

Evidence statement 12: Cues to action - policies in schools and leisure facilities
ES 12.1 Two studies from New Zealand and the US find that primary school staff were willing to implement school-wide sun protection policies such as: physical shade structures or trees; 'no hat, no play' or 'no hat, play in the shade' rules; provision of free sunscreen; or rescheduling outdoor activities. Obtaining funding for such policies, especially environmental change, was a barrier in some cases (Collins et al. 2006 [-]; Geller et al. 2008 [++]). One further Australian study notes that policies such as 'no hat, no play' are common in Australian primary schools, but are rare in secondary schools (Paul et al. 2008 [++]).

ES 12.2 One study reports that the scheduling of outdoor school activities such as lunch breaks and sports events, typically at hotter times of day, is outside the control of students (Gillespie et al. 1993 [-]).

ES 12.3 One study, a process evaluation of a sun protection intervention ('Pool Cool') at outdoor pools, finds that signs, sunscreen pumps and shade structures were viewed positively and frequently used by pool-goers (Escoffery et al. 2008 [++])

ES 12.4 In one study, recreation staff indicated that few sun protection policies had been implemented, and were conscious that staff often did not model good sun practice, but were generally willing to implement sun protection policies (Glanz et al. 1999 [++]).

ES 12.4 Participants in one study suggested the use of venues such as community centres to diffuse sun protection messages beyond schools to facilitate better sun protection practices. Potential barriers to positive outcomes at community venues included low attendance and perceived low priority of skin cancer as a health subject. (Geller et al. 2008 [++]).

Applicability
None of the studies included in this section were from the UK. Since policies and forms of governance in schools and other institutions may vary between countries, the findings may not be readily applicable to the UK context.

Evidence statement 13: Cues to action - media messages
ES 13.1 Three study reports , of young adults (18 to 25 years) and adults discuss the influence of the media on individuals' behaviour (Abroms et al. 2003 [+]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]). All of these studies show the belief that representations in the media may have an adverse effect on sun protection behaviours. *Applicability* None of the studies in this section are from the UK. However, it is likely that media messages are similar across countries.

Evidence statement 14: Cues to action - specific triggers of sun protection behaviour
ES 14.1 Three study reports, from the USA and Australia, show people of all age ranges to be more likely to use sun protection in general in summer and in sunny weather (Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]). ES 14.2 Two study reports from the UK, one of male outdoor workers (aged 20-50 years) and the other of young women (aged 12-15 years), report the belief that sun protection measures are not required in the UK due to the lack of hot, sunny weather (CRUK n.d.c (*Outdoor workers*) [-]; Curtis and Pollock 2009 [-]).

ES 14.3 Two study reports describe adults (aged 16-54 years) putting on a T-shirt or applying sunscreen only after beginning to burn (Bergenmar and Brandberg 2001 [++]; Grey 2008 [-]).

Applicability
Studies from the UK indicate a particular perception that the weather in the UK does not call for sun protection. Other findings from non-UK studies are also likely to be applicable to the UK context.

Evidence statement 15: barriers and facilitators – resource provision

ES 15.1 Five studies identify factors which could be addressed by resource provision interventions such as making available sunscreen or protective clothing. These factors include the cost of sunscreen (Abroms et al. 2003 [+]; Glanz et al. 1999 [++]; Paul et al. 2008 [++]; Reeder et al. 2000 [+]), and the inconvenience of remembering to carry sunscreen (Abroms et al. 2003 [+]; Gillespie et al. 1993 [-]) or protective clothing (Paul et al. 2008 [++]). These barriers appear to be particularly relevant for children and young people (aged 8 to 25 years).

ES 15.2 Two studies present process data on multi-component interventions with a resource provision component, including sunscreen and clothing provision as well as environmental change and information (Collins et al. 2006 [-]; Escoffery et al. 2008 [++]). Both these studies find that resource provision is feasible and acceptable for service providers in these settings, and that there is substantial uptake of resource provision. Potential barriers include the fact that not all staff who are involved in delivering interventions see sun protection as a high priority (Collins et al. 2006 [-]).

ES 15.3 Two studies investigate service providers' views towards potential resource provision interventions, finding that school staff (Geller et al. 2008 [++]) and leisure staff (Glanz et al. 1999 [++]) are positive about the potential to implement sun protection interventions. However, they have concerns relating to practical requirements such as time and funding, and are not always confident that their own roles and responsibilities will be clearly defined.

ES 15.4 A wide range of other barriers are identified in the studies. These include physical discomfort (Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]; Parrott et al. 1996 [+]; Paul et al. 2008 [++]), inconvenience of use (Abroms et al. 2003 [+]; CRUK n.d.c (*Outdoor workers*) [-]; Curtis and Pollock 2009 [-]; Geller et al. 2008 [++]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]; Parrott et al. 1996 [+]; Paul et al. 2008 [++]; Reeder et al. 2000 [+]) and social barriers including appearance and prevailing norms (Abroms et al. 2003 [+]; Calder and Aitken 2008 [++]; Gillespie et al. 2003 [-]; Glanz et al. 1999 [++]; Lupton and Gaffney 1996 [++]; Parrott et al. 1996 [+]; Paul et al. 2008 [++]; Shoveller et al. 2003 [++]). Not all resources are acceptable to all targeted populations.

Applicability
Most of the studies cited here were not conducted in the UK. It is possible that barriers to the implementation and uptake of interventions will be greater in the UK than elsewhere, due to service providers and targeted populations having less awareness of sun protection.

Evidence statement 16: barriers and facilitators – environmental change
ES 16.1 One study looks at multi-component interventions in schools including the provision of environmental shade, finding that such interventions are practicable and acceptable (Collins et al. 2006 [-]). These interventions formed part of broader programmes which also included resource provision, regulatory and scheduling changes, and education. ES 16.2 One study finds that using environmental shade may reduce the spontaneity of outdoor activities, especially for younger children (Gillespie et al. 1993 [-]). One study finds that school authorities see the cost of providing environmental shade as a barrier (Geller et al. 2008 [++]). *Applicability* None of the studies cited here were conducted in the UK. It is unclear to what extent findings relating to environmental change may be applicable to the UK context.

Evidence statement 17: barriers and facilitators – multi-component interventions
ES 17.1 Five studies find that people do not think skin cancer is a serious risk, and that awareness of the risks of sun exposure is generally low (CRUK n.d.b (*SunSmart*) [-]; Curtis and Pollock 2009 [-]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]); this perception could be addressed by multi-component interventions. ES 17.2 Seven studies identify appearance (the risk of skin aging, moles, wrinkles, or visible sunburn) as a potential motivation for sun protection behaviour (Abroms et al. 2003 [+]; Clarke and Korotchenko 2009 [+]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Lupton and Gaffney 1996 [++]; Murray and Turner 2004 [+]; Paul et al. 2008 [++]). This motivation could be addressed by sun protection messages as part of multi-component interventions. ES 17.3 Three studies find that incidental tanning is perceived to be less risky than deliberate tanning (Bergenmar and Brandberg 2001 [++]; Lupton and Gaffney 1996 [++]; Shoveller et al. 2003 [++]).Six studies find that sun exposure, or a tanned appearance, are associated with a healthy, active lifestyle (Bergenmar and Brandberg 2001 [++]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Calder and Aitken 2008 [++]; Lupton and Gaffney 1996 [++]; Shoveller et al. 2003 [++]). These perceptions may have implications for the design of interventions. *Applicability* Most of the studies cited here were not conducted in the UK. It is possible that barriers to the implementation and uptake of interventions will be greater in the UK than elsewhere, due to service providers and targeted populations having less experience of sun protection interventions, and less awareness of sun protection.

Evidence statement 18: views of people who may use prevention services
ES 18.1 Five studies find that people do not think skin cancer is a serious risk (CRUK n.d.b

(*SunSmart*) [-]; Curtis and Pollock 2009 [-]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]). Twelve studies find that a tanned appearance is considered attractive (Calder and Aitken 2008 [++]; Clarke and Korotchenko 2009 [+]; Curtis and Pollock 2009 [-]; Lupton and Gaffney 1996 [++]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Grey 1998 [-]; Murray and Turner 2004 [+]; Paul et al. 2008 [++]; Reeder et al. 2000 [+]; Shoveller et al. 2003 [++]; Young et al. 2005 [++]).

ES 18.2 Three studies find that incidental tanning is perceived as less risky than deliberate tanning (Bergenmar and Brandberg 2001 [++]; Lupton and Gaffney 1996 [++]; Shoveller et al. 2003 [++]). The use of protection is associated with deliberate tanning, such as at the beach, in three further studies (Abroms et al. 2003 [+]; Glanz et al. 1999 [++]; Parrott et al. 1996 [+]). This suggests that sun protection is seen as less salient where sun exposure is incidental and not deliberate. Two studies indicate that this may be particularly true for men (Abroms et al. 2003 [+]; Lupton and Gaffney 1996 [++]).

Applicability
Most of the studies cited here were not conducted in the UK. However, the findings appear to be consistent across countries.

Evidence statement 19: views of service providers
ES 19.1 Three studies find that service providers, including school staff (Collins et al. 2006 [-]; Geller et al. 2008 [++]) and leisure staff (Glanz et al. 1999 [++]), have positive attitudes towards resource provision and environmental change interventions. However, two studies report concerns about the potential extension to their responsibilities (Geller et al. 2008 [++]; Glanz et al. 1999 [++]), and one study raises the prospect of an overload of policies and recommendations (Geller et al. 2008 [++]). *Applicability* None of the studies cited here were conducted in the UK. There may be differences between countries in the organisational context of service delivery, which may create barriers to the applicability of these findings to the UK context.

Evidence statement 20: Differences by population - gender
ES 20.1 Two studies find that men were found to be less likely than women to deliberately sunbathe, but also less likely to use sun protection (Abroms et al. 2003 [+]; CRUK n.d.a (*Sunburn*) [-]). Three studies report the perception that sunbathing (Lupton and Gaffney 1996 [++]) or sunbed use (Calder and Aitken 2008 [++]; CRUK n.d.c (*Outdoor workers*) [-]) are unmasculine. ES 20.2 Three studies find that women, especially mothers, tend to take the lead role in promoting sun protection behaviours within the family (Abroms et al. 2003 [+]; Hay et al. 2009 [++]; Paul et al. 2008 [++]).

ES 20.2 Four studies find that women were more concerned than men about how the sun affects their appearance, both negatively (skin aging and wrinkles) and positively (tanned appearance) (Abroms et al. 2003 [+]; Lupton and Gaffney 1996 [++]; Murray and Turner 2004 [+]; Paul et al. 2008 [++]).

Applicability
Most of the studies cited in this section were not conducted in the UK. However, the findings appear to be consistent across countries.

Evidence statement 21: Differences by population – age

ES 21.1 Seven studies find that young children are more likely to be influenced by parents, particularly mothers and school staff (Abroms et al. 2003 [+]; Clarke and Korotchenko 2009 [+]; Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]; Paul et al. 2008 [++]; Shoveller et al. 2003 [++]; Young et al. 2005 [++]).

ES 21.2 Four studies find that adolescents are less likely to be influenced by authority figures and adults and may assert their independence by not following sun protection messages (CRUK n.d.a (*Sunburn*) [-]; Lupton and Gaffney 1996 [++]; Shoveller et al. 2003 [++]; Young et al. 2005 [++]). One study finds that adolescents see sun protection as primarily concerning younger children (Paul et al. 2008 [++]).

ES 21.3 Four studies find that parents of young children are more receptive than the general population to sun protection messages (CRUK n.d.a (*Sunburn*) [-]; CRUK n.d.c (*Outdoor workers*) [-]; Glanz et al. 1999 [++]; Reeder et al. 2000 [+]). However, three studies find that parental concern relating to young children's sun exposure does not necessarily translate into concern about their own sun exposure, or to that of older children (CRUK n.d.c (*Outdoor workers*) [-]; Grey 2008 [-]; Paul et al. 2008 [++]).

Applicability
Most of the studies cited in this section were not conducted in the UK. However, the findings appear to be consistent across countries.

Evidence statement 22: Differences by population – socioeconomic status and occupation

ES 22.1 One UK study finds that people from higher-SES groups were more aware of long-term health risks from sun exposure than those from lower-SES groups (CRUK n.d.a (*Sunburn*) [-]).

ES 22.2 Two studies focus on the views of outdoor workers (CRUK n.d.c (*Outdoor workers*) [-]; Parrott et al. 1996 [+]). Both these studies find that outdoor workers do not feel that sun protection is a priority, and that they have little awareness of the risks of sun exposure.

Applicability
Two of the three studies in this section come from the UK, and the findings of the other (from the USA) are consistent with the UK research. Hence, findings are applicable to the UK context.

1.4 Discussion

1.4.1 Evidence gaps

A number of gaps were found in the available qualitative evidence, including:

- a lack of data of direct relevance to interventions;
- a limited number of studies, particularly high-quality studies, conducted in the UK;
- a lack of data on the determinants of different sun protection behaviours; and
- limited data on the differences between ethnic or socioeconomic groups.

1.4.2 Conclusions

Resource provision, environmental change and multi-component interventions to prevent skin cancer may benefit from taking the public's and other stakeholders' views into account. The findings of this review suggest a number of barriers which could usefully be addressed by interventions, including the cost and inconvenience of sun protection resources, and social norms concerning their use.

However, especially in the UK, most people are not concerned about skin cancer, and often do not see their own UV exposure as risky. There are some exceptions, particularly parents of young children, who appear to be more receptive to sun protection interventions than other groups. Concerns about appearance and visible skin damage may be as important a facilitator for sun protection as the risk of cancer. Men are consistently less concerned than women about sun exposure risk, and less aware of the need for protection. Some data indicate that people from lower-SES groups, and people who work outdoors, are less concerned than others. These perceptions may create a barrier to the uptake and successful implementation of sun protection interventions.

In addition, the perception of a tanned appearance as attractive and healthy is strongly held across a wide range of populations. Other potential barriers to intervention uptake include concerns about the practicality of sun protection, and the ease of use of sun protection resources. Social norms about sun protection and sun exposure, and concerns about maintaining an attractive or fashionable appearance, are also salient, particularly for young people and young adults (teens to early twenties).

These findings indicate that uptake of interventions may face a range of barriers in particular populations and settings. In particular, the acceptability of resource provision interventions may depend on the specific characteristics of the resources offered. For example, protective clothing which is seen to be unattractive may be rejected. Careful targeting of interventions to particular settings and populations may be required to overcome these barriers. Nonetheless, to the extent that they are aware of the risks, many people appear to be willing to make changes in behaviour, and are supportive of sun protection interventions.

In institutions such as schools, potential barriers include a lack of funding, unclear definitions of responsibility, and an overload of policies and recommendations. Again, however, potential service providers, such as teachers and other school staff, and staff at leisure facilities, are generally optimistic about their own role in promoting sun protection behaviour.

While the risks involved in deliberate tanning, particularly sunbed use, are widely recognised, there is less awareness of the dangers of incidental sun exposure. Outdoor activities, particularly physical activities, are seen as healthy, and the risks involved in sun exposure during such activities are often not considered. The perception of a tanned appearance as healthy and attractive also appears to owe something to the connotation of an active lifestyle. These views may have implications for the design and targeting of interventions.

The data included in this review indicate that there is substantial scope for resource provision and multi-component interventions to impact on sun protection behaviour. The picture regarding environmental change alone is less clear, although there are some promising indications that such interventions may be valuable, particularly as part of holistic strategies in particular contexts.

2.0 Aims and background

2.1 Objectives and rationale

This review is intended to inform the development of NICE guidance on public information, sun protection resources and changes to the environment for the prevention of skin cancer. A series of evidence reviews and reports are being produced in two phases to inform the development of this guidance. This review forms one component of phase 2 of the research for this guidance (phase 2 also includes a review of effectiveness and cost-effectiveness of interventions, and economic modelling). Phase 1 investigated the provision of public information and education, while phase 2 focuses on resource provision, environmental change and multi-component interventions.

This report systematically reviews and synthesises relevant qualitative research to inform this topic.

2.2 Research questions

The primary research question for the review was:

- What factors help or hinder the provision or use of the following to prevent the first occurrence of skin cancer attributable to UV exposure?
  - sun protection resources;
  - physical changes to the natural or built environment (such as shelters and other areas of shade in public spaces or school grounds); and
  - multi-component interventions.

The following secondary research questions were also developed to interrogate the data further, to the extent that relevant data were available:

- What are the views of people who may use prevention services?
- What are the views of service providers?
- How do these views differ by population characteristics (e.g. age, ethnicity)?
- What environmental, social or cultural factors may prevent or support the uptake or effective use of sun protection resources or use of physical environmental changes made to help prevent skin cancer? (For example, these factors might include people's perceptions of the risks and benefits of UV exposure, including knowledge that exposure to the sun is a source of vitamin D.)
- To what extent are such interventions available and accessible to different groups in the population?

3.0 Methods

The review was conducted in accordance with the second edition of *Methods for the development of NICE public health guidance* (NICE 2009).

3.1 Searching

The following database sources were searched for this review:

- ASSIA
- Campbell Collaboration Library of Systematic Reviews
- Centre for Reviews and Dissemination databases (including DARE and HTA)
- CINAHL
- Cochrane Library (including CENTRAL)
- Embase
- ERIC
- HMIC
- Medline
- PsycInfo
- Social Policy and Practice

The full search strategies for each database source can be found in Appendix A.

The following websites were also searched:

- BiblioMap (EPPI-Centre)
- Cancer Council New South Wales
- Cancer Council Victoria
- Cancer Research (including Sun Smart Micro site)
- Health and Safety Executive
- Health Protection Agency
- Intute
- Macmillan Skin Cancer Micro site (including former Cancer Backup resources)
- Melanoma Foundation
- Melanoma International Foundation
- National Cancer Institute
- NHS Evidence
- NICE
- Public Health Observatories (including skin cancer hub)
- Skin Cancer Foundation
- Sun Smart (Australia)
- TRIP

In addition, the team who conducted the review of effectiveness and cost-effectiveness evidence for phase 2 of the guidance supplied a list of potentially relevant records from their searches.

To supplement the database and website searches the following were also undertaken to identify additional potential relevant records:

- scanning of citation lists of included studies obtained through database searching;
- 'forward' citation chasing on these studies using ISI Web of Knowledge, locating studies which cited them (citations were not chased from studies found through citation chasing, nor from those identified by the effectiveness review team);
- scanning lists of included studies from all systematic reviews which met the inclusion criteria at the full text screening stage.

These records were entered into the database and screened as for the original searches.

3.2 Screening

All records from the searches were uploaded into a database and duplicate records were removed. Initially the records were screened on title and abstract. Where no abstract was available, a web search was first undertaken to locate one; if no abstract could be found, records were screened on title alone. All records were screened by two reviewers independently using the abstract inclusion checklist in Appendix B and any differences resolved by discussion and reference to a third reviewer if necessary. Agreement before reconciliation for the abstract screening was 95.9% and inter-rater reliability (Cohen's kappa) was κ=0.472.[1]

The full text of records whose abstracts met the inclusion criteria, or for which it was unclear whether they met the criteria, were retrieved. The full text papers were then re-screened by two reviewers independently using the full text inclusion checklist in Appendix B and any differences resolved by discussion and reference to a third reviewer if necessary. Agreement before reconciliation for the full text screening was 89.5% and inter-rater reliability (Cohen's kappa) was κ=0.757.

In summary, the inclusion criteria were:

- Does the study address the primary prevention of skin cancer due to UV exposure, or views relating to skin cancer, sunbathing or tanning?
- Does the study present qualitative research (e.g. surveys (with open-ended questions), interviews, case studies, observational studies (participant observation) or ethnographic or action research)?
- Was the study published in 1990 or later?
- Is the study published in English?

[1] It has been argued that Cohen's kappa or similar measures may under-rate reliability where scores are highly asymmetrical, i.e. numbers for one code (e.g. exclude) are much higher than for the other(s) (e.g. include) (Feinstein and Cicchetti 1990). This is the case here, because inclusion rates were fairly low, and hence there were many more studies excluded than included. For this reason, the kappa score is lower than standard guidance would indicate is acceptable, even though rates of agreement were high.

- Does the study present (i) views relating to environmental change; (ii) views relating to resource provision; (iii) views relating to multi-method interventions including combination of (i) and (ii); (iv) a combination of either (i) or (ii) or both of these with provision of information; (v) views on the potential barriers or facilitators relating to skin cancer prevention activities?
- Was the study conducted in a country which is a current member of the OECD?

3.3 Quality assessment

All included studies were quality-assessed using the tool in Appendix H of the *Methods for the development of NICE public health guidance* (NICE 2009). This tool contains 12 questions which can be answered 'yes', 'no', or 'can't tell / not reported'. On the basis of the answers to these questions, each study was given an overall quality rating: (++), high quality; (+), medium quality; or (-), low quality. Linked studies (studies reporting data from the same research project) were quality-assessed separately. The tool was completed independently by two reviewers for a randomly selected sample of 10% of records (N=3). For the other records, the tool was completed by one reviewer and checked by another, with any disagreements resolved by discussion. The results of quality assessment are presented in section 4.3 below; an example completed quality assessment form is presented in Appendix C

3.4 Data extraction

Data were extracted from included studies using the tool for qualitative studies in Appendix K of the *Methods for the development of NICE public health guidance* (NICE 2009). The tool was completed independently by two reviewers for a randomly selected sample of 10% of records (N=3). For the other records, the tool was completed by one reviewer and checked by another, with any disagreements resolved by discussion. Data for each included study were extracted and are presented in the evidence tables (Appendix D). Linked studies (studies reporting data from the same research project) were quality-assessed separately where the data presented was substantively different in the two studies.

For those studies which were also included in the phase 1 qualitative evidence review, the completed data extraction forms from the phase 1 review were used as the basis of data extraction for this review; however, in some cases, further data were extracted and added to the evidence tables. (The quality assessment conducted on these studies was entirely new for this review, since the authors of the phase 1 review used a different tool for quality assessment.)

3.5 Data synthesis and presentation

A framework based on the Health Belief Model was used to synthesise the data, in line with the approach adopted for the phase 1 qualitative review. In addition, two extra themes were added to the model in order to allow the synthesis to address the primary and secondary research questions more directly. These were, first, barriers and facilitators to the implementation of interventions, and second, differences in views between subgroups of the population.

The findings data which had been extracted from the studies were read, and coded according to the thematic headings of the model, by two reviewers. The data extracted from the phase 1 studies were included in this process, and it did not rely on the analysis of these studies presented in the phase 1 review report. Hence, the thematic analysis of the phase 1 studies included in this review is unique and may have identified different themes from those presented in the phase 1 review.

Within the headings, subheadings were developed inductively where appropriate. The findings under each code were then drawn together in a narrative synthesising the study findings. For each theme, this report presents first an overview of relevant studies, then a detailed narrative covering the studies, followed by a summary in the form of an evidence statement.

4.0 Summary of included studies

4.1 Flow of literature through the review

Database searches located 2998 records. A further 80 records were located by forward citation chasing. A further 26 records were supplied by the team conducting the review of effectiveness and cost-effectiveness. Thus, 3104 abstracts were entered into the database. Of these, 1118 were duplicate records and were removed from the database. Thus, 1986 abstracts were screened for inclusion.

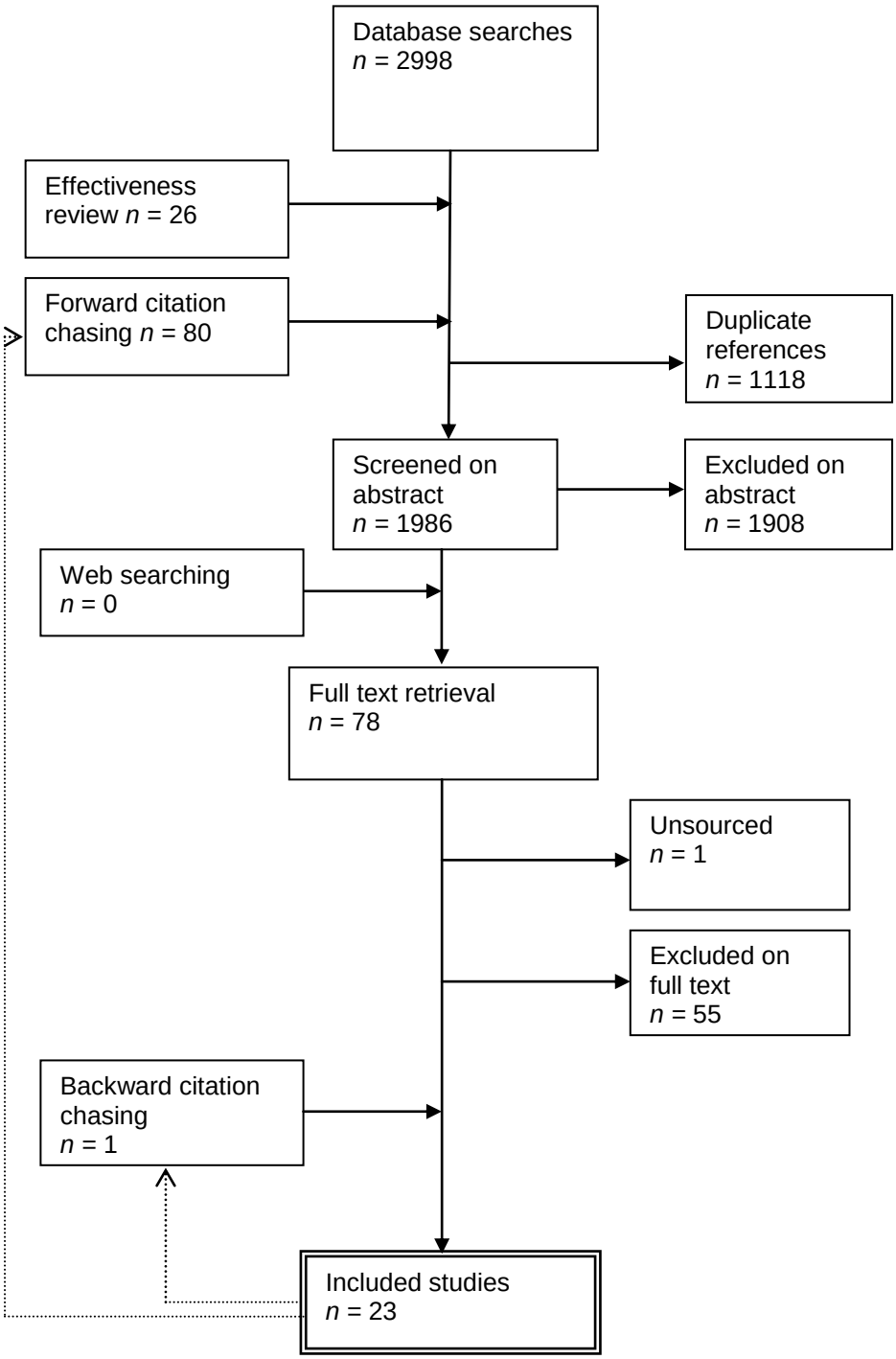
A total of 1908 references were excluded following screening of titles and abstracts. The remaining 78 references proceeded to full text retrieval. One reference was added from backward citation chasing. No references were located through website searching. Fifty-five records were excluded on full text (details of these are presented in Appendix E). Of these, one (2%) was excluded because it was a review of research, 41 (75%) because they did not present qualitative research, and 13 (24%) because they were not relevant to resource provision, environmental change or multi-component interventions. The full text of one record could not be located. The remaining 22 studies (reported in 23 papers) were included in the review (see section 7.1 below for the reference details of all included studies). The flow of literature through the review is illustrated in Figure 1.

Two study reports (Shoveller et al. 2003; Young et al. 2005) presented data from the same study. Hence, the 23 papers in the review represent a total of 22 studies.

4.1.1 Overlap with phase 1 review

Of the 23 papers included in our review, nine (Geller et al. 2008; Gerbert et al. 1996; Gillespie et al. 1993; Glanz et al. 1999; Lupton and Gaffney 1996; Murray and Turner 2004; Reeder et al. 2000; Shoveller et al. 2003; Young et al. 2005) were also included in the phase 1 review. As noted above, the data extraction for these studies was based on that carried out for the phase 1 review, but the thematic analysis was carried out without reference to that undertaken for phase 1. The relation of our review to phase 1 is discussed further in section 6.2.1 below.

Figure 1. Flow of literature through the review



4.2 Summary of included studies

The 23 included papers report studies conducted in the following countries:

- six in the UK (CRUK n.d.a; CRUK n.d.b; CRUK n.d.c; Curtis and Pollock 2009; Grey 2008; Murray and Turner 2004);
- seven in the USA (Abroms et al. 2003; Escoffery et al. 2008; Geller et al. 2008; Gerbert et al. 1996; Glanz et al. 1999; Hay et al. 2009; Parrott et al. 1996);
- three in Australia (Gillespie et al. 1993; Lupton and Gaffney 1996; Paul et al. 2008);
- three in Canada (Clarke and Korotchenko 2009; Shoveller et al. 2003; Young et al. 2005);
- three in New Zealand (Calder and Aitken 2008; Collins et al. 2006; Reeder et al. 2000); and
- one in Sweden (Bergenmar and Brandberg 2001).

All studies used some form of interview or focus group methodology to collect qualitative data. Five studies combined qualitative methods with quantitative methods such as closed-question surveys; only qualitative data was extracted from these studies (Bergenmar and Brandberg 2001; Escoffery et al. 2008; Glanz et al. 1999; Hay et al. 2005; Parrott et al. 1996).

Only one study was specifically intended as a process evaluation of an intervention; this study presented limited qualitative data (Escoffery et al. 2008). A further two studies elicited views on interventions as part of a broader investigation into attitudes (Collins et al. 2006; Lupton and Gaffney 1996). Five studies were undertaken as formative research to inform the development of interventions, but did not present evaluation or process data (CRUK n.d.b; Gillespie et al. 1993; Glanz et al. 1999; Grey 2008; Parrott et al. 1996).

The majority of studies sampled from the general population. One study investigated the families of people diagnosed with malignant melanoma (Hay et al. 2009), and one sampled people known to be at elevated clinical risk for skin cancer (Bergenmar and Brandberg 2001).

Study population characteristics consisted of the following:

- nine had a focus on children and young people (under 18 years: CRUK n.d.a; CRUK n.d.b; Curtis and Pollock 2009; Gillespie et al. 1993; Glanz et al. 1999; Lupton and Gaffney 1996; Paul et al. 2008; Shoveller et al. 2003; Young et al. 2005);
- six on young adults (18-30 years: Abroms et al. 2003; Bergenmar and Brandberg 2001; Calder and Aitken 2008; CRUK n.d.a; CRUK n.d.b; Murray and Turner 2004);
- one on older people (over 70 years: Clarke and Korotchenko 2009);
- four on parents of children or young people (Glanz et al. 1999; Reeder et al. 2000; Shoveller et al. 2003; Young et al. 2005);
- two on school staff (Collins et al. 2006; Geller et al. 2008);
- two on staff in leisure facilities (Escoffery et al. 2008; Glanz et al. 1999);
- two on women (Clarke and Korotchenko 2009; Curtis and Pollock 2009); and
- one on men (CRUK n.d.c).

The details of the methodology and populations of the included studies are summarised in Table 1. Full study details are presented in the evidence tables (Appendix D).

Table 1. Study characteristics

	Aim	Method and population	Location	Programme
Abroms et al. 2003	To understand the behavioural and normative beliefs underlying sunscreen use, and differences between men and women in these beliefs	Focus groups with men and women; ages 18-25 years; light (63%) to medium skin-tone (37%)	Baltimore, Maryland; Orlando, Florida; and Denver, Colorado, USA	None
Bergenmar and Brandberg 2001	To investigate perceptions of sun related behaviour, attitudes toward sunbathing and sun protection (among young people with hereditary risk of malignant melanoma)	Interviews with non-melanoma patients from pigmented lesion clinic; ages 18-30 years; ethnicity not stated (NS)	Stockholm-Gotland, Sweden	None
Calder and Aitken 2008	To understand the influences on UV risk behaviours and barriers to adopting protective behaviours	Focus groups; ages 18-20 years; ethnicity NS	New Zealand	None
Clarke and Korotchenko 2009	To examine older women's experiences and perceptions of sunbathing, sun avoidance, and suntanned appearances	Semi-structured interviews; female; ages 70-95; mostly fair-skinned persons	Western Canada	None
Collins et al. 2006	To assess how primary schools respond to public health messages regarding sun protection	Interviews with principals, associate principals and teachers from schools in low- and high-socioeconomic-status (SES) areas; ages NS; ethnicity NS	Auckland, New Zealand	School-based programmes (evaluation)

Key: NS=Not Stated

	Aim	Method and population	Location	Programme
Cancer Research UK n.d.a (*Sunburn*)	To assess the knowledge, attitudes and understanding of sunburn among adults and young people. The study addresses the following: the experience of sunburn and language used to describe burn; understanding of sunburn beliefs; health risks of sunburn; messages around sunburn	Focus groups; adults ages 19-30 years, young people ages 13-18 years; most have fair skin	Leeds, Manchester, Bristol, North London, Sunbury, UK	None
Cancer Research UK n.d.b (*SunSmart*)	To identify motivations for seeking a tan and using sunbeds; factors that will deter young people from using sunbeds; factors that encourage them to stay safe in the sun	Focus groups (with ages 12-24 years) and in-depth interviews (with ages 18 years and younger); ethnicity NS	UK	SunSmart campaign (formative)
Cancer Research UK n.d.c (*Outdoor workers*)	To conduct qualitative research among men, with a focus on outdoor workers, to investigate their attitudes towards the sun, sun protection and skin cancer	Focus groups, online interviews, in-depth interviews; male; ages 20-50 years; ethnicity NS	UK	None
Curtis and Pollock 2009	To explore influences on the sun exposure behaviours of girls in the UK, aged 12–15 years, and reflect on the role of the school nurse in relation to the study findings.	Focus groups; females ages 12-15 years; ethnicity NS	Nottinghamshire, UK	None

Key: NS=Not Stated

	Aim	Method and population	Location	Programme
Escoffery et al. 2008	To carry out a process evaluation of the Pool Cool Diffusion Trial	Site visits; observations; interviews of leisure facility staff and patrons; ages NS; ethnicity NS	USA	Pool Cool Diffusion (evaluation)
Geller et al. 2008	To understand the factors that may influence sun protection policy development in elementary schools that would be required if the CDC guidelines were to be implemented	Interviews with elementary school superintendents, principals, teachers, school nurses, parent-teacher organisation presidents and chairs; 94% of students in school districts were White	Massachusetts, USA	None
Gerbert et al. 1996	To assess people's attitudes and beliefs about skin cancer	Focus group; ages early 20s to mid-60s; people of 'Caucasian' family origin	California, USA	None
Gillespie et al. 1993	To describe the first phase of a larger project designed to develop and evaluate a school based sun protection initiative	Focus group with students in primary and secondary schools; ages 8-16 years; ethnicity NS	Australia	School based program (formative)

Key: NS=Not Stated

	Aim	Method and population	Location	Programme
Glanz et al. 1999	To learn what children know and think about skin cancer and sun protection, to inform development of a health promotion (HP) campaign; to get ideas from them about the appeal and feasibility of various materials and strategies.	Focus group and interviews with children, parents and recreation staff; children age 6-8 years; family origin: 1/3 'Caucasian', 1/3 fair skinned Asian/ mixed, 1/5 dark skinned Asian/ Filipino/ Native Hawaiian. Parents' family origin: 'Caucasian' (27%), Filipino (40%), Japanese (13%), Native Hawaiian/ mixed (20%). Recreation staff family origin: 48% Caucasian, Japanese (24%) Filipino 12%, Native Hawaiian/ mixed/ other (16%)	Hawaii, USA	Sun Smart (formative)
Grey 2008	To develop and test a 'Sun Safe Code'	Individual and group interviews; ages 16-54 years; fair skin to olive skin tones	UK	Sun Safe Code (formative)
Hay et al. 2009	To examine communication in families after malignant melanoma diagnosis, family members' responses and processes by which families encourage protective behaviours	Open-ended semi-structured interviews with melanoma patients and their adult children; ages over 18 years; people of 'Caucasian' family origin	USA	None

Key: NS=Not Stated

	Aim	Method and population	Location	Programme
Lupton and Gaffney 1996	To identify discourses and practices about sun protection and tanning among young people	Focus groups with secondary school students; ages 11-16; “English speaking backgrounds”	Australia	Me No Fry (evaluation)
Murray and Turner 2004	To explore the reasoning behind sun bed use and why people use tanning facilities	Interviews with adult sun bed users; ages 18-32; ethnicity NS	Merseyside, UK	None
Parrott et al. 1996	Formative research for the GHHH (Georgia's Harvesting Healthy Habits) project. To assess determinants of farmers' sun protection behaviours	Field observation; in-depth interviews (qualitative data) with farmers, service providers (public health nurses) and other stakeholders; average age 50 years; white ethnicity (farmers)	Georgia, USA	GHHH (Georgia's Harvesting Healthy Habits) project (formative)
Paul et al. 2008	To explore adolescents’ sun protection behaviours and compare by age and gender	Focus groups with adolescents; ages 12-17 years; majority medium- and some fair-skinned persons	New South Wales, Australia	None
Reeder et al. 2000	To investigate parental opinions, understandings and practices concerning sun protection for young children	Semi-structured focus groups with parents; ages 35-40 years; ethnicity NS	New Zealand	None

Key: NS=Not Stated

	Aim	Method and population	Location	Programme
Shoveller et al. 2003	To describe how adolescents make decisions about sunbathing during transition from childhood to adolescence	Interviews with adolescents (ages 12-16 years) and parents (ages 34-50 years); ethnicity NS	Canada	None
Young et al. 2005[2]	To explore the characteristics of family sun-protection projects as they occur in families with adolescents, and any differences across families	Same as Shoveller et al. 2003	Canada	None

Key: NS=Not Stated

[2] Shoveller et al. (2003) and Young et al. (2005) are linked studies (i.e. they present data from the same study). However, the data presented in the two papers is largely distinct and the two were treated separately for the purposes of data extraction.

4.3 Quality of the included studies

The results of quality assessment are presented in Table 2. Eleven papers were rated high (++), five medium (+) and seven low (-). Areas where many papers received low scores include: the role of the researcher; the description of context; the reliability of analysis; and the 'richness' of the data reported. Of particular note here is the fact that of the six UK studies, five received a low quality rating. This may be partly due to the fact that only summary reports could be retrieved for three studies (CRUK n.d.a; CRUK n.d.b; CRUK n.d.c). The low quality of the UK studies indicates that there may be issues relating to the applicability of the study findings (see section 4.4 below).

Table 2. Quality of the included studies

	Overall score	Is a qualitative approach appropriate?	Is the research question clear?	How defensible/ rigorous is the research design?	How well was the data collection carried out?	Is the role of the researcher clearly described?	Is the context clearly described?	Were the methods reliable?	Is the data analysis sufficiently rigorous?	Is the data rich?	Is the analysis reliable?	Are the findings convincing?	Are the findings relevant to the aims of the study?	Conclusions	How clear /coherent is the reporting of ethics?
Abroms et al. 2003	+	Y	Y	Y	Y	N	N	CT	Y	CT	Y	Y	Y	Y	CT
Bergenmar and Brandberg 2001	++	Y	Y	CT	Y	N	Y	Y	Y	CT	N	Y	Y	Y	Y
Calder and Aitken 2008	++	Y	Y	Y	Y	N	N	Y	Y	Y	CT	Y	Y	Y	CT
CRUK n.d.a (Sunburn)	-	Y	Y	CT	CT	N	N	CT	CT	N	CT	N	N	N	CT
CRUK n.d.b (SunSmart)	-	Y	Y	CT	CT	N	N	CT	CT	N	CT	N	N	N	CT
CRUK n.d.c (Outdoor workers)	-	Y	Y	CT	CT	N	N	CT	CT	N	CT	N	N	N	CT
Clarke and Korotchenko 2009	+	Y	Y	Y	CT	N	Y	N	CT	Y	N	Y	Y	Y	Y
Collins et al. 2006	-	Y	Y	Y	Y	N	CT	CT	N	CT	CT	Y	Y	Y	CT
Curtis & Pollock 2009	-	Y	Y	Y	CT	N	N	N	N	N	N	Y	Y	Y	Y
Escoffery et al. 2006	++	Y	Y	Y	Y	N	N	Y	Y	N	Y	CT	Y	Y	Y
Geller et al. 2008	++	Y	Y	Y	Y	N	CT	Y	Y	CT	Y	CT	Y	Y	Y
Gerbert et al. 1996	++	Y	Y	Y	Y	N	CT	Y	Y	Y	N	Y	Y	Y	CT
Gillespie et al. 1993	-	Y	Y	Y	Y	N	N	N	N	N	N	N	Y	Y	CT
Glanz et al. 1999	++	Y	Y	Y	Y	N	CT	Y	Y	CT	Y	Y	Y	Y	CT
Grey 2008	-	Y	Y	Y	Y	N	N	CT	CT	N	CT	CT	Y	Y	CT

	Overall score	Is a qualitative approach appropriate?	Is the research question clear?	How defensible/ rigorous is the research design?	How well was the data collection carried out?	Is the role of the researcher clearly described?	Is the context clearly described?	Were the methods reliable?	Is the data analysis sufficiently rigorous?	Is the data rich?	Is the analysis reliable?	Are the findings convincing?	Are the findings relevant to the aims of the study?	Conclusions	How clear /coherent is the reporting of ethics?
Hay et al. 1999	++	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y
Lupton and Gaffney 1996	++	Y	Y	Y	Y	N	CT	Y	Y	Y	CT	Y	Y	Y	CT
Murray and Turner 2004	+	Y	Y	Y	Y	CT	N	N	CT	N	N	Y	Y	Y	Y
Parrott et al. 1996	+	Y	Y	Y	Y	N	Y	Y	CT	N	N	N	Y	Y	CT
Paul et al. 2008	++	Y	Y	Y	Y	CT	Y	Y	Y	Y	Y	Y	Y	Y	Y
Reeder et al. 2000	+	Y	Y	CT	Y	N	Y	Y	N	N	CT	Y	Y	Y	CT
Shoveller et al. 2003	++	Y	Y	Y	Y	N	N	CT	Y	Y	Y	Y	Y	Y	Y
Young et al. 2005	++	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	CT

Key: Y = Yes N = No CT = Can't tell

4.4 Applicability

Six studies were conducted in the UK (CRUK n.d.a; CRUK n.d.b; CRUK n.d.c; Curtis and Pollock 2009; Grey 2008; Murray and Turner 2004). As noted above, most of these received a low quality rating, and none was rated high. This indicates that there may be barriers to the applicability of their findings, particularly relating to incomplete reporting of study methods and contexts.

Most of the other studies were conducted in locations with considerably higher levels of sun exposure than the UK. This difference in climate is likely to have an impact on risk factors, attitudes and patterns of behaviour, and may limit the generalisability of the study findings to the UK context. Most British people are likely to receive a substantial proportion of their total annual UV exposure during holidays to warmer locations (Diffey 2008); we located a very limited amount of data regarding behaviour during holidays, which may also have an impact on applicability.

In addition, some other countries, particularly Australia, have implemented much more extensive legislative and educational programmes for skin cancer prevention than have been attempted in the UK, which are likely to have had an impact on attitudes.

Our analysis indicates that there are considerable differences between age groups, and between men and women, in attitudes and behaviour. These factors should therefore be taken into account in assessing the applicability of study findings to other populations.

5.0 Study findings

We used a framework based on the Health Belief Model to synthesize the study findings, in line with the approach used for the phase 1 qualitative evidence review. The Health Belief Model is a framework which categorises the potential determinants of health behaviours into six themes: perceived susceptibility (risk); perceived severity; perceived benefits; perceived barriers; cues to action; and self-efficacy. We did not locate data on self-efficacy, and so this theme was not used in the framework. Three of the included primary studies used the Health Belief Model as an analytic framework (Gerbert et al. 1996; Gillespie et al. 1993; Glanz et al. 1999).

In addition to the Health Belief Model, two additional thematic headings were added derived from the review questions. These covered the barriers and facilitators of interventions, and the views of different groups, including service users, service providers, and different socio-demographic subgroups of the population.

The themes and subthemes derived from the Health Belief Model, and the number of studies in the review relevant to each, are shown in Table 3.

Table 3. Synthesis framework based on the Health Belief Model

Theme	Definition in this review	Subthemes	Number of studies discussing theme
Perceived susceptibility	Risk of getting skin cancer	- Risk communication	12
Perceived severity	Seriousness of skin cancer or skin damage from UV exposure	- Cancer vs appearance	10
Perceived benefits	The benefits to be gained from skin cancer prevention or sun protection activities		8
Perceived barriers	Factors which may make it less likely that individuals will engage in preventive activity	- Positive perceptions of a tanned appearance - Perceived health benefits of sun exposure - Routes to tanning - Social barriers to sun protection - Practical barriers - Institutional barriers	20
Cues to action	Factors which may help to trigger	- Sources of positive influence - Knowing people who have had	17

	preventive activity	skin cancer - Policies in schools and leisure facilities - Media messages - Specific triggers	

5.1 Perceived susceptibility

Twelve studies discuss perceived susceptibility to skin cancer (Calder and Aitken 2008; CRUK n.d.a (*Sunburn*); CRUK n.d.b (*SunSmart*); CRUK n.d.c *(Outdoor workers)*; Curtis and Pollock 2009; Gerbert et al. 1996; Gillespie et al. 1993; Glanz et al. 1999; Hay et al. 2009; Murray and Turner 2004; Parrott et al. 1996; Shoveller et al. 2003).

Two studies mention that health 'scares' experienced by themselves or friends or family members (such as having potentially cancerous moles removed), or a family history of malignant melanoma, increased perceived risk (Gerbert et al. 1996; Hay et al. 2009).

In four studies, children (aged 6-8 years) or young people (aged 12-25 years approximately) saw skin cancer as a problem for older people and did not see themselves as at risk in the foreseeable future (CRUK n.d.b (*SunSmart*); Curtis and Pollock 2009; Gillespie et al. 1993), or did not understand the risk of cancer (Glanz et al. 1999).

> *You don't think about it happening … we are young, and the possibility is so far in the future. (participant, Year 8, Curtis and Pollock 2009).*

Adults (aged 20-70 approximately) expressed a similar view in one study (Gerbert et al. 1996).

> *I'll deal with it when it happens, you know, 50 years or so. (participant, low-concern group, Gerbert et al. 1996)*

Conversely, fathers in one study expressed the belief that children were at greater risk from the sun than adults because of the perceived delicacy of children's skin (CRUK n.d.c (*Outdoor workers*)).

> *The kids … you are very aware of them not getting burnt … more delicate skin. (participant, CRUK n.d.c*)

People with darker skin were seen as less at risk in two studies (CRUK n.d.c *(Outdoor workers)*; Gillespie et al. 1993). Participants in one study believed that because they did not burn, they were not at risk of skin damage or cancer (Glanz et al. 1999). In one study, people from higher-socioeconomic-status (SES) groups were more likely to be aware of the health risks of sun exposure than people from lower-SES groups (CRUK n.d.a (*Sunburn*)).

Participants in five studies expressed the belief that sun exposure reduced subsequent risk of sun damage or cancer by increasing "resistance" (CRUK n.d.c (*Outdoor workers*); Glanz et al.

1999; Parrott et al. 1996), or that getting a tan reduced the risk of burning (Murray and Turner 2004; Shoveller et al. 2003).

> *The children are always in the sun and they rarely get sick... the more exposure they get to whatever, the more resistant they are. (parent, participant, Glanz et al. 1999)*

> *[Farmers] get toughened to the sun pretty fast, so they don't need it [sun protection]. (participant, Parrott et al. 1996)*

Three studies found that participants were aware of the danger of skin cancer, but tended to avoid thinking about it, or to adopt optimistic framings which minimised the dangers of continuing sunbed use or sun exposure (Calder and Aitken 2008; CRUK n.d.c (*Outdoor workers*); Murray and Turner 2004).

> *Well I mean, the obvious risk is skin cancer but I tend not to think about it, you just seem to put it to the back of your mind and hope that you won't get it. (participant, Murray and Turner 2004)*

> *I've read of people getting skin cancer, in magazines, and blaming it on their use of sunbeds, but they seemed to use the sunbeds a lot more than I do. (participant, Murray and Turner 2004)*

One study found this attitude to be the most common, while a minority were fatalistic about the risk, and few engaged with risk and modified their behaviour accordingly (CRUK n.d.c (*Outdoor workers*)).

Hay et al. (2009) found that many participants had an "all-or-nothing" view of the determinants of cancer risk. For example, some participants diagnosed with melanoma viewed their melanoma as directly related to sun exposure, and thought that this environmental cause precluded genetic factors. As a result, those participants were less likely to communicate information about risk to family members.

In one study, young women aged 12-15 years in the UK said that they thought skin cancer was a less serious concern than other health issues, such smoking and healthy eating (Curtis and Pollock 2009).

5.1.1 Risk communication

One study (Hay et al. 2009) focused particularly on the communication of risk within families who had experienced skin cancer. This study found that people diagnosed with skin cancer usually discussed risk factors and susceptibility with family members soon after diagnosis. Participants who saw genetic factors as important were more likely to communicate with their family members about risk. Women tended to take the leading role in communicating risk to family members, even where they were not the person diagnosed with cancer.

A number of factors affected the decision about whether, and to what extent, to communicate risk. People used information about individuals' risk factors (e.g. skin tone, risk behaviours), and their perceived receptiveness to health information generally, in deciding whether to communicate about risk. In some cases individuals were seen as "too smart" to need such communication.

> *Because she's a highly educated girl, I mean, she should be able to put one and one together and, I don't think she'd use it anymore, let me put it to you that way. I don't think it needs to be discussed, that she would use [tanning] salons. (participant, Hay et al. 2009)*

Evidence statement 1: perceived susceptibility
ES 1.1 Two studies report that the experience of melanoma or pre-cancerous moles by participants or people they know, or a family history of malignant melanoma, increase perceived risk (Gerbert et al. 1996 [++]; Hay et al. 2009 [++]). ES 1.2 Five studies report that the risk of skin cancer is not appreciated or is seen as not of immediate concern (CRUK n.d.b (*SunSmart*) [-]; Curtis and Pollock 2009 [-]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]). This perception is particularly stated by children (aged 6-8 years) and young people (aged 12-25 years approximately), who view the risk as too distant to be a serious concern. ES 1.3 One study reports that fathers thought that children had a greater risk of developing skin cancer than adults because their skin is more "delicate" (CRUK n.d.c (*Outoor workers*) [-]). ES 1.4 Three studies of adult participants report that people are aware of the risks of skin cancer, but avoid thinking about them, or adopt an optimistic framing that minimises their own perceived susceptibility, such as assuming that others' exposure to risk factors must be higher than their own (Calder and Aitken 2008 [++]; CRUK n.d.c (*Outdoor workers*) [-]; Murray and Turner 2004 [+]). ES 1.5 One US study discusses the communication of risks within families where a member has had an experience of skin cancer, finding that people diagnosed with cancer usually discussed risk with their families, and that women took a leading role in communication (Hay et al. 2009 [++]). ES 1.6 Five studies of young people and adults report the belief that sun exposure provides "resistance" to skin damage, burning or cancer in the future (CRUK n.d.c (*Outdoor workers*) [-]; Glanz et al. 1999 [++]; Parrott et al. 1996 [+]; Murray and Turner 2004 [+]; Shoveller et al. 2003 [++]). In particular, outdoor workers reported such beliefs in two studies (CRUK n.d.c (*Outdoor workers*) [-]; Parrott et al. 1996 [+]), and parents in one (Glanz et al. 1999 [++]). ES 1.7 Three studies identify other factors that affect perceived susceptibility to skin cancer. Two studies report the perception that a darker skin colour decreased risk level (CRUK n.d.c *(Outdoor workers)* [-]; Gillespie et al. 1993 [-]). One study finds that participants of higher

socioeconomic status were more aware of the risks (CRUK n.d.a (*Sunburn*) [-]).

Applicability
Eight of twelve studies that reported data on perceived susceptibility to skin cancer or skin damage were from countries other than the UK. Most of the factors identified did not appear to vary substantially between countries. However, it is possible that people in the UK may have lower perceived susceptibility than elsewhere because of differences in climate (see Evidence Statement 14).

5.2 Perceived severity of consequences of exposure

The perceived severity of skin cancer is discussed in seven studies (Calder and Aitken 2008; Gerbert et al. 1996; Gillespie et al. 1993; Glanz et al. 1999; Murray and Turner 2004; Parrott et al. 1996; Paul et al. 2008). All these studies find that most participants did not see skin cancer as a serious threat. Children ages 6-8 years in one study did not understand what skin cancer was or the consequences of skin cancer (Glanz et al. 1999). Participants in three studies expressed a belief that skin cancers are easily treatable (Calder and Aitken 2008; Glanz et al. 1999; Paul et al. 2008).

> *I think I'll get cancer, I know I'll get cancer, because I don't care about protection now. I won't die of cancer – I'll just have a few things taken out. (female, 16-17 years, participant, Paul et al. 2008)*

The farmers who participated in Parrott et al.'s (1996) study, while agreeing that the consequences of sun exposure are serious, also believed that getting skin cancer would not affect their ability to work.

5.2.1 Cancer vs appearance

Concerns relating to appearance fall into two groups: the short-term effects of sunburn; and the longer-term effects of skin aging.

Concern regarding the short-term effects of sun exposure on appearance, such as red or peeling skin, was expressed by participants in two studies (Abroms et al. 2003; Paul et al. 2008).

Skin aging was mentioned as a concern in seven studies (Abroms et al. 2003; Clarke and Korotchenko 2009; Gerbert et al. 1996; Gillespie et al. 1993; Lupton and Gaffney 1996; Murray and Turner 2004; Paul et al. 2008). In two studies skin aging was perceived by some participants to be as serious a consequence of sun exposure as the risk of cancer (Gerbert et al. 1996; Murray and Turner 2004). Concern about skin aging and its effects on appearance may be more likely to motivate sun protection behaviours than concern about skin cancer.

> *I did nothing [for sun protection when I was young]. Now I am beginning to put sun block on my face because I can see the effects. I can see wrinkles and my skin isn't as clear as it used to be. (female, participant, Abroms et al. 2003)*

In four studies, concern about skin aging was found to be more prevalent among female than male participants (Abroms et al. 2003; Lupton and Gaffney 1996; Murray and Turner 2004; Paul et al. 2008). In Abroms et al.'s (2003) study, some men were concerned about the short-term effects of sunburn (e.g. discomfort), but none expressed concern about skin aging.

Evidence statement 2: perceived severity
ES 2.1 Perceived severity of skin cancer was low in seven studies across a wide range of age groups (aged 6 years to over 60 years): Calder and Aitken 2008 [++]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]; Murray and Turner 2004 [+]; Parrott et al. 1996 [+]; Paul et al. 2008 [++]). In three studies participants thought that skin cancer was easy to treat (Calder and Aitken 2008 [++]; Glanz et al. 1999 [++]; Paul et al. 2008 [++]). In one study with participants aged 6-8 years, there was a lack of understanding about what skin cancer was or the risks of skin cancer (Glanz et al. 1999 [++]). A study of farmers in the USA finds that they did not see skin cancer affecting their day-to-day work (Parrott et al. 1996 [+]). ES 2.2. Seven studies report that skin aging was seen as a serious consequence of sun exposure (Abroms et al. 2003 [+]; Clarke and Korotchenko 2009 [+]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Lupton and Gaffney 1996 [++]; Murray and Turner 2004 [+]; Paul et al. 2008 [++]). Two studies find that skin aging is perceived as a more serious consequence of sun exposure than is skin cancer (Gerbert et al. 1996 [++]; Murray and Turner 2004 [+]). Four studies report that skin aging is seen as a more serious consequence by women than it is by men (Abroms et al. 2003 [+]; Lupton and Gaffney 1996 [++]; Murray and Turner 2004 [+]; Paul et al. 2008 [++]). *Applicability* Only one study in this group (Murray and Turner 2004 [+]) was conducted in the UK. All other studies were conducted in the USA, New Zealand or Australia. It is possible that knowledge about the severity of skin cancer may be greater in the latter countries than the UK due to previous information campaigns.

5.3 Perceived benefits of sun protection

Eight studies discuss the perceived benefits of sun protection (Abroms et al. 2003; Clarke and Korotchenko 2009; Collins et al. 2006; Gillespie et al. 1993; Glanz et al. 1999; Hay et al. 2009; Lupton and Gaffney 1996; Paul et al. 2008). In most cases participants used sun protection in order to offset the perceived risks of sun exposure including skin cancer and skin aging.

Avoiding cancer was explicitly stated as a benefit in four studies (Abroms et al. 2003; Clarke and Korotchenko 2009; Hay et al. 2009; Paul et al. 2008).

> *I'll put some sunscreen on. I don't want to get too tan because the next thing you know, I will be having tumours lanced. (male, participant, Abroms et al. 2003)*

The avoidance of visible skin aging was stated as a benefit, particularly by women, in three studies (Abroms et al. 2003; Clarke and Korotchenko 2009; Paul et al. 2008).

Avoiding the discomfort from the sun's heat and glare, or avoiding sunburn, was stated as a benefit in three studies (Abroms et al. 2003; Gillespie et al. 1993; Paul et al. 2008). In one study, male participants mentioned that using eye protection helped to improve sporting performance (Paul et al. 2008).

A fashionable appearance was stated as a benefit of wearing a hat in one study (Lupton and Gaffney 1996). However, it should be noted that a number of other studies found that hats and other protective clothing are unfashionable and not desirable (see section 5.4.4 below).

In two studies, participants said that using sun protection enabled them to stay in the sun for longer when playing sports (Abroms et al. 2003) or at the beach (Paul et al. 2008).

In two studies, school staff (Collins et al. 2006) and parents and recreation staff (Glanz et al. 1999) emphasised the benefits of promoting sun protection to young children in order to 'start them young' and lay down good habits for later life (Collins et al. 2006; Glanz et al. 1999). Participants in Collins et al. (2006) saw this possibility as contributing to the success of school-based interventions, while those in Glanz et al. (1999) saw it as a potential facilitator.

> *[Young children may establish] good life-long habits*. *(participant, school representative, Collins et al. 2006)*

Evidence statement 3: perceived benefits of sun protection
ES 3.1 Participants in most studies used sun protection, principally sunscreen, in order to offset the perceived risks of sun exposure including skin cancer (Abroms et al. 2003 [+]; Clarke and Korotchenko 2009 [+]; Hay et al. 2009 [++]; Paul et al. 2008 [++]) and skin aging (Abroms et al. 2003 [+]; Clarke and Korotchenko 2009 [+]; Paul et al. 2008 [++]). Avoiding sunburn and the sun's heat and glare were mentioned as a benefit of sun protection in three studies (Abroms et al. 2003 [+]; Gillespie et al. 1993 [-]; Paul et al. 2008 [++]). ES 3.211. Participants in two studies said that using sun protection enabled them to stay in the sun for longer when playing sports (Abroms et al. 2003 [+]) or at the beach (Paul et al. 2008 [++]). ES 3.3 Two studies of parents and school staff stated the benefits of promoting sun protection to young people helped them acquire positive long-term habits (Collins et al. 2006 [-]; Glanz et al. 1999 [++]). *Applicability* None of the studies in this section were conducted in the UK or Europe. Hence, it is unclear to

what extent findings about the perceived benefits of sun protection may be applicable in the UK context.

5.4 Perceived barriers to sun protection

The perceived barriers to using sun protection resources, such as sunscreen and protective clothing, have been divided into the following sub-categories:

- Positive perceptions of a tanned appearance
- Perceived health benefits of sun exposure
- Routes to tanning
- Social barriers to sun protection
- Practical barriers
- Institutional barriers

5.4.1 Positive perceptions of a tanned appearance

A tanned appearance was seen as attractive or aesthetically pleasing by participants in twelve studies (Calder and Aitken 2008; Clarke and Korotchenko 2009; Curtis and Pollock 2009; Lupton and Gaffney 1996; Gerbert et al. 1996; Gillespie et al. 1993; Grey 1998; Murray and Turner 2004; Paul et al. 2008; Reeder et al. 2000; Shoveller et al. 2003; Young et al. 2005). Conversely, white skin was viewed as unattractive in three studies, with participants using terms such as "*ugly*" and "*pasty*" to describe untanned skin (Clarke and Korotchenko 2009; Curtis and Pollock 2009; Lupton and Gaffney 1996).

The older women, ages 70 to 95 years, interviewed by Clarke and Korotchenko (2009) described how perceptions of a tan had changed in their lifetimes: as children they were encouraged to associate a tanned appearance with being working-class or of non-white ethnicity. Nonetheless, most of these women preferred a tanned appearance (*"I like a good, healthy glow on somebody"*), whether or not they actively sunbathed.

> *When I was a child, anybody that was brown, they were labourers. This is an awful thing to admit, but the upper class was never brown. And it was paleness that showed that we were a different class. (participant, Clarke and Korotchenko 2009)*

In particular, a tanned appearance was described as 'healthy' in nine studies (Calder and Aitken 2008; Clarke and Korotchenko 2009; Curtis and Pollock 2009; Gerbert et al. 1996; Grey 1998; Lupton and Gaffney 1996; Murray and Turner 2004; Shoveller et al. 2003; Young et al. 2005). In most cases the 'healthy' appearance of a tan was simply stated as a perception. However, in three studies, participants identified a causal link, whereby tanned skin was seen as an indicator of an active, outdoors lifestyle (Calder and Aitken 2008; Lupton and Gaffney 1996; Shoveller et al. 2003). A related point, although not directly linked to appearance, is that being outdoors is perceived as intrinsically healthier than being indoors. This is because being outdoors is seen to correspond with an active lifestyle, while being indoors is seen as lazy or anti-social (see section 5.4.2 below).

> *[A tan] represents that you are active, you don't just sit inside at a computer all day. (male, 21, participant, Calder and Aitken 2008)*

> *I have got a friend and she is really pale, and it really describes the way she lives. Because I mean, she doesn't go bike riding or to the beach or anything, that's why she is not tanned, and you can tell who's sport and who goes out a lot and who just stays in. (female, participant, Lupton and Gaffney 1996)*

> *Like, if you don't have a tan, most people think, 'Well gee, this person must not go outside because if they went outside more often, they'd have a tan'. So, they [think you] stay inside, just watch TV or do nothing… [they] think you're a couch potato. (male, 15, participant, Shoveller et al. 2003)*

In one Australian study, untanned skin was seen as artificial due to the special effort required to remain untanned in summer.

> *If you have got white skin, it looks sort of fake. (participant, Lupton and Gaffney 1996)*

Participants in this study also associated a tan with being Australian, while white skin was characteristic of 'Pommies' (Lupton and Gaffney 1996).

Participants in two studies said they felt more confident, or had greater self-esteem, with a tan (Gerbert et al. 1996, Murray and Turner 2004). In one further study, a participant described tanning in terms of personality change (Curtis and Pollock 2009).

> *It's a change in a person, so you get to see a different side to them. (female, 14-15 years, participant, Curtis and Pollock 2009)*

However, participants in three studies indicated that a deep tan was not automatically desirable and did not suit everyone (Clarke and Korotchenko 2009; Lupton and Gaffney 1996; Shoveller et al. 2003). Participants in one study used sun protection primarily to get the 'right' level of tan, one which was neither too dark nor too light (Shoveller et al. 2003). Participants in one study saw a deep tan as indicative of health risks and preferred a lighter tan (Clarke and Korotchenko 2009).

> *I think a bit of a tan does make you look healthier. But … I don't really like dark, dark skins from tanning anymore. (participant, Clarke and Korotchenko 2009)*

Evidence statement 4: Perceived barriers - positive perceptions of a tanned appearance
ES 4.1 Twelve studies report positive perceptions of a tanned appearance, i.e. that a tanned appearance is perceived as attractive (Calder and Aitken 2008 [++]; Clarke and Korotchenko 2009 [+]; Curtis and Pollock 2009 [-]; Lupton and Gaffney 1996 [++]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Grey 1998 [-]; Murray and Turner 2004 [+]; Paul et al. 2008 [++]; Reeder et al. 2000 [+]; Shoveller et al. 2003 [++]; Young et al. 2005 [++]). Two studies report that a tanned appearance increases confidence and self-esteem (Gerbert et al. 1996 [++]; Murray and

Turner 2004 [+]).

ES 4.2 Three studies report that the degree of tan colour was important in shaping perceptions of tanned appearance, with a deep tan not necessarily seen as desirable (Clarke and Korotchenko 2009 [+]; Lupton and Gaffney 1996 [++]; Shoveller et al. 2003 [++]).

ES 4.3 Nine studies find that a tanned appearance is seen as healthy (Calder and Aitken 2008 [++]; Clarke and Korotchenko 2009 [+]; Curtis and Pollock 2009 [-]; Gerbert et al. 1996 [++]; Grey 2008 [-]; Lupton and Gaffney 1996 [++]; Murray and Turner 2004 [+]; Shoveller et al. 2003 [++]; Young et al. 2005 [++]). Of these, three studies note that a tanned appearance indicates an active, outdoors lifestyle (Calder and Aitken 2008 [++]; Lupton and Gaffney 1996 [++]; Shoveller et al. 2003 [++]).

Applicability
Although only two studies reporting a positive perception of a tanned appearance were conducted in the UK (Curtis and Pollock 2009 [-]; Murray and Turner 2004 [+]), these perceptions appear to be consistent across countries.

5.4.2 Perceived health benefits of sun exposure

Seven studies report specific perceived health benefits associated with sun exposure, or a general perception of outdoor activity as healthy, that inhibits sun protective behaviours such as applying sunscreen, covering up or taking shelter (Bergenmar and Brandberg 2001; Clarke and Korotchenko 2009; Gerbert et al. 1996; Gillespie et al. 1993; Glanz et al. 1999; Murray and Turner 2004; Parrott et al. 1996).

Participants in three studies mentioned that ultraviolet exposure increased vitamin D (Clarke and Korotchenko 2009, Gerbert et al. 1996, Murray and Turner 2004).

Participants in one study expressed the view that sunbed use was good for their skin, in particular that it reduced acne (Murray and Turner 2004).

As noted in section 5.1 above, participants in two studies also expressed a belief that sun exposure was protective against subsequent skin damage and cancer, by increasing “resistance” (Glanz et al. 1999; Parrott et al. 1996).

In addition, participants in three studies said that being outdoors 'feels healthier' than being indoors (Bergenmar and Brandberg 2001; Gerbert et al. 1996; Gillespie et al. 1993). Primary-school-aged children interviewed in an educational setting linked this perception to being free to run and play (Gillespie et al. 1993). A related point, made in one study, is that being outdoors in sunny weather improves people's mood (Calder and Aitken 2008).

> *It's pleasant and feels healthy to be outdoors in the sun and the breeze. (participant, Bergenmar and Brandberg 2001)*

Evidence statement 5: Perceived barriers - perceived health benefits of sun exposure
ES 5.1 Three studies report the belief that ultraviolet exposure is beneficial because it provides vitamin D (Clarke and Korotchenko 2009 [+]; Gerbert et al. 1996 [++]; Murray and Turner 2004 [+]). ES 5.2 Two studies report that sun exposure is believed to protect against future skin damage or cancer by increasing "resistance" (Glanz et al. 1999 [++]; Parrott et al. 1996 [+]). ES 5.3 Three study reports discuss the perception that outdoor activities which involve sun exposure are healthier than indoor activities, both among adults (Bergenmar and Brandberg 2001 [++]; Gerbert et al. 1996 [++]) and children (Gillespie et al. 1993 [-]). One study finds this perception to be linked to the freedom to play actively for children (Gillespie et al. 1993 [-]). *Applicability* Only one of the studies in this group was conducted in the UK (Murray and Turner 2004 [+]). It is unclear whether perceptions of the health benefits of sun exposure are generalisable between countries.

5.4.3 Routes to tanning

Participants in eight studies (Bergenmar and Brandberg 2001; Calder and Aitken 2008; Clarke and Korotchenko 2009; CRUK n.d.a (*Sunburn*); CRUK n.d.c (*Outdoor workers*); Lupton and Gaffney 1996; Murray and Turner 2004; Shoveller et al. 2003) distinguished between different ways in which they could get a tan: deliberate compared with incidental tanning; and sun exposure compared with sunbed use.

Deliberate vs incidental tanning

In three studies, participants made a distinction between deliberately setting out to get a tan and getting one incidentally in the course of being outdoors, usually with the implication that sun protection was more appropriate for the former (Bergenmar and Brandberg 2001; Lupton and Gaffney 1996; Shoveller et al. 2003).

Participants in one study made the distinction between incidental and deliberate tanning while recognising that it was of little practical significance (Bergenmar and Brandberg 2001).

> *Planning to sunbathe gives me a guilty conscience. I don't consider myself one who would sunbathe on a pier; I lie on a pier reading a book. I realize there is not much difference. (participant, Bergenmar and Brandberg 2001)*

The importance of the distinction may be linked to the idea that outdoor activities are healthy in themselves, in contrast to deliberate sunbathing (Bergenmar and Brandberg 2001; see section 5.4.2 above). Young people in one study believed that incidental tanning was less damaging, and associated it with outdoor physical activity and sports (Shoveller et al. 2003).

> *I don't really see that sun tanning can really damage you … [if] you get it from an outdoor activity. (male, 13 years, participant, Shoveller et al. 2003)*

> *I wasn't like really trying to get a tan … I'd wear my bathing suit. I'd go swimming and just play volleyball or something like that ... (female, 15 years, participant, Shoveller et al. 2003)*

In one study, male participants felt that deliberately trying to become tanned was unmasculine, but getting a tan as an incidental result of engaging in outdoor activities, particularly sports, was acceptable (Lupton and Gaffney 1996).

A further issue related to deliberate tanning is the perception that becoming sunburnt is a necessary part of the tanning process, stated by participants in two studies (CRUK n.d.a (*Sunburn*); Lupton and Gaffney 1996).

Sun vs sunbeds

Participants in three studies distinguished the effects of sun exposure from those of sunbed use (Clarke and Korotchenko 2009; Murray and Turner 2004; Shoveller et al. 2003). Using sunbeds was seen as unnatural and dangerous, and associated with excessive or risky patterns of behaviour, in one study (Clarke and Korotchenko 2009).

> *I put on sunscreen now and I'll do, basically, a little light tanning. Nothing too extreme. I would never go and sit on one of those tanning beds … We're all very conscious healthwise about the dangers of tanning … I wouldn't say I would stop completely … I think you have to strike a healthy medium and do what's safe. (participant, Clarke and Korotchenko 2009)*

Some of the sunbed users interviewed by Murray and Turner (2004) expressed the view that sunbeds were more dangerous than sun exposure, although one pointed out that the effects of sun exposure are harder to monitor. Participants in Shoveller et al.'s (2003) study generally believed that sunbed use was more dangerous than sun exposure.

In addition, in two studies participants thought that women were more likely to use sunbeds than men (Calder and Aitken 2008; CRUK n.d.c (*Outdoor workers*)).

Evidence statement 6: Perceived barriers - routes to tanning
ES 6.1 Participants in three studies distinguished deliberate from incidental tanning, and expressed the belief that incidental tanning was less dangerous or less likely to require protection (Bergenmar and Brandberg 2001 [++]; Lupton and Gaffney 1996 [++]; Shoveller et al. 2003 [++]). ES 6.2 One study finds that participants preferred to see themselves as tanning incidentally, rather than deliberately (Bergenmar and Brandberg 2001 [++]). This may be because deliberate

tanning has 'unhealthy' connotations but incidental tanning from outdoor activities does not.

ES 6.2. Three studies compared sunbed use to sun exposure. Most of the participants in these studies believed that sunbeds were more dangerous than sun exposure (Clarke and Korotchenko 2009 [+]; Murray and Turner 2004 [+]; Shoveller et al. 2003 [+]).

Applicability
Most of the findings in this section come from studies conducted outside the UK. Because of climatic differences, findings regarding incidental tanning may not be readily applicable to the UK context.

5.4.4 Social barriers to sun protection

Ten studies (Abroms et al. 2003; Calder and Aitken 2008; CRUK n.d.c (*Outdoor workers*); Gillespie et al. 2003; Glanz et al. 1999; Grey 2008; Lupton and Gaffney 1996; Parrott et al. 1996; Paul et al. 2008; Shoveller et al. 2003) reference social barriers to using sun protection resources, such as protective clothing and sunscreen.

The unfashionable or unattractive appearance of protective clothing such as hats was mentioned in six studies (Calder and Aitken 2008; Gillespie et al. 2003; Glanz et al. 1999; Lupton and Gaffney 1996; Paul et al. 2008; Shoveller et al. 2003). This perception is particularly prominent among children and young people (aged 8-20). One study (Calder and Aitken 2008) suggests that this perception is more salient among women, but others (Lupton and Gaffney 1996; Paul et al. 2008) find that both male and female participants are concerned about appearance.

> *You don't see anyone wearing wide brimmed hats. Except as a joke. (participant, Paul et al. 2008)*

Among children and young people, the use of protective clothing, particularly hats, was regarded more favourably if the clothing was fashionable and attractive (Gillespie et al. 2003; Lupton and Gaffney 1996). However, one school in one study had adopted a fashionable baseball cap as part of its uniform to encourage protective clothing, but found that once the institution adopted the cap, it was perceived by students as unfashionable and lost its positive associations (Lupton and Gaffney 1996).

Adult participants in three studies noted that people around them generally did not use sun protection, or that there was little social support for using it (Abroms et al. 2003; Glanz et al. 1999; Parrott et al. 1996).

> *You rarely see local people putting on sunscreen. (parent, participant, Glanz et al. 1999)*

Sunscreen was seen as linked to particular contexts, especially the beach, in four studies, with the implication that protection was less likely to be used in other contexts (Abroms et al. 2003; Gillespie et al. 1993; Glanz et al. 1999; Parrott et al. 1996). In one study, participants said that they were more likely to use sun protection on holiday (CRUK n.d.c (*Outdoor workers*)).

> *Well if I'm going to the beach, I will put [sunscreen] on. But other than that, if I'm just going outside for an outdoor activity, I really don't think about it. (male, participant, Abroms et al. 2003)*

In one of these studies, participants said sunscreen was easier to remember when they were deliberately planning to spend the day in the sun (Gillespie et al. 1993). Glanz et al. (1999) note that sunscreen was much more frequently mentioned by participants than other forms of sun protection, and was the only type of sun protection mentioned by some participants.

Participants in one study said they were more concerned with sun protection for their children than for themselves (Grey 2008).

> *I put cream on my son every half hour, but for me I put it on once and then I think that's OK. (female, 19-24 years, Grey 2008)*

Similarly, young people (aged 12-17 years) in Paul et al.'s (2008) study saw media messages, and parental concern, about sun protection as narrowly focused on young children and of limited relevance to themselves.

Sunscreen use was seen as unmasculine by some young adult men in one study (Abroms et al. 2003).

> *[I don't like sunscreen] . . . because we're men. . . . We don't like to put oil on. Then you get the stuff on your hands and you smell like a coconut. (male, participant, Abroms et al. 2003)*

In particular, men in this study expressed discomfort with the idea of other men applying sunscreen (Abroms et al. 2003).

> *I think it's like a masculine thing . . . I mean it's all right for [your girlfriend] to put suntan lotion on your back [at the beach], but if you're down there with the guys, you're not going to be saying, "Hey, buddy, rub some lotion on me." (male, participant, Abroms et al. 2003)*

Evidence statement 7: Perceived barriers - social barriers
ES 7.1 Six studies identify the unfashionable or unattractive appearance of protective clothing as a barrier to their use among children and young people (aged 6-20: Calder and Aitken 2008 [++]; Gillespie et al. 2003 [-]; Glanz et al. 1999 [++]; Lupton and Gaffney 1996 [++]; Paul et al. 2008 [++]; Shoveller et al. 2003 [++]). Two studies find that protective clothing, such as hats, would be more acceptable if they were fashionable and attractive (Gillespie et al. 2003 [-];

Lupton and Gaffney 1996 [++]).

ES 7.2 Three studies find that young adult and adult participants see sun protection behaviour as not strongly supported by social norms within their communities (Abroms et al. 2003 [+]; Glanz et al. 1999 [++]; Parrott et al. 1996 [+]).

ES 7.3 Five studies describe a strong association between sunscreen use and particular contexts, such as the beach and being on holiday (Abroms et al. 2003 [+]; CRUK n.d.c (*Outdoor workers*) [-]; Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]; Parrott et al. 1996 [+]).

ES 7.4. One study finds that young people (ages 12-17 years) see media messages and parental behaviours regarding sun protection as focused on young children and not relevant to themselves (Paul et al. 2008 [++]).

ES 7.5. One study finds that men see sunscreen use as unmasculine (Abroms et al. 2003 [+]).

Applicability
Most studies in this section were carried out outside the UK, and it is unclear to what extent the findings are generalisable. However, there is no specific reason to think that the social barriers identified are not applicable to the UK.

5.4.5 Practical barriers to sun protection

Inconvenience, time, effort

The inconvenience of sun protection products, or the time and effort involved in remembering to carry and use them, was mentioned as a practical barrier in ten studies (Abroms et al. 2003; CRUK n.d.c (*Outdoor workers*); Curtis and Pollock 2009; Geller et al. 2008; Gerbert et al. 1996; Gillespie et al. 1993; Glanz et al. 1999; Parrott et al. 1996; Paul et al. 2008; Reeder et al. 2000).

Several more specific issues were mentioned. The inconvenience of carrying resources such as sunscreen, or the difficulty of remembering to do so, was mentioned in three studies, especially for children, young people and young adults (8-25 years). Both sunscreen (Abroms et al. 2003; Gillespie et al. 1993) and protective clothing (Paul et al. 2008) were described as inconvenient to carry and remember. Sunscreen was described as 'messy' or inconvenient to apply in six studies (Abroms et al. 2003; CRUK n.d.c (*Outdoor workers*); Curtis and Pollock 2009; Gerbert et al. 1996; Parrott et al. 1996; Reeder et al. 2000). Participants in two of these studies noted that sand or dirt became mixed into the sunscreen (CRUK n.d.c (*Outdoor workers*); Curtis and Pollock 2009). School staff mentioned practical barriers to encouraging children to use sunscreen before outdoor activities, including monitoring application, touching children to help with application, students sharing sunscreen, and parental permission (Geller et al. 2008).

Hats or sunglasses were felt to be physically awkward, because they fall off or get in the way, by participants in three studies (Glanz et al. 1999; Parrott et al. 1996; Paul et al. 2008).

Structural features such as shade were felt to be sometimes inconvenient to use by children and young people in one study (Gillespie et al. 1993).

Discomfort

Protective clothing was found to be uncomfortable by participants in four studies (Gillespie et al. 1993, Glanz et al. 1999, Parrott et al. 1996, Paul et al. 2008). Participants in one study mentioned that sunscreen caused discomfort when it 'sweated off' and got into their eyes (Abroms et al. 2003).

Cost

The expense of sun protection, particularly sunscreen, was mentioned as a barrier in four studies (Abroms et al. 1999, Glanz et al. 1999, Paul et al. 2008; Reeder et al. 2000). However, Parrott et al. (1996) found that cost was not a barrier to using sun protection resources among the farmers in their study.

One further study found that staff in schools in disadvantaged areas would like to implement compulsory hat policies, but were concerned that some families would not be able to afford it; one school in this study provided hats free of charge (Collins et al. 2006).

The cost of providing shade structures in school grounds, or distributing free sunscreen, was seen as a barrier to implementing these policies by school staff in one study (Geller et al. 2008).

Child co-operativeness

Parents of young children in two studies mentioned that children's unco-operativeness was a barrier to applying sunscreen (Glanz et al. 1999; Reeder et al. 2000).

> *The reason I don't put it on my oldest is because he complains so horribly and he's always in such a hurry. (participant, Glanz et al. 1999)*

Perceived ineffectiveness

Participants in one study said that they found sunscreen ineffective in protecting against burning (Abroms et al. 2003).

Health consequences

Participants in two studies said that sunscreen caused acne (Abroms et al. 2003; Lupton and Gaffney 1996). The possibility of allergic reactions to sunscreen was mentioned as a barrier to providing free sunscreen in one study (Geller et al. 2008). Participants in two studies expressed concern about possible toxicity and the long-term health effects of regular sunscreen use (Gerbert et al. 1996; Reeder et al. 2000).

Evidence statement 8: Perceived barriers - practical barriers
ES 8.1. Ten study reports described the inconvenience of sun protection resources as barriers to their use (Abroms et al. 2003 [+]; CRUK n.d.c (*Outdoor workers*) [-]; Curtis and Pollock 2009 [-]; Geller et al. 2008 [++]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]; Parrott et al. 1996 [+]; Paul et al. 2008 [++]; Reeder et al. 2000 [+]). The particular issues which contribute to the perception of inconvenience are: the need to carry and remember sun protection resources (three studies: Abroms et al. 2003 [+]; Gillespie et al. 1993 [-]; Paul et al. 2008 [++]); the 'messiness' of sunscreen (six studies: Abroms et al. 2003 [+]; CRUK n.d.c (*Outdoor workers*) [-]; Curtis and Pollock 2009 [-]; Gerbert et al. 1996 [++]; Parrott et al. 1996 [+]; Reeder et al. 2000 [+]); the awkwardness of hats and sunglasses which may fall off or interfere with activities (three studies: Glanz et al. 1999 [++]; Parrott et al. 1996 [+]; Paul et al. 2008 [++]); and the inconvenience of making use of shade structures by children and young people (one study: Gillespie et al. 1993 [-]). ES 8.2 Four study reports describe physical discomfort as a barrier to the use of protective clothing (Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]; Parrott et al. 1996 [+]; Paul et al. 2008 [++]). ES 8.3 One study finds that school staff see a number of practical barriers to encouraging children to use sunscreen before outdoor activities, including monitoring application, touching children to help with application, students sharing sunscreen, and parental permission (Geller et al. 2008 [++]). ES 8.4. Six study reports said that the cost of sun protection resources was a barrier to their use (Abroms et al. 1999 [+]; Collins et al. 2006 [-]; Geller et al. 2008 [++]; Glanz et al. 1999 [++]; Paul et al. 2008 [++]; Reeder et al. 2000 [+]). This primarily concerned sunscreen purchased by individuals, with one study mentioning the cost of hats as a barrier to implementing compulsory hat policies in low-SES schools (Collins et al. 2006 [-]), and one the cost of installing shade structures in schools (Geller et al. 2008 [++]). However, one study that focused on farmers in the USA said that cost was not a barrier (Parrott et al. 1996 [+]). ES 8.4 Other practical barriers to sun protection are: children being uncooperative with the application of sunscreen (two studies: Glanz et al. 1999 [++]; Reeder et al. 2000 [+]); the perceived ineffectiveness of sunscreen in stopping burning (one study: Abroms et al. 2003 [+]); and the perception of adverse health consequences of sunscreen use such as acne (two studies: Abroms et al. 2003 [+]; Lupton and Gaffney 1996 [++]), allergic reactions (one study: Geller et al. 2008 [++]), and potential long-term toxicity (two studies: Gerbert et al. 1996 [++]; Reeder et al. 2000 [+]). *Applicability* Most studies in this section were carried out outside the UK, and it is unclear to what extent the findings are generalisable. However, there is no specific reason to think that the social barriers identified are not applicable to the UK.

5.4.6 Institutional barriers

Two studies interviewed school staff concerning the perceived barriers faced by schools in implementing and encouraging sun protection practices (Collins et al. 2006; Geller et al 2008). One study (Collins et al. 2006) presented data regarding currently implemented policies; the other (Geller et al. 2008) focused on potential future policies.

The cost of implementing new policies, and the limited availability of staff time, were identified as barriers in one study (Geller et al. 2008). Concerns about the liability of staff (in the event of an allergic reaction to sunscreen, for example), and about the staff training required to implement sun protection policies, were also identified as barriers in this study (Geller et al. 2008).

In both these studies, not all staff felt that sun protection was a high priority. Some participants believed that because students did not spend long outdoors, sun protection was not a major concern; they also saw their options for implementing policies such as re-scheduling outdoor activities, or making changes to the physical environment, as limited (Geller et al. 2008). Some participants felt that sun protection detracted from the school's core tasks such as teaching (Collins et al. 2006). Staff also felt that they and parents were "*bombarded*" with policies and initiatives about different issues, creating a sense of overload (Geller et al. 2008). One participant argued that policies such as 'no hat, no play' regulations were an infringement of children's rights (Collins et al. 2006).

> *Well I see schools that have detentions for children who do not wear hats which I think is just ridiculous. I think it is an intrusion on the children's rights. (participant, Collins et al. 2006)*

Effective communication with parents was identified as a potential barrier in one study (Geller et al. 2008). The cost to parents was also mentioned as a concern relating to compulsory hat regulations in one study (Collins et al. 2006).

Evidence statement 9: Perceived barriers - institutional barriers
ES 9.1 One study reports potential institutional barriers to sun protection in schools, including: the cost of implementing new policies for schools; time constraints on school staff; the difficulty of changing outdoor structures to provide shade; concerns about liability; and the need for staff training (Geller et al. 2008 [++]). ES 9.2 Two studies find that some school staff felt that sun protection was not a high-priority issue, because of the limited time children spent outdoors (Geller et al. 2008 [++]; Collins et al. 2006 [-]). Participants in one study felt that sun protection detracted from teaching (Collins et al. 2006 [-]) and in one other study, school staff said they felt overwhelmed with policies and initiatives on a wide range of issues (Geller et al. 2008 [++]). ES 9.3 Effective communication with parents was identified as a potential barrier in one study (Geller et al. 2008 [++]). The cost to parents was also mentioned as a concern relating to

compulsory hat regulations in one study (Collins et al. 2006 [-]).

Applicability
The two studies (Collins et al. 2006 [-]; Geller et al. 2008 [++]) described in this section were conducted in New Zealand and the USA respectively. Due to differences in school governance and funding systems between countries, the findings may not be readily applicable to the UK.

5.5 Cues to action

The potential cues which may trigger individuals' use of sun protection resources have been divided into five categories:

- Sources of positive influence;
- Knowing people who have had skin cancer;
- Policies in schools and leisure facilities;
- Media messages;
- Specific triggers.

5.5.1 Sources of positive influence

Ten studies (Abroms et al. 2003; Clarke and Korotchenko 2009; CRUK n.d.a (*Sunburn*); Gillespie et al. 1993; Glanz et al. 1999; Hay et al. 2009; Lupton and Gaffney 1996; Paul et al. 2008; Shoveller et al. 2003; Young et al. 2005) discuss the sources of encouragement to adopt sun safety behaviours. Parents, particularly mothers, were cited as an important source of encouragement in seven studies (Abroms et al. 2003; Clarke and Korotchenko 2009; Gillespie et al. 1993; Glanz et al. 1999; Paul et al. 2008; Shoveller et al. 2003; Young et al. 2005). Other sources of encouragement included teachers, lifeguards and coaches (Gillespie et al. 1993; Glanz et al. 1999; Paul et al. 2008). Parents' and other adults' roles in these studies were not limited to encouragement but included practical support.

> *When I'm packing she'll [mother] make sure I've got the sunscreen in the bag and then when I'm ready to go, she'll make me put it on again and put zinc on my lips. (male, participant, Paul et al. 2008)*

Seven studies described differences between age groups in terms of who functions as a source of encouragement (CRUK n.d.a (*Sunburn*); Gillespie et al. 1993; Glanz et al. 1999; Lupton and Gaffney 1996; Paul et al. 2008; Shoveller et al. 2003; Young et al. 2005). Glanz et al. (1999) found that parents or carers apply sunscreen more often to younger children, while older children are more likely to apply it themselves.

Gillespie et al. (1993) found that older children are more likely to listen to their peers, while younger children are more likely to be encouraged by authority figures such as teachers. Four further studies (CRUK n.d.a (*Sunburn*); Lupton and Gaffney 1996; Shoveller et al. 2003; Young et al. 2005) report similar findings, and in addition, see young people's shift from parents and teachers to peers as sources of encouragement as part of a broader process by which they

assert their independence. One participant in Lupton and Gaffney's (1996) study argued that young people are, in general, less likely to passively accept authority figures' advice than in the past, but want the rationales for specified behaviours to be explicitly set out, giving this as a reason why they may not listen to parents or teachers.

On the other hand, some participants in Paul et al. (2008) saw themselves as having become more responsible with age, and hence more inclined to listen to health messages.

> *When you are at that age at primary, sometimes you like to do the opposite to what you are told. That's how it is. But as you get older, you reason with yourself and realize that it's stupid. (male, 16-17 years, participant, Paul et al. 2008)*

Young adult participants in one study said that parental encouragement had little impact on their behaviour (Abroms et al. 2003).

> *[My mom says,] "You're going to die [from working as a lifeguard without sunscreen]. You're going to get skin cancer." All right, mom. Have a good day. I'm going to work. Leave me alone. (male, participant, Abroms et al. 2003)*

The recreation staff interviewed by Glanz et al. (1999) said that they had not been as effective in encouraging sun protection behaviour as they could be. Parrott et al. (1996) found that doctors rarely acted as a source of encouragement.

Two studies (Abroms et al. 2003; CRUK n.d.a (*Sunburn*)) examined gender differences in sources of influence. One study found that girlfriends and friends were the most influential sources for men (Abroms et al. 2003). Girlfriends and friends were noted to be more likely than parents to be with men when sunscreen decisions were made. For women, it was found that mothers were the most influential, providing verbal encouragement and in some cases supplying resources such as sunscreen. Most female participants also saw their friends and peers as sources of encouragement; their boyfriends or husbands, however, were generally indifferent to sunscreen use, although a few discouraged it. The other study also found that young men often rely on their girlfriend or mother for protection (CRUK n.d.a (*Sunburn*)).

One study found that people who have been diagnosed with skin cancer actively acted as sources of encouragement for other family messages, reminding them to use sun protection and, in some cases, using forceful personal messages: "*you don't want to end up like me*" (Hay et al. 2009). However, a participant in one study who had been diagnosed with malignant melanoma said that she had not actively passed on the message to colleagues (Glanz et al. 1999).

Evidence statement 10: Cues to action - sources of positive influence
ES 10.1 Six studies, most in school settings, find that children aged 6-8 years (Glanz et al. 1999 [++]), young people aged 12-17 years (Paul et al. 2008 [++]; Shoveller et al. 2003 [++]; Young et al. 2005 [++]; Gillespie et al. 1993 [-]), and young adults aged 18-25 years (Abroms et al. 2003 [+]) identified parents, especially mothers, as important sources of positive encouragement and

practical support for adopting sun protective behaviours. One further study of older women aged 75 to 90 years found that as children, they had also been positively influenced by parents (Clarke and Korotchenko 2009 [+]). Other adults, such as teachers and lifeguards, were identified as sources of positive encouragement for children aged 6-8 years (Glanz et al. 1999 [++]) and young people aged 8-17 years (Gillespie et al. 1993 [-]; Paul et al. 2008 [++]) to adopt sun protective behaviours.

ES10.2 Seven study reports find differences between children (approximately 8-13 years) and older young people (approximately 14-17 years) in sources of positive encouragement to use various forms of sun protection. One study found that parents or carers apply sunscreen more often to younger children, while older children are more likely to apply it themselves (Glanz et al. 1999 [++]). Five studies find that younger children are more likely to listen to parents', or other adults such as teachers' advice to use sun protection such as sunscreen or clothing, because of their role as authority figures, while older young people are more likely to be influenced by their peers (CRUK n.d.a (*Sunburn*) [-]; Gillespie et al. 1993 [-]; Lupton and Gaffney 1996 [++]; Shoveller et al. 2003 [++]; Young et al. 2005 [++]). Young people in these studies described the shift towards peer influence as part of a process of asserting their independence from authority. However, the remaining one study found that older young people (aged 16-17 years) felt themselves to be more receptive to health messages than younger children (Paul et al. 2008 [++]).

ES 10.3 One US study which interviewed recreation staff finds that they felt that they had not been an effective source of encouragement to encourage positive sun protective behaviour such as wearing clothes or applying sunscreen (Glanz et al. 1999 [++]. Another study of farmers in the USA notes that doctors rarely acted as a source of encouragement for positive sun protection behaviour (Parrott et al. 1996 [+]).

Applicability
Most of the studies in this section were not conducted in the UK. However, findings regarding sources of influence appear to be consistent across countries, and there are no specific reasons to think that these findings may not be generalisable to the UK context.

5.5.2 Knowing people who have had skin cancer

Participants in five studies, from the whole range of age groups, said that knowing someone with skin cancer, such as a friend or relative, had led them to increase their overall sun protection behaviours (Calder and Aitken 2008; Gerbert et al. 1996; Gillespie et al. 1993; Hay et al. 2009; Paul et al. 2008).

Evidence statement 11: Cues to action - knowing people that have had skin cancer
ES 11.1 Adults and young people in five study reports stated that knowing someone with skin cancer may act as a cue to adopt sun protection behaviours in general (Calder and Aitken 2008 [++]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Hay et al. 2009 [++]; Paul et al. 2008 [++]).

Applicability
None of the studies in this section were conducted in the UK. It is unclear to what extent the findings may be generalisable to the UK context.

5.5.3 Policies in schools and leisure facilities

Six studies discuss the role of institutional policies as cues to action, with four looking at schools (Collins et al. 2006; Geller et al. 2008; Gillespie et al. 1993; Paul et al. 2008) and two at leisure facilities (Escoffery et al. 2008; Glanz et al. 1999).

Two studies mention the role of messages or policies within schools as a cue to action (Collins et al. 2006; Geller et al. 2008). Collins et al. (2006) found that most of the schools in their sample from New Zealand implemented school-wide policies, including: constructing physical shade structures or planting trees; introducing 'no hat, no play' or 'no hat, play in the shade' rules; providing free sunscreen to students; and rescheduling outdoor activities to early morning or late afternoon. For some schools, addressing UV exposure and the risks associated with it forms a part of a larger initative to promote students' health at a 'whole-school' level. School staff were generally positively disposed to these policies, seeing them in the context of an integrated health promotion effort, and implemented them effectively. Schools in New Zealand are largely self-governing and responsible for funding interventions themselves. Finding outside funding was problematic in nine schools and they therefore could not provide shade. This was true of schools in disadvantaged areas as well as those with populations of higher socioeconomic status. Some schools took particular measures to encourage sun protection among pupils from minority ethnic groups (Maori and Pacific Islander).

In contrast, the US schools studied by Geller et al. (2008) generally did not have formal sun protection policies, and staff were less confident about their role in implementing change; nonetheless, most staff were willing to introduce such policies, and in particular to create physical shade structures.

Both the studies cited above concern primary schools; little data were available on secondary school policies, and a participant in one study observed that policies such as 'no hat, no play' which are common in primary schools in Australia are rare in secondary schools (Paul et al. 2008).

Children and young people in one study observed that the scheduling of outdoor school activities including lunch breaks and sports events was outside their control, and that such activities are frequently scheduled during the hottest part of the day (Gillespie et al. 1993).

Two studies examined leisure facilities such as outdoor swimming pools or sports facilities (Escoffery et al. 2008; Glanz et al. 1999). One study reports a process evaluation of a sun protection intervention ('Pool Cool') that targets patrons of outdoor pools (Escoffery et al. 2008). This study finds that signs, sunscreen pumps and shade structures were generally viewed

positively and frequently used by pool-goers. The programme also had a positive effect on staff, making them more conscious of sun safety (Escoffery et al. 2008). The recreation staff interviewed by Glanz et al. (1999) indicated that few sun protection policies had been implemented at their workplaces, and were conscious that staff often did not model good sun protection practices, but were generally willing to implement such policies.

In addition, participants in one further study suggested the use of venues such as community centres to diffuse sun protection messages beyond schools (Geller et al. 2008). They saw some potential barriers to positive outcomes at community venues, including low attendance and a perceived low priority of skin cancer as a health subject.

Evidence statement 12: Cues to action - policies in schools and leisure facilities
ES 12.1 Two studies from New Zealand and the US find that primary school staff were willing to implement school-wide sun protection policies such as: physical shade structures or trees; 'no hat, no play' or 'no hat, play in the shade' rules; provision of free sunscreen; or rescheduling outdoor activities. Obtaining funding for such policies, especially environmental change, was a barrier in some cases (Collins et al. 2006 [-]; Geller et al. 2008 [++]). One further Australian study notes that policies such as 'no hat, no play' are common in Australian primary schools, but are rare in secondary schools (Paul et al. 2008 [++]). ES 12.2 One study reports that the scheduling of outdoor school activities such as lunch breaks and sports events, typically at hotter times of day, is outside the control of students (Gillespie et al. 1993 [-]). ES 12.3 One study, a process evaluation of a sun protection intervention ('Pool Cool') at outdoor pools, finds that signs, sunscreen pumps and shade structures were viewed positively and frequently used by pool-goers (Escoffery et al. 2008 [++]) ES 12.4 In one study, recreation staff indicated that few sun protection policies had been implemented, and were conscious that staff often did not model good sun practice, but were generally willing to implement sun protection policies (Glanz et al. 1999 [++]). ES 12.5 Participants in one study suggested the use of venues such as community centres to diffuse sun protection messages beyond schools to facilitate better sun protection practices. Potential barriers to positive outcomes at community venues included low attendance and perceived low priority of skin cancer as a health subject. (Geller et al. 2008 [++]). *Applicability* None of the studies included in this section were from the UK. Since policies and forms of governance in schools and other institutions may vary between countries, the findings may not be readily applicable to the UK context.

5.5.4 Media messages

Three studies mention the influence of the media on individuals' behaviour (Abroms et al. 2003; Gerbert et al. 1996; Gillespie et al. 1993). Some participants mentioned that publicity concerning the negative effects of sunlight was a motivating factor to increase sun screen use, although it only had a short-term effect on behaviour.

> *When there was first the big scare about the hole on the ozone layer, about how we were all going to get skin cancer… for a while I was wearing sunscreen… But that lasted maybe three weeks. (participant, Gerbert et al. 1996)*

However, participants in three studies believed that popular media's representation of the attractiveness of a tan had an adverse effect on sun protection behaviour (Abroms et al. 2003; Gerbert et al. 1996; Gillespie et al. 1993). A respondent in one study of young people (aged 18-25 years) pointed out that characters on television, for example in *Baywatch*, are never seen using sunscreen (Abroms et al. 2003).

Evidence statement 13: Cues to action - media messages
ES13.1 Three study reports, of young adults (18 to 25 years) and adults discuss the influence of the media on individuals' behaviour (Abroms et al. 2003 [+]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]). All of these studies show the belief that representations in the media may have an adverse effect on sun protection behaviours. *Applicability* None of the studies in this section are from the UK. However, it is likely that media messages are similar across countries.

5.5.5 Specific triggers of sun protection behaviour

Participants in three studies said that they are more likely to use sun protection in summer than in winter (Gillespie et al. 1993; Glanz et al. 1999), or in sunny weather more than on overcast days (Gerbert et al. 1996). In two UK studies, one of male outdoor workers (aged 20-50 years) and the other of young women (aged 12-15 years), participants said that the weather in the UK does not demand sun protection (CRUK n.d.c (*Outdoor workers*); Curtis and Pollock 2009).

Participants in two studies mentioned that they are more likely to use sun protection when they notice that they are already beginning to burn (Bergenmar and Brandberg 2001; Grey 2008).

Evidence statement 14: Cues to action - specific triggers of sun protection behaviour
ES 14.1 Three study reports, from the USA and Australia, show people of all age ranges to be more likely to use sun protection in general in summer and in sunny weather (Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]). ES 14.2 Two study reports from the UK, one of male outdoor workers (aged 20-50 years) and

the other of young women (aged 12-15 years), report the belief that sun protection measures are not required in the UK due to the lack of hot, sunny weather (CRUK n.d.c (*Outdoor workers*) [-]; Curtis and Pollock 2009 [-]).

ES 14.3 Two study reports describe adults (aged 16-54 years) putting on a T-shirt or applying sunscreen only after beginning to burn (Bergenmar and Brandberg 2001 [++]; Grey 2008 [-]).

Applicability
Studies from the UK indicate a particular perception that the weather in the UK does not call for sun protection. Other findings from non-UK studies are also likely to be applicable to the UK context.

5.6 Barriers and facilitators to the use of interventions

In this section, evidence relating to barriers and facilitators of interventions is summarised. This includes both data from studies which directly focused on interventions, and data from other studies which may be relevant to interventions.

5.6.1 Provision of sun protection resources

The findings of this review show a number of barriers to sun protection that could potentially be addressed by resource provision interventions, such as making available free sunscreen or protective clothing. Five studies note that the cost of sunscreen (Abroms et al. 1999; Glanz et al. 1999; Paul et al. 2008; Reeder et al. 2000), and the inconvenience of remembering to carry sunscreen (Abroms et al. 2003; Gillespie et al. 1993) or protective clothing (Paul et al. 2008), particularly among children and young people (8 to 25 years), may be barriers to their use.

Two studies present data on the implementation of interventions with a resource provision component. Collins et al. (2006) look at school-based programmes including free sunscreen and hat provision as well as environmental shade provision, regulatory and scheduling changes, and education. Escoffery et al. (2008) look at an intervention in swimming pools including free sunscreen provision as well as environmental shade provision, signage and staff training. Both these studies find that resource provision is feasible and acceptable for service providers in these settings, and that there is substantial uptake of resource provision by targeted populations. Some barriers were found in these studies, including dissenting views from some school staff who did not see sun protection as a high priority (Collins et al. 2006).

In two studies, service providers' views on potential interventions, including resource provision, were elicited. These studies find that school staff (Geller et al. 2008) and leisure staff (Glanz et al. 1999) are generally aware of the value of sun protection interventions and optimistic about their own role in promoting sun protection behaviour. However, they have concerns around practicability (funding; limited scheduling options) and issues of the definition of their responsibilities (monitoring; allergies to sunscreen; parental permission; liability in case of

sunburn). Many service providers have ideas about how sun protection could be incorporated into their role (Glanz et al. 1999), which may be valuable in designing interventions.

The studies identified a number of other barriers to resource use including:

- Physical discomfort (Gillespie et al. 1993; Glanz et al. 1999; Parrott et al. 1996; Paul et al. 2008)
- Inconvenience of use (Abroms et al. 2003; CRUK n.d.c (*Outdoor workers*); Curtis and Pollock 2009; Geller et al. 2008; Gerbert et al. 1996; Gillespie et al. 1993; Glanz et al. 1999; Parrott et al. 1996; Paul et al. 2008; Reeder et al. 2000)
- Social barriers including appearance and prevailing norms (Abroms et al. 2003, Glanz et al. 1999, Parrott et al. 1996; Calder and Aitken 2008; Gillespie et al. 2003, Glanz et al. 1999, Lupton and Gaffney 1996, Paul et al. 2008, Shoveller et al. 2003)

Different populations are likely to have different barriers. For example, appearance or fashionability is particularly important for young people (Calder and Aitken 2008; Gillespie et al. 2003; Glanz et al. 1999; Lupton and Gaffney 1996; Paul et al. 2008; Shoveller et al. 2003). This indicates that the nature of the resources provided should be carefully considered. Different resources may be appropriate to different populations: for example, families with young children have different needs to older young people.

Evidence statement 15: barriers and facilitators – resource provision
ES 15.1 Five studies identify factors which could be addressed by resource provision interventions such as making available sunscreen or protective clothing. These factors include the cost of sunscreen (Abroms et al. 2003 [+]; Glanz et al. 1999 [++]; Paul et al. 2008 [++]; Reeder et al. 2000 [+]), and the inconvenience of remembering to carry sunscreen (Abroms et al. 2003 [+]; Gillespie et al. 1993 [-]) or protective clothing (Paul et al. 2008 [++]). These barriers appear to be particularly relevant for children and young people (aged 8 to 25 years). ES 15.2 Two studies present process data on multi-component interventions with a resource provision component, including sunscreen and clothing provision as well as environmental change and information (Collins et al. 2006 [-]; Escoffery et al. 2008 [++]). Both these studies find that resource provision is feasible and acceptable for service providers in these settings, and that there is substantial uptake of resource provision. Potential barriers include the fact that not all staff who are involved in delivering interventions see sun protection as a high priority (Collins et al. 2006 [-]). ES 15.3 Two studies investigate service providers' views towards potential resource provision interventions, finding that school staff (Geller et al. 2008 [++]) and leisure staff (Glanz et al. 1999 [++]) are positive about the potential to implement sun protection interventions. However, they have concerns relating to practical requirements such as time and funding, and are not always confident that their own roles and responsibilities will be clearly defined. ES 15.3 A wide range of other barriers are identified in the studies. These include physical discomfort (Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]; Parrott et al. 1996 [+]; Paul et al. 2008 [++]), inconvenience of use (Abroms et al. 2003 [+]; CRUK n.d.c (*Outdoor workers*) [-];

Curtis and Pollock 2009 [-]; Geller et al. 2008 [++]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]; Parrott et al. 1996 [+]; Paul et al. 2008 [++]; Reeder et al. 2000 [+]) and social barriers including appearance and prevailing norms (Abroms et al. 2003 [+]; Calder and Aitken 2008 [++]; Gillespie et al. 2003 [-]; Glanz et al. 1999 [++]; Lupton and Gaffney 1996 [++]; Parrott et al. 1996 [+]; Paul et al. 2008 [++]; Shoveller et al. 2003 [++]). Not all resources are acceptable to all targeted populations.

Applicability
Most of the studies cited here were not conducted in the UK. It is possible that barriers to the implementation and uptake of interventions will be greater in the UK than elsewhere, due to service providers and targeted populations having less awareness of sun protection.

5.6.2 Physical changes to natural or built environment

We located relatively little data relevant to environmental change interventions such as constructing shade structures or planting trees, with only three studies providing clearly relevant data (Collins et al. 2006; Gillespie et al. 1993; Geller et al. 2008). Such interventions appear to be feasible in schools, and may be most promising as part of a holistic 'whole school' approach to health promotion, combined with educational curricula and changes to school regulations and policies (Collins et al. 2006). However, uptake of environmental shade may be incompatible with the freedom to engage in outdoor activities, which is valued especially by younger children (Gillespie et al. 1993). Lack of funding may be a barrier to implementing such interventions (Geller et al. 2008).

Outside the school context, where there is less supportive policy infrastructure, we found no data directly relevant to environmental change interventions. The low perceived salience of sun protection for incidental sun exposure, and the emphasis on sunscreen as the primary mode of protection (Glanz et al. 1999), mean that the availability of shade in the environment is rarely discussed. Nonetheless, it is possible that the use of environmental shade where it is available is higher than the findings of qualitative research would suggest.

Evidence statement 16: barriers and facilitators – environmental change

ES 16.1 One study looks at multi-component interventions in schools including the provision of environmental shade, finding that such interventions are practicable and acceptable (Collins et al. 2006 [-]). These interventions formed part of broader programmes which also included resource provision, regulatory and scheduling changes, and education.

ES 16.2 One study finds that using environmental shade may reduce the spontaneity of outdoor activities, especially for younger children (Gillespie et al. 1993 [-]). One study finds that school authorities see the cost of providing environmental shade as a barrier (Geller et al. 2008 [++]).

Applicability
None of the studies cited here were conducted in the UK. It is unclear to what extent findings relating to environmental change may be applicable to the UK context.

5.6.3 Multi-component interventions

Five studies find that people do not think skin cancer is a serious risk, and that sun protection is of low importance (CRUK n.d.b (*SunSmart*); Curtis and Pollock 2009; Gerbert et al. 1996; Gillespie et al. 1993; Glanz et al. 1999). This suggests that multi-component interventions, combining information or education (such as media campaigns, signage or point-of-sale prompts) with resource provision and/or environmental change, may constitute a promising strategy.

Seven studies indicate that concerns about appearance (the risk of visible skin aging, moles, wrinkles, or visible sunburn) are highly salient in terms of the perceived risks of sun exposure (Abroms et al. 2003; Paul et al. 2008; Clarke and Korotchenko 2009; Gerbert et al. 1996; Gillespie et al. 1993; Lupton and Gaffney 1996; Murray and Turner 2004). Two of these find that visible skin aging is perceived by some participants to be as serious a consequence of sun exposure as the risk of cancer (Gerbert et al. 1996; Murray and Turner 2004). Multi-component interventions might therefore seek to emphasise appearance-related messages rather than focusing on skin cancer, which is perceived to be distant and improbable. Addressing social norms around tanning, and the attractiveness of a tanned appearance, may also have a role to play in multi-component interventions. However, there is a risk that such messages may alienate men, who are reluctant to be seen to be motivated by concerns about their appearance, even when the latter are important to them (Abroms et al. 2003; Lupton and Gaffney 1996; see section 5.7.3 below).

An important potential barrier to the uptake of interventions is the perception that incidental tanning is less risky than deliberate tanning (Bergenmar and Brandberg 2001; Lupton and Gaffney 1996; Shoveller et al. 2003). Interventions could therefore be tailored in such a way as to re-frame sun protection messages away from deliberate sunbathing and beach settings, and towards the mitigation of incidental sun damage. For example, providing sun protection resources or environmental shade in settings such as parks or pedestrian areas could be combined with information on the risks of incidental sun exposure.

A potential concern here is the potential for conflict with other aspects of the health promotion agenda, particularly physical activity. The association of tanning with a healthy, active lifestyle (Bergenmar and Brandberg 2001; Calder and Aitken 2008; Gerbert et al. 1996; Gillespie et al. 1993; Lupton and Gaffney 1996; Shoveller et al. 2003) – as well as the practical barriers to using sun protection in conjunction with physical activities such as sport or active transport – means that sun protection interventions will need to be carefully designed in order not to inadvertently undermine the promotion of physical activity.

Evidence statement 17: barriers and facilitators – multi-component interventions
ES 17.1 Five studies find that people do not think skin cancer is a serious risk, and that awareness of the risks of sun exposure is generally low (CRUK n.d.b (*SunSmart*) [-]; Curtis and

Pollock 2009 [-]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]); this perception could be addressed by multi-component interventions.

ES 17.2 Seven studies identify appearance (the risk of skin aging, moles, wrinkles, or visible sunburn) as a potential motivation for sun protection behaviour (Abroms et al. 2003 [+]; Clarke and Korotchenko 2009 [+]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Lupton and Gaffney 1996 [++]; Murray and Turner 2004 [+]; Paul et al. 2008 [++]). This motivation could be addressed by sun protection messages as part of multi-component interventions.

ES 17.3 Three studies find that incidental tanning is perceived to be less risky than deliberate tanning (Bergenmar and Brandberg 2001 [++]; Lupton and Gaffney 1996 [++]; Shoveller et al. 2003 [++]). Six studies find that sun exposure, or a tanned appearance, are associated with a healthy, active lifestyle (Bergenmar and Brandberg 2001 [++]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Calder and Aitken 2008 [++]; Lupton and Gaffney 1996 [++]; Shoveller et al. 2003 [++]). These perceptions may have implications for the design of interventions.

Applicability
Most of the studies cited here were not conducted in the UK. It is possible that barriers to the implementation and uptake of interventions will be greater in the UK than elsewhere, due to service providers and targeted populations having less experience of sun protection interventions, and less awareness of sun protection.

5.7 Views of different groups

In this section we examine the public's views; service providers' views; and differences between population groups.

5.7.1 Views of people who may use prevention services

A consistent finding of this review is that the perceived risks of sun exposure, and the perceived severity of skin cancer, are generally low (CRUK n.d.b (*SunSmart*); Curtis and Pollock 2009; Gerbert et al. 1996; Gillespie et al. 1993; Glanz et al. 1999), and a tanned appearance is considered attractive (Calder and Aitken 2008; Clarke and Korotchenko 2009; Curtis and Pollock 2009; Lupton and Gaffney 1996; Gerbert et al. 1996; Gillespie et al. 1993; Grey 1998; Murray and Turner 2004; Paul et al. 2008; Reeder et al. 2000; Shoveller et al. 2003; Young et al. 2005). There are exceptions: parents of young children appear to be more receptive to sun protection messages, and women more than men (see section 5.7.3). Nonetheless, it appears that sun protection interventions are likely to have a low perceived salience for much of the population. For this reason, it may be of value to combine resource provision or environmental interventions with education or information, in order to maximise their impact.

Within this general point, one issue of interest is the difference between deliberate and incidental tanning. The risk involved in deliberate tanning is often recognised, at least in theory,

but that involved in outdoor activities which result in 'incidental' tanning are not, partly because of the healthy connotations of outdoor physical activity (Bergenmar and Brandberg 2001; Lupton and Gaffney 1996; Shoveller et al. 2003). Because of this healthy connotation, and because sun protection is associated with deliberate tanning such as at the beach (Abroms et al. 2003; Glanz et al. 1999; Parrott et al. 1996), incidental tanning is not perceived as calling for sun protection. This appears to be particularly relevant for men, who reject the idea of deliberately tanning, but value a tanned appearance gained as a result of 'incidental' sun exposure (Abroms et al. 2003; Lupton and Gaffney 1996; see section 5.7.3 below). There is a potential risk that interventions focused on high-exposure settings such as beaches may inadvertently strengthen the perceived distinction between deliberate and incidental tanning.

Evidence statement 18: views of people who may use prevention services
ES 18.1 Five studies find that people do not think skin cancer is a serious risk (CRUK n.d.b (*SunSmart*) [-]; Curtis and Pollock 2009 [-]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]). Twelve studies find that a tanned appearance is considered attractive (Calder and Aitken 2008 [++]; Clarke and Korotchenko 2009 [+]; Curtis and Pollock 2009 [-]; Lupton and Gaffney 1996 [++]; Gerbert et al. 1996 [++]; Gillespie et al. 1993 [-]; Grey 1998 [-]; Murray and Turner 2004 [+]; Paul et al. 2008 [++]; Reeder et al. 2000 [+]; Shoveller et al. 2003 [++]; Young et al. 2005 [++]). ES 18.2 Three studies find that incidental tanning is perceived as less risky than deliberate tanning (Bergenmar and Brandberg 2001 [++]; Lupton and Gaffney 1996 [++]; Shoveller et al. 2003 [++]). The use of protection is associated with deliberate tanning, such as at the beach, in three further studies (Abroms et al. 2003 [+]; Glanz et al. 1999 [++]; Parrott et al. 1996 [+]). This suggests that sun protection is seen as less salient where sun exposure is incidental and not deliberate. Two studies indicate that this may be particularly true for men (Abroms et al. 2003 [+]; Lupton and Gaffney 1996 [++]). *Applicability* Most of the studies cited here were not conducted in the UK. However, the findings appear to be consistent across countries.

5.7.2 Views of service providers

Service providers, or potential service providers such as teachers, other school staff and staff at leisure facilities, are generally optimistic about the prospects for intervention and policy change, and willing to take an active role in implementing policy (Collins et al. 2006; Geller et al. 2008; Glanz et al. 1999). Staff in schools who have implemented integrated sun-protection policies are actively engaged in modelling and encouraging good sun protection practices (Collins et al. 2006). However, in some cases, potential service providers are concerned about the potential extension to their responsibilities, and about the boundaries and expectations around this extended role (Geller et al. 2008; Glanz et al. 1999). There is also the risk, particularly in schools, of an overload of policies and recommendations leading to unclarity about what activities to prioritise (Geller et al. 2008).

Evidence statement 19: views of service providers
ES 18.2 Three studies find that service providers, including school staff (Collins et al. 2006 [-]; Geller et al. 2008 [++]) and leisure staff (Glanz et al. 1999 [++]), have positive attitudes towards resource provision and environmental change interventions. However, two studies report concerns about the potential extension to their responsibilities (Geller et al. 2008 [++]; Glanz et al. 1999 [++]), and one study raises the prospect of an overload of policies and recommendations (Geller et al. 2008 [++]). *Applicability* None of the studies cited here were conducted in the UK. There may be differences between countries in the organisational context of service delivery, which may create barriers to the applicability of these findings to the UK context.

5.7.3 Differences by population

Gender

In two studies, men were found to be less likely than women to deliberately sunbathe to tan, but also less likely to use sun protection (Abroms et al. 2003; CRUK n.d.a (*Sunburn*)). A theme in several studies is that actions taken in order to protect or improve one's appearance are perceived as unmasculine. This applies both to deliberate sunbathing (Lupton and Gaffney 1996) and sunbed use (Calder and Aitken 2008; CRUK n.d.c (*Outdoor workers*)), but also to the use of sun protection such as sunscreen (Abroms et al. 2003).

As already noted, these gender differences may be linked to other perceptions, in particular the perception of incidental tanning as less harmful than deliberate tanning, and the association of a tanned appearance with a healthy, outdoor lifestyle (see section 5.7.1 above). Men appear to value a tan gained as a result of outdoor activities, especially sports, but do not see themselves as engaging in 'tanning' as a distinct activity. Hence, men are likely to be less receptive to sun protection messages which focus on the dangers of deliberate sunbathing or sunbed use. Women appear to be more aware of the risks involved in incidental sun exposure, and hence more receptive to sun protection messages, but are also more likely to engage in deliberate tanning.

In addition, women, especially mothers, tend to take the lead role in promoting sun protection behaviours within the family, particularly for children but also for other adults (Abroms et al. 2003; Hay et al. 2009; Paul et al. 2008).

Women were found to be more concerned than men about appearance, including both perceived positive aspects of sun exposure (tanning) and negative effects (skin aging), in four studies (Abroms et al. 2003; Lupton and Gaffney 1996; Murray and Turner 2004; Paul et al. 2008). Very few male participants in the studies expressed concern about the long-term effects of sun exposure on appearance.

These differences between men's and women's attitudes appear to emerge early, with some differences visible as early as age 12 to 14 (Paul et al. 2008). Further, we would suggest that these differences do not arise in isolation from the broader culture, but are linked to deeply-rooted gender norms which code concern with appearance, in general, as feminine: "men act, women appear" (Berger 1972). As noted above, these differences indicate that different strategies may be appropriate to men and women. However, it is difficult to operationalise such differences within social or community-based intervention strategies. Our findings suggest that women are more likely to be receptive to sun protection messages, and to pass these messages on to family members.

Evidence statement 20: Differences by population - gender
ES 20.1 Two studies find that men were found to be less likely than women to deliberately sunbathe, but also less likely to use sun protection (Abroms et al. 2003 [+]; CRUK n.d.a (*Sunburn*) [-]). Three studies report the perception that sunbathing (Lupton and Gaffney 1996 [++]) or sunbed use (Calder and Aitken 2008 [++]; CRUK n.d.c (*Outdoor workers*) [-]) are unmasculine. ES 20.2 Three studies find that women, especially mothers, tend to take the lead role in promoting sun protection behaviours within the family (Abroms et al. 2003 [+]; Hay et al. 2009 [++]; Paul et al. 2008 [++]). ES 20.3 Four studies find that women were more concerned than men about how the sun affects their appearance, both negatively (skin aging and wrinkles) and positively (tanned appearance) (Abroms et al. 2003 [+]; Lupton and Gaffney 1996 [++]; Murray and Turner 2004 [+]; Paul et al. 2008 [++]). *Applicability* Most of the studies cited in this section were not conducted in the UK. However, the findings appear to be consistent across countries.

Age

Our findings indicate that different age groups, particularly among children and young people, have different views. For younger children, sun protection behaviours are likely to be strongly influenced by parents and teachers and other school staff (Abroms et al. 2003; Clarke and Korotchenko 2009; Gillespie et al. 1993; Glanz et al. 1999; Paul et al. 2008; Shoveller et al. 2003; Young et al. 2005). Nonetheless, younger children are aware of the need for sun protection and willing to encourage others (Gillespie et al. 1993), and may be usefully targeted by sun protection interventions.

Older children and adolescents may be more difficult to reach effectively, as they are engaged in a process of gaining independence which may lead to the rejection of simplistic messages from adults and authority figures (CRUK n.d.a (*Sunburn*); Lupton and Gaffney 1996; Shoveller

et al. 2003; Young et al. 2005). They may see sun protection as a matter for younger children (Paul et al. 2008). They are also strongly influenced by concerns about appearance and 'coolness' and by social norms, including gender norms. These findings suggest that peer-led interventions may be a promising strategy with this age group.

The one study with a focus on older people (Clarke and Korotchenko 2009) found certain views which may be characteristic of this age group, including a strong belief in sun exposure as healthy in itself. On the other hand, older people are aware at first-hand of the long-term effects of sun exposure, and of the contingency of social expectations around tanning.

Parents of young children appear to be more receptive than the general population to sun protection messages (CRUK n.d.a (*Sunburn*); CRUK n.d.c (*Outdoor workers*); Glanz et al. 1999; Reeder et al. 2000). However, some data suggest that parental concern relating to young children's sun exposure may not extend to their own sun exposure, or to that of older children (CRUK n.d.c (*Outdoor workers*); Grey 2008; Paul et al. 2008). This suggests that sun protection messages targeted at parents may have had an impact on the protection of young children, but less influence on behaviour more broadly.

Evidence statement 21: Differences by population – age
ES 21.1 Seven studies find that young children are more likely to be influenced by parents, particularly mothers and school staff (Abroms et al. 2003 [+]; Clarke and Korotchenko 2009 [+]; Gillespie et al. 1993 [-]; Glanz et al. 1999 [++]; Paul et al. 2008 [++]; Shoveller et al. 2003 [++]; Young et al. 2005 [++]). ES 21.2 Four studies find that adolescents are less likely to be influenced by authority figures and adults and may assert their independence by not following sun protection messages (CRUK n.d.a (*Sunburn*) [-]; Lupton and Gaffney 1996 [++]; Shoveller et al. 2003 [++]; Young et al. 2005 [++]). One study finds that adolescents see sun protection as primarily concerning younger children (Paul et al. 2008 [++]). ES 22.2 Four studies find that parents of young children are more receptive than the general population to sun protection messages (CRUK n.d.a (*Sunburn*) [-]; CRUK n.d.c (*Outdoor workers*) [-]; Glanz et al. 1999 [++]; Reeder et al. 2000 [+]). However, three studies find that parental concern relating to young children's sun exposure does not necessarily translate into concern about their own sun exposure, or to that of older children (CRUK n.d.c (*Outdoor workers*) [-]; Grey 2008 [-]; Paul et al. 2008 [++]). *Applicability* Most of the studies cited in this section were not conducted in the UK. However, the findings appear to be consistent across countries.

Ethnicity

We found little data regarding ethnicity. One study suggests that certain beliefs, for example in the value of sun exposure for children to increase 'resistance' to sun damage, may be more prevalent among certain ethnic or cultural groups; however, this study does not directly explore differences in belief between ethnic groups, so this point is of limited reliability (Glanz et al. 1999). One study found that some schools had specifically targeted minority ethnic pupils with sun protection policies (Collins et al. 2006).

Our findings do not allow us to say to what extent sun protection interventions may need to be tailored to people of different ethnicities, as a result either of socio-cultural factors, or of phenotypic differences in skin tone which may impact on (actual or perceived) skin cancer risk.

Socioeconomic status (SES) and occupation

We found little data regarding SES. One study found that people from higher-SES groups were more aware of long-term health risks from sun exposure than those from lower-SES groups (CRUK n.d.a (*Sunburn*)). One study found that schools in low-SES areas were able to implement sun protection policies as successfully as those in high-SES areas (Collins et al. 2006). Other than this, our findings do not allow us to say how barriers or facilitators of interventions may differ for people of different SES.

One occupational group of particular concern is outdoor workers. Two included studies had a focus on outdoor workers (CRUK n.d.c (*Outdoor workers*); Parrott et al. 1996). Both these studies found a generally low perceived severity of and susceptibility to skin cancer (including the belief that sun exposure would increase 'resistance' to sun damage). Parrott et al.'s (1996) study of farmers in the southern USA found that they had limited access to resources for preventing skin cancer resources. Inconvenience was a more salient barrier than cost for this population, which may suggest that the potential for resource provision interventions is limited; there is also concern about the accessibility of interventions for dispersed rural populations. The other study, of outdoor workers in the UK (CRUK n.d.c (*Outdoor workers*)), similarly found that most thought they were not at risk, and were unwilling to use sun protection. Some felt that sun protection was not a priority for their employers. However, employees in larger organisations were amenable to changing behaviour if the necessary policies were led and financed by management. These studies suggest that the skin cancer risk of outdoor workers is a cause for concern; interventions in the workplace might be promising, but are likely to be challenging to implement.

Evidence statement 22: Differences by population – socioeconomic status and occupation
ES 22.1 One UK study finds that people from higher-SES groups were more aware of long-term health risks from sun exposure than those from lower-SES groups (CRUK n.d.a (*Sunburn*) [-]). ES 22.2 Two studies focus on the views of outdoor workers (CRUK n.d.c (*Outdoor workers*) [-]; Parrott et al. 1996 [+]). Both these studies find that outdoor workers do not feel that sun protection is a priority, and that they have little awareness of the risks of sun exposure. *Applicability*

Two of the three studies in this section come from the UK, and the findings of the other (from the USA) are consistent with the UK research. Hence, findings are applicable to the UK context.

6.0 Discussion and summary

6.1 Strengths and weaknesses of the review

This review was systematic in nature, based on the guidance set out in the second edition of *Methods for the development of NICE public health guidance* (NICE 2009). Our search strategies were highly sensitive and included a wide range of potentially relevant sources. However, we did not include studies from the phase 1 review if they were not located by our searches (see section 6.4.1). The use of a cluster of terms referring to intervention types in our search strategy, although justified by the scope and purpose of the review, may have led to relevant studies not being located.

We used the Health Belief Model as a framework, which provided a coherent structure for the data synthesis (apart from the category of self-efficacy which was found not to be useful). Our synthesis was essentially thematic in nature, seeking to identify and collate common themes across the studies, and involved the elaboration of higher-order constructs only to a limited extent. Such thematic synthesis was supported by the nature of most of the primary studies, and helps to maintain the transparency of the synthesis process. However, further synthesis to develop these constructs would be of value. For example, the relation observed in our findings between 'health' and 'attractiveness' is a complex one; further exploration of this relationship and its links to other key concepts (e.g. gender norms) would be illuminating, and potentially of value in drawing out implications for interventions.

A further limitation of thematic synthesis, also noted by the phase 1 reviewers, is that it tends to weight review findings as a function of frequency and study quality, which may not be an accurate guide to the importance or reliability of the given finding. Again, however, the potential loss of depth in the synthesis must be set against the gains in transparency.

6.2 Gaps in the evidence

This review located a substantial amount of robust qualitative data on the barriers and facilitators of resource provision, environmental change and multi-component interventions for skin cancer prevention. However, there are some areas which are not well covered. Key gaps in the evidence include the following.

Few studies elicited data on study participants' views relating specifically to the delivery and implementation of interventions. While many of our findings have implications for the design and implementation of interventions, only in a small number of cases were these implications explicitly drawn out by primary study participants.

Few studies were conducted in the UK, and those that were, were not of high quality. Most studies were conducted in locations with warmer, sunnier climates, and with a longer history of skin cancer prevention programmes. There are likely to be challenges in generalising such evidence to the UK context. We found little data on holidays as a context of sun exposure,

which may be problematic, since UK residents are likely to receive much of their annual UV exposure on holiday.

Most studies did not focus on understanding the differences between factors which may influence different kinds of sun protection behaviour and resources (e.g. sunscreen, shade, or protective clothing). Of the data which did elicit views about specific behaviours, sunscreen use was predominant over other protective behaviours.

Information on subgroups of the population was mixed, with a substantial amount of data available on differences between men and women and between age groups (at least among children and young people), but little on socio-economic status and virtually none on ethnicity.

6.2.1 Relation of this review to the phase 1 review

This review did not locate all the studies included in the phase 1 review due to the different search terms used; of those located, some were excluded due to our different inclusion criteria. (Conversely, we included some studies not included in the phase 1 review.) We also did not screen all the studies in the phase 1 review for inclusion: this represents an exception to our search strategy. As a result, this review overlaps partially with that undertaken for phase 1.

The quality assessment tool used for this review (that set out in the second edition of *Methods for the development of NICE public health guidance*) was different to that used for phase 1. As a result, the quality scores for the studies which were included in both reviews are not always identical.

We used the same overarching framework for synthesis (the Health Belief Model) as phase 1. This helps to make the findings comparable across the two reviews. However, due to the differences in the data examined, we did not use exactly the same arrangement of sub-themes within the framework. Even for overlapping studies and themes, our synthesis may be different owing to the different contexts of analysis.

6.3 Conclusions

Resource provision, environmental change and multi-component interventions to prevent skin cancer may benefit from taking the public's and other stakeholders' views into account. The findings of this review suggest a number of barriers which could usefully be addressed by interventions, including the cost and inconvenience of sun protection resources, and social norms concerning their use.

However, especially in the UK, most people are not concerned about skin cancer, and often do not see their own UV exposure as risky. There are some exceptions, particularly parents of young children, who appear to be more receptive to sun protection interventions than other groups. Concerns about appearance and visible skin damage may be as important a facilitator

for sun protection as the risk of cancer. Men are consistently less concerned than women about sun exposure risk, and less aware of the need for protection. Some data indicate that people from lower-SES groups, and people who work outdoors, are less concerned than others. These perceptions may create a barrier to the uptake and successful implementation of sun protection interventions.

In addition, the perception of a tanned appearance as attractive and healthy is strongly held across a wide range of populations. Other potential barriers to intervention uptake include concerns about the practicality of sun protection, and the ease of use of sun protection resources. Social norms about sun protection and sun exposure, and concerns about maintaining an attractive or fashionable appearance, are also salient, particularly for young people and young adults (teens to early twenties).

These findings indicate that uptake of interventions may face a range of barriers in particular populations and settings. In particular, the acceptability of resource provision interventions may depend on the specific characteristics of the resources offered. For example, protective clothing which is seen to be unattractive may be rejected. Careful targeting of interventions to particular settings and populations may be required to overcome these barriers. Nonetheless, to the extent that they are aware of the risks, many people appear to be willing to make changes in behaviour, and are supportive of sun protection interventions.

In institutions such as schools, potential barriers include a lack of funding, unclear definitions of responsibility, and an overload of policies and recommendations. Again, however, potential service providers, such as teachers and other school staff, and staff at leisure facilities, are generally optimistic about their own role in promoting sun protection behaviour.

While the risks involved in deliberate tanning, particularly sunbed use, are widely recognised, there is less awareness of the dangers of incidental sun exposure. Outdoor activities, particularly physical activities, are seen as healthy, and the risks involved in sun exposure during such activities are often not considered. The perception of a tanned appearance as healthy and attractive also appears to owe something to the connotation of an active lifestyle. These views may have implications for the design and targeting of interventions.

The data included in this review indicate that there is substantial scope for resource provision and multi-component interventions to impact on sun protection behaviour. The picture regarding environmental change alone is less clear, although there are some promising indications that such interventions may be valuable, particularly as part of holistic strategies in particular contexts.

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8.0 Appendix A. Search Strategies

8.1 Development of search strategies

The search strategy was developed within the Centre for Evidence and Policy at King's College London. The terms were further defined through extensive testing and consultation with Matrix Evidence prior to submission to NICE in the form of a draft search protocol formatted for Medline and a list of resources.

The strategy was re-tested upon return from NICE with the final protocol and list of resources being approved on Thursday, 17 December 2010. Searching commenced on Monday, 21 December 2010.

The Medline strategy was applied across all of the medical databases that could interpret the mix of MeSH and free-text language. Where MeSH terms worked in Medline and did not translate to similar themed but subject specific resources, Psychinfo for instance, the initial terms were retained for the sake of methodological consistency even if some of the lines did not achieve results.

In the social science databases, which generally do not support MeSH, it was necessary to re-draft the lines of the Medline strategy into formatted search clusters. The terms were simplified by removing the MeSH terms and leaving the terms to operate as free-text. In the resources for which it was possible, MeSH logic was applied though without the precise formatting.

All of the search results were imported into a reference management tool for the purposes of de-duplication and screening.

8.2 ASSIA

Assia (CSA)

Date search Conducted: Wednesday, December 30th 2009

1. (skin cancer or (skin and (neoplasm* or cancer* or carcinoma* or adenocarcinom* or tumour* or tumor* or malignan*)) or skin neoplasms or non melanoma or malignant melanoma or melanoma or basal cell carcinoma)
2. (sun* or sunburn* or tan* or infrared* or solar* or damage or ultra violet* or ultraviolet* or ultra-violet*)
3. (prevent* or primary prevent* or health education* or health promotion* or protect* or precaution* or reduc* or natural* or protection or seeking shade or age or life style* or lifestyle* or life-style* or life style* or health)
4. (built environment* or structural chang* or physical chang* or shade or purpose built or sun trap* or architect* or consult* or design or construction or surrounding* or shelter or seat* or static* or pub* place or park* or garden* or public event* or

event* or concert* or outdoor* or walk* or (sport and (water* or winter*)) or build* or house* or flats or tent* or veranda* or blind* or umbrella* or awning* or cover* or shelter* or foliage or green* or tree* or plant* or nature or wind break* or barrier* or purpose* or childhood or secondary* or college or univ* or work* or lunch* or play* or game* or beach* or bathing beaches or swimming* or swimming pools or environmental exposure* or school* or universities or university or work*)

5. (provi* or distribut* or prescri* or free or hand out or give*) and (hat* or sunhat* or glasses or sunglass* or visor* or sun screen* or sunscreen* or sun block* or cover up or protective clothing)
6. (qualitative* or focus* or discussion* or case stud* or interview* or questionnaire* or evaluat* or (research* and (participant* or action* or priorit* or activit*)) or observation* or verbal interaction* or process or implementation or perception* or attitude* or view)

#1 AND #2 AND #3 AND (#4 OR #5) AND #6

Limit to earliest to 2010

8.3 Campbell Library

Search Conducted: Wednesday, December 30th 2009

1. (skin cancer or (skin and (neoplasm* or cancer* or carcinoma* or adenocarcinom* or tumour* or tumor* or malignan*)) or skin neoplasms or non melanoma or malignant melanoma or melanoma or basal cell carcinoma)
2. (sun* or sunburn* or tan* or infrared* or solar* or damage or ultra violet* or ultraviolet* or ultra-violet*)
3. (prevent* or primary prevent* or health education* or health promotion* or protect* or precaution* or reduc* or natural* or protection or seeking shade or age or life style* or lifestyle* or life-style* or life style* or health)
4. (built environment* or structural chang* or physical chang* or shade or purpose built or sun trap* or architect* or consult* or design or construction or surrounding* or shelter or seat* or static* or pub* place or park* or garden* or public event* or event* or concert* or outdoor* or walk* or (sport and (water* or winter*)) or build* or house* or flats or tent* or veranda* or blind* or umbrella* or awning* or cover* or shelter* or foliage or green* or tree* or plant* or nature or wind break* or barrier* or purpose* or childhood or secondary* or college or univ* or work* or lunch* or play* or game* or beach* or bathing beaches or swimming* or swimming pools or environmental exposure* or school* or universities or university or work*)
5. (provi* or distribut* or prescri* or free or hand out or give*) and (hat* or sunhat* or glasses or sunglass* or visor* or sun screen* or sunscreen* or sun block* or cover up or protective clothing)
6. (qualitative* or focus* or discussion* or case stud* or interview* or questionnaire* or evaluat* or (research* and (participant* or action* or priorit* or activit*)) or

observation* or verbal interaction* or process or implementation or perception* or attitude* or view)

1 AND 2 AND 3 AND (4 OR 5) AND 6

Notes: Results structured by Campbell's date limits 2002-2009

8.4 Centre for Reviews and Dissemination databases

Date search conducted: Wednesday, December 30th 2009

1. (skin cancer or (skin and (neoplasm* or cancer* or carcinoma* or adenocarcinom* or tumour* or tumor* or malignan*)) or skin neoplasms or non melanoma or malignant melanoma or melanoma or basal cell carcinoma)

2. (sun* or sunburn* or tan* or infrared* or solar* or damage or ultra violet* or ultraviolet* or ultra-violet*)

3. (prevent* or primary prevent* or health education* or health promotion* or protect* or precaution* or reduc* or natural* or protection or seeking shade or age or sunscreening agent* or life style* or lifestyle* or life-style* or life style* or health)

4. (built environment* or structural chang* or physical chang* or shade or purpose built or sun trap* or architect* or consult* or design or construction or surrounding* or shelter or seat* or static* or pub* place or park* or garden* or public event* or event* or concert* or outdoor* or walk* or (sport and (water* or winter*)))

5. (build* or house* or flats or tent* or veranda* or blind* or umbrella* or awning* or cover* or shelter* or foliage or green* or tree* or plant* or nature or wind break* or barrier* or purpose* or childhood or secondary* or college or univ* or work* or lunch* or play* or game* or beach* or bathing beaches or swimming* or swimming pools or environmental exposure* or school* or universities or university or work*)

6. ((provi* or distribut* or prescri* or free or hand out or give*) and (hat* or sunhat* or glasses or sunglass* or visor* or sun screen* or sunscreen* or sun block* or cover up or protective clothing))

7. (qualitative* or focus* or discussion* or case stud* or interview* or questionnaire* or evaluat* or (research* and (participant* or action* or priorit* or activit*)) or observation* or verbal interaction* or process or implementation or perception* or attitude* or view)

#4 or #5 = 8

Strategy 1: #1 AND #2 AND #3 AND #8 AND #7

Strategy 2: #1 AND #2 AND #3 AND #6 AND 7

limit to 1990 to 2009

Strategy 1 = 29
Strategy 2 = 10

Notes: Cluster 4 and 5 were split and run as two separate strategies due to interface limitations.

8.5 CINAHL

via EBSCOHost.

Date Search Conducted: Wednesday, December 23rd 2009

S1: skin cancer.tx
S2: (skin and (neoplasm$ or cancer$ or carcinoma$ or adenocarcinom$ or tumour$ or tumor$ or malignan$)).tx
S3: exp skin neoplasms/
S4: non melanoma.tx
S5: malignant melanoma.tx
S6: exp melanoma/
S7: exp carcinoma, basal cell/
S8: or/S1-S7
S9: sun$.tx
S10: sunburn/
S11: tan$.tx
S12: infrared rays/ or infrared$.tx
S13: (solar$ or damage or ultra violet$).tx
S14: or/S9-S13
S15: prevent$.tx
S16: exp primary prevent/
S17: exp health education/ or health education$.tx
S18: exp health promotion/ or health promotion$.tx
S19: (protect$ or precaution$ or reduc$ or natural$ or protection or seeking shade or age).tx
S20: exp sunscreening agents/ or sun screening agents.tx
S21: life style/ or (lifestyle$ or life-style$ or life style$)
S22: health/
S23: or/S15-S22
S24: (built environment$ or structural chang$ or physical chang$ or shade or purpose built or sun trap$ or architect$ or consult$ or design or construction or surrounding$ or shelter or seat$ or static$ or pub$ place or park$ or garden$ or public event$ or event$ or concert$ or outdoor$ or walk$ or (sport and (water$ or winter$)) or build$ or house$ or flats or tent$ or veranda$ or blind$ or umbrella$ or awning$ or cover$ or shelter$ or foliage or green$ or tree$ or plant$ or

nature or wind break$ or barrier$ or purpose$ or childhood or secondary$ or college or univ$ or work$ or lunch$ or play$ or game$).tx
S25: bathing beaches/ or beach$.tx
S26: swimming/ or swimming.tx
S27: swimming pools/
S28: environmental exposure.tx
S29: schools/ or school$.tx
S30: universities/ or university.tx
S31: work$
S32: or/S24-S31
S33: (provi$ or distribut$ or prescri$ or free or hand out or give$).tx
S34: (hat$ or sunhat$ or glasses or sunglass$ or visor$ or sun screen$ or sunscreen$ or sun block$ or cover up).tx
S35: protective clothing/
S36: S33 and (S34 or S35)
S37: qualitative research/
S38: (qualitative$ or focus or discussion$ or case stud$ or interview$ or questionnaire$ or evaluat$ or (research$ and (participant$ or action$ or priorit$ or activit$)) or observation$ or focus$ or case stud$ or verbal interaction$ or process or implementation or perception$ or attitude$ or view).tx
S39: or/S37-S38
S40: (chemical or nuclear or biolog$ or throat$ or lung$ or bowel$ or liver$ or colon$ or breast$ or cervical$ or pancre$ or testic$ or bone$ or recta$ or laryn$ or prostate or stomach$)
S41: S8 and S14 and S23 and (S32 or S36) and S39
S42: S41 NOT S40
S43: limit S42 yr=”1990 – 2009”

8.6 Cochrane Library

via Wiley Interscience.

Date search conducted: Wednesday, December 30th 2009

1. (skin cancer or (skin and (neoplasm* or cancer* or carcinoma* or adenocarcinom* or tumour* or tumor* or malignan*)) or skin neoplasms or non melanoma or malignant melanoma or melanoma or basal cell carcinoma)
2. (sun* or sunburn* or tan* or infrared* or solar* or damage or ultra violet* or ultraviolet* or ultra-violet*)
3. (prevent* or primary prevent* or health education* or health promotion* or protect* or precaution* or reduc* or natural* or protection or seeking shade or age or life style* or lifestyle* or life-style* or life style* or health)
4. (built environment* or structural chang* or physical chang* or shade or purpose built or sun trap* or architect* or consult* or design or construction or surrounding* or shelter or seat* or static* or pub* place or park* or garden* or public event* or event* or concert* or outdoor* or walk* or (sport and (water* or winter*)) or build* or house* or flats or tent* or veranda* or blind* or umbrella* or awning* or cover* or

shelter* or foliage or green* or tree* or plant* or nature or wind break* or barrier* or purpose* or childhood or secondary* or college or univ* or work* or lunch* or play* or game* or beach* or bathing beaches or swimming* or swimming pools or environmental exposure* or school* or universities or university or work*)

5. (provi* or distribut* or prescri* or free or hand out or give*) and (hat* or sunhat* or glasses or sunglass* or visor* or sun screen* or sunscreen* or sun block* or cover up or protective clothing)
6. (qualitative* or focus* or discussion* or case stud* or interview* or questionnaire* or evaluat* or (research* and (participant* or action* or priorit* or activit*)) or observation* or verbal interaction* or process or implementation or perception* or attitude* or view)

#1 AND #2 AND #3 AND (#4 OR #5) AND #6

Notes: 469 hits but 23 of these were Cochrane groups and not exportable files. Thus 446 hits imported via endnote.
The entire Cochrane library was searched for ease of process. DARE and HTA were searched separately through CRD (above).

8.7 Embase

EMBASE 1980 to 2009 Week 51

Date search conducted: Monday, December 21st 2009

1. skin cancer.mp
2. (skin and (neoplasm$ or cancer$ or carcinoma$ or adenocarcinom$ or tumour$ or tumor$ or malignan$)).mp
3. exp skin neoplasms/
4. non melanoma.mp
5. malignant melanoma.mp
6. exp melanoma/
7. exp carcinoma, basal cell/
8. or/1-7
9. sun$.mp
10. sunburn/
11. tan$.mp
12. infrared rays/ or infrared$.mp
13. (solar$ or damage or ultra violet$).mp
14. or/9-13
15. prevent$.mp
16. exp primary prevent/
17. health education$.mp or exp health education/
18. health promotion$.mp or exp health promotion/

19. (protect$ or precaution$ or reduc$ or natural$ or protection or seeking shade or age).mp
20. exp sunscreening agents/ or sun screening agents.mp
21. life style/ or (lifestyle$ or life-style$ or life style$).mp
22. health/
23. or/15-22
24. (built environment$ or structural chang$ or physical chang$ or shade or purpose built or sun trap$ or architect$ or consult$ or design or construction or surrounding$ or shelter or seat$ or static$ or pub$ place or park$ or garden$ or public event$ or event$ or concert$ or outdoor$ or walk$ or (sport and (water$ or winter$)) or build$ or house$ or flats or tent$ or veranda$ or blind$ or umbrella$ or awning$ or cover$ or shelter$ or foliage or green$ or tree$ or plant$ or nature or wind break$ or barrier$ or purpose$ or childhood or secondary$ or college or univ$ or work$ or lunch$ or play$ or game$).mp
25. beach$.mp or bathing beaches/
26. swimming/ or swimming.mp
27. swimming pools/
28. environmental exposure.mp
29. schools/ or school$.mp
30. universities/ or university.mp
31. work$.mp
32. or/24-31
33. (provi$ or distribut$ or prescri$ or free or hand out or give$).mp
34. (hat$ or sunhat$ or glasses or sunglass$ or visor$ or sun screen$ or sunscreen$ or sun block$ or cover up).mp
35. protective clothing/
36. 33 and (34 or 35)
37. qualitative research/
38. (qualitative$ or focus or discussion$ or case stud$ or interview$ or questionnaire$ or evaluat$ or (research$ and (participant$ or action$ or priorit$ or activit$)) or observation$ or focus$ or case stud$ or verbal interaction$ or process or implementation or perception$ or attitude$ or view).mp
39. or/37-38
40. (chemical or nuclear or biolog$ or throat$ or lung$ or bowel$ or liver$ or colon$ or breast$ or cervical$ or pancre$ or testic$ or bone$ or recta$ or laryn$ or prostate or stomach$).mp
41. 8 and 14 and 23 and (32 or 36) and 39
42. 41 NOT 40
43. limit 42 yr=”1990 – Current”

8.8 ERIC

ERIC via CSA

Date search conducted: Wednesday, December 30th 2009

1. (skin cancer or (skin and (neoplasm* or cancer* or carcinoma* or adenocarcinom* or tumour* or tumor* or malignan*)) or skin neoplasms or non melanoma or malignant melanoma or melanoma or basal cell carcinoma)
2. (sun* or sunburn* or tan* or infrared* or solar* or damage or ultra violet* or ultraviolet* or ultra-violet*)
3. (prevent* or primary prevent* or health education* or health promotion* or protect* or precaution* or reduc* or natural* or protection or seeking shade or age or life style* or lifestyle* or life-style* or life style* or health)
4. (built environment* or structural chang* or physical chang* or shade or purpose built or sun trap* or architect* or consult* or design or construction or surrounding* or shelter or seat* or static* or pub* place or park* or garden* or public event* or event* or concert* or outdoor* or walk* or (sport and (water* or winter*)) or build* or house* or flats or tent* or veranda* or blind* or umbrella* or awning* or cover* or shelter* or foliage or green* or tree* or plant* or nature or wind break* or barrier* or purpose* or childhood or secondary* or college or univ* or work* or lunch* or play* or game* or beach* or bathing beaches or swimming* or swimming pools or environmental exposure* or school* or universities or university or work*)
5. (provi* or distribut* or prescri* or free or hand out or give*) and (hat* or sunhat* or glasses or sunglass* or visor* or sun screen* or sunscreen* or sun block* or cover up or protective clothing)
   (qualitative* or focus* or discussion* or case stud* or interview* or questionnaire* or evaluat* or (research* and (participant* or action* or priorit* or activit*)) or observation* or verbal interaction* or process or implementation or perception* or attitude* or view)

   #1 AND #2 AND #3 AND (#4 OR #5) AND #6

   Limit to earliest to 2010

8.9 HMIC

HMIC Health Management Information Consortium November 2009

Date Search conducted: Monday, December 21st 2009

1. skin cancer.mp
2. (skin and (neoplasm$ or cancer$ or carcinoma$ or adenocarcinom$ or tumour$ or tumor$ or malignan$)).mp
3. exp skin neoplasms/
4. non melanoma.mp
5. malignant melanoma.mp
6. exp melanoma/
7. exp carcinoma, basal cell/
8. or/1-7
9. sun$.mp

10. sunburn/
11. tan$.mp
12. infrared rays/ or infrared$.mp
13. (solar$ or damage or ultra violet$).mp
14. or/9-13
15. prevent$.mp
16. exp primary prevent/
17. health education$.mp or exp health education/
18. health promotion$.mp or exp health promotion/
19. (protect$ or precaution$ or reduc$ or natural$ or protection or seeking shade or age).mp
20. exp sunscreening agents/ or sun screening agents.mp
21. life style/ or (lifestyle$ or life-style$ or life style$).mp
22. health/
23. or/15-22
24. (built environment$ or structural chang$ or physical chang$ or shade or purpose built or sun trap$ or architect$ or consult$ or design or construction or surrounding$ or shelter or seat$ or static$ or pub$ place or park$ or garden$ or public event$ or event$ or concert$ or outdoor$ or walk$ or (sport and (water$ or winter$)) or build$ or house$ or flats or tent$ or veranda$ or blind$ or umbrella$ or awning$ or cover$ or shelter$ or foliage or green$ or tree$ or plant$ or nature or wind break$ or barrier$ or purpose$ or childhood or secondary$ or college or univ$ or work$ or lunch$ or play$ or game$).mp
25. beach$.mp or bathing beaches/
26. swimming/ or swimming.mp
27. swimming pools/
28. environmental exposure.mp
29. schools/ or school$.mp
30. universities/ or university.mp
31. work$.mp
32. or/24-31
33. (provi$ or distribut$ or prescri$ or free or hand out or give$).mp
34. (hat$ or sunhat$ or glasses or sunglass$ or visor$ or sun screen$ or sunscreen$ or sun block$ or cover up).mp
35. protective clothing/
36. 33 and (34 or 35)
37. qualitative research/
38. (qualitative$ or focus or discussion$ or case stud$ or interview$ or questionnaire$ or evaluat$ or (research$ and (participant$ or action$ or priorit$ or activit$)) or observation$ or focus$ or case stud$ or verbal interaction$ or process or implementation or perception$ or attitude$ or view).mp
39. or/37-38
40. (chemical or nuclear or biolog$ or throat$ or lung$ or bowel$ or liver$ or colon$ or breast$ or cervical$ or pancre$ or testic$ or bone$ or recta$ or laryn$ or prostate or stomach$).mp

41. 8 and 14 and 23 and (32 or 36) and 39
42. 41 NOT 40
43. limit 42 yr="1990 – Current"

8.10 Medline

Ovid MEDLINE(R) 1950 to November Week 3 2009

Date Search Conducted: Monday, December 21st 2009

1. skin cancer.mp
2. (skin and (neoplasm$ or cancer$ or carcinoma$ or adenocarcinom$ or tumour$ or tumor$ or malignan$)).mp
3. exp skin neoplasms/
4. non melanoma.mp
5. malignant melanoma.mp
6. exp melanoma/
7. exp carcinoma, basal cell/
8. or/1-7
9. sun$.mp
10. sunburn/
11. tan$.mp
12. infrared rays/ or infrared$.mp
13. (solar$ or damage or ultra violet$).mp
14. or/9-13
15. prevent$.mp
16. exp primary prevent/
17. health education$.mp or exp health education/
18. health promotion$.mp or exp health promotion/
19. (protect$ or precaution$ or reduc$ or natural$ or protection or seeking shade or age).mp
20. exp sunscreening agents/ or sun screening agents.mp
21. life style/ or (lifestyle$ or life-style$ or life style$).mp
22. health/
23. or/15-22
24. (built environment$ or structural chang$ or physical chang$ or shade or purpose built or sun trap$ or architect$ or consult$ or design or construction or surrounding$ or shelter or seat$ or static$ or pub$ place or park$ or garden$ or public event$ or event$ or concert$ or outdoor$ or walk$ or (sport and (water$ or winter$)) or build$ or house$ or flats or tent$ or veranda$ or blind$ or umbrella$ or awning$ or cover$ or shelter$ or foliage or green$ or tree$ or plant$ or nature or wind break$ or barrier$ or purpose$ or childhood or secondary$ or college or univ$ or work$ or lunch$ or play$ or game$).mp
25. beach$.mp or bathing beaches/
26. swimming/ or swimming.mp

27. swimming pools/
28. environmental exposure.mp
29. schools/ or school$.mp
30. universities/ or university.mp
31. work$.mp
32. or/24-31
33. (provi$ or distribut$ or prescri$ or free or hand out or give$).mp
34. (hat$ or sunhat$ or glasses or sunglass$ or visor$ or sun screen$ or sunscreen$ or sun block$ or cover up).mp
35. protective clothing/
36. 33 and (34 or 35)
37. qualitative research/
38. (qualitative$ or focus or discussion$ or case stud$ or interview$ or questionnaire$ or evaluat$ or (research$ and (participant$ or action$ or priorit$ or activit$)) or observation$ or focus$ or case stud$ or verbal interaction$ or process or implementation or perception$ or attitude$ or view).mp
39. or/37-38
40. (chemical or nuclear or biolog$ or throat$ or lung$ or bowel$ or liver$ or colon$ or breast$ or cervical$ or pancre$ or testic$ or bone$ or recta$ or laryn$ or prostate or stomach$).mp
41. 8 and 14 and 23 and (32 or 36) and 39
42. 41 NOT 40
43. limit 42 yr="1990 – Current"

8.11 PsycInfo

via Ovid 1806 to December Week 3 2009

Date search conducted: Monday, December 21st 2009

1. skin cancer.mp
2. (skin and (neoplasm$ or cancer$ or carcinoma$ or adenocarcinom$ or tumour$ or tumor$ or malignan$)).mp
3. exp skin neoplasms/
4. non melanoma.mp
5. malignant melanoma.mp
6. exp melanoma/
7. exp carcinoma, basal cell/
8. or/1-7
9. sun$.mp
10. sunburn/
11. tan$.mp
12. infrared rays/ or infrared$.mp
13. (solar$ or damage or ultra violet$).mp
14. or/9-13

15. prevent$.mp
16. exp primary prevent/
17. health education$.mp or exp health education/
18. health promotion$.mp or exp health promotion/
19. (protect$ or precaution$ or reduc$ or natural$ or protection or seeking shade or age).mp
20. exp sunscreening agents/ or sun screening agents.mp
21. life style/ or (lifestyle$ or life-style$ or life style$).mp
22. health/
23. or/15-22
24. (built environment$ or structural chang$ or physical chang$ or shade or purpose built or sun trap$ or architect$ or consult$ or design or construction or surrounding$ or shelter or seat$ or static$ or pub$ place or park$ or garden$ or public event$ or event$ or concert$ or outdoor$ or walk$ or (sport and (water$ or winter$)) or build$ or house$ or flats or tent$ or veranda$ or blind$ or umbrella$ or awning$ or cover$ or shelter$ or foliage or green$ or tree$ or plant$ or nature or wind break$ or barrier$ or purpose$ or childhood or secondary$ or college or univ$ or work$ or lunch$ or play$ or game$).mp
25. beach$.mp or bathing beaches/
26. swimming/ or swimming.mp
27. swimming pools/
28. environmental exposure.mp
29. schools/ or school$.mp
30. universities/ or university.mp
31. work$.mp
32. or/24-31
33. (provi$ or distribut$ or prescri$ or free or hand out or give$).mp
34. (hat$ or sunhat$ or glasses or sunglass$ or visor$ or sun screen$ or sunscreen$ or sun block$ or cover up).mp
35. protective clothing/
36. 33 and (34 or 35)
37. qualitative research/
38. (qualitative$ or focus or discussion$ or case stud$ or interview$ or questionnaire$ or evaluat$ or (research$ and (participant$ or action$ or priorit$ or activit$)) or observation$ or focus$ or case stud$ or verbal interaction$ or process or implementation or perception$ or attitude$ or view).mp
39. or/37-38
40. (chemical or nuclear or biolog$ or throat$ or lung$ or bowel$ or liver$ or colon$ or breast$ or cervical$ or pancre$ or testic$ or bone$ or recta$ or laryn$ or prostate or stomach$).mp
41. 8 and 14 and 23 and (32 or 36) and 39
42. 41 NOT 40
43. limit 42 yr=”1990 – Current”

8.12 Social Policy & Practice

via Ovid

Date search conducted: Monday, December 21st 2009

1. skin cancer.mp
2. (skin and (neoplasm$ or cancer$ or carcinoma$ or adenocarcinom$ or tumour$ or tumor$ or malignan$)).mp
3. exp skin neoplasms/
4. non melanoma.mp
5. malignant melanoma.mp
6. exp melanoma/
7. exp carcinoma, basal cell/
8. or/1-7
9. sun$.mp
10. sunburn/
11. tan$.mp
12. infrared rays/ or infrared$.mp
13. (solar$ or damage or ultra violet$).mp
14. or/9-13
15. prevent$.mp
16. exp primary prevent/
17. health education$.mp or exp health education/
18. health promotion$.mp or exp health promotion/
19. (protect$ or precaution$ or reduc$ or natural$ or protection or seeking shade or age).mp
20. exp sunscreening agents/ or sun screening agents.mp
21. life style/ or (lifestyle$ or life-style$ or life style$).mp
22. health/
23. or/15-22
24. (built environment$ or structural chang$ or physical chang$ or shade or purpose built or sun trap$ or architect$ or consult$ or design or construction or surrounding$ or shelter or seat$ or static$ or pub$ place or park$ or garden$ or public event$ or event$ or concert$ or outdoor$ or walk$ or (sport and (water$ or winter$)) or build$ or house$ or flats or tent$ or veranda$ or blind$ or umbrella$ or awning$ or cover$ or shelter$ or foliage or green$ or tree$ or plant$ or nature or wind break$ or barrier$ or purpose$ or childhood or secondary$ or college or univ$ or work$ or lunch$ or play$ or game$).mp
25. beach$.mp or bathing beaches/
26. swimming/ or swimming.mp
27. swimming pools/
28. environmental exposure.mp
29. schools/ or school$.mp
30. universities/ or university.mp
31. work$.mp

32. or/24-31
33. (provi$ or distribut$ or prescri$ or free or hand out or give$).mp
34. (hat$ or sunhat$ or glasses or sunglass$ or visor$ or sun screen$ or sunscreen$ or sun block$ or cover up).mp
35. protective clothing/
36. 33 and (34 or 35)
37. qualitative research/
38. (qualitative$ or focus or discussion$ or case stud$ or interview$ or questionnaire$ or evaluat$ or (research$ and (participant$ or action$ or priorit$ or activit$)) or observation$ or focus$ or case stud$ or verbal interaction$ or process or implementation or perception$ or attitude$ or view).mp
39. or/37-38
40. (chemical or nuclear or biolog$ or throat$ or lung$ or bowel$ or liver$ or colon$ or breast$ or cervical$ or pancre$ or testic$ or bone$ or recta$ or laryn$ or prostate or stomach$).mp
41. 8 and 14 and 23 and (32 or 36) and 39
42. 41 NOT 40
43. limit 42 yr="1990 – Current"

9.0 Appendix B. Screening checklists

9.1 Screening checklist – abstracts

1.	Does the study address the primary prevention of skin cancer due to UV exposure, or views relating to skin cancer, sunbathing or tanning? Studies that include a small proportion of participants who have had an episode of skin cancer will be included here.	YES/UNCLEAR – go to Q2	NO – exclude
2.	Does the study present qualitative research (e.g. surveys (with open-ended questions), interviews, case studies, observational studies (participant observation) or ethnographic or action research)? Intervention studies which report qualitative data on perceptions ('process evaluations') will be included here. Systematic reviews including such studies will be included at abstract stage and proceed to retrieval.[3]	YES/UNCLEAR – go to Q3	NO – exclude
3.	Was the study published in 1990 or later?	YES/UNCLEAR – go to Q4	NO – exclude
4.	Is the study published in English?	YES/UNCLEAR – go to Q5	NO – exclude
5.	Does the study present views relating *only* to skin-cancer-related information and/or education interventions?	YES – exclude	UNCLEAR/NO – go to Q6
6.	Was the study conducted in a country which is a current member of the OECD?[4]	YES/UNCLEAR – include	NO – retain in 'non-OECD' list for review later

[3] A systematic review is defined as one which clearly reports its search strategies and inclusion criteria. Systematic reviews will not be included in the review, but will be retained and their lists of included primary studies screened for inclusion once the first stage of full text screening is completed.

[4] Current members of the OECD are: Australia; Austria; Belgium; Canada; Czech Republic; Denmark; Finland; France; Germany; Greece; Hungary; Iceland; Ireland; Italy; Japan; Luxembourg; Mexico; Netherlands; New Zealand; Norway; Poland; Portugal; Slovakia; South Korea; Spain; Sweden; Switzerland; Turkey; UK; USA.

9.2 Screening checklist – full text articles

1.	Does the study address the primary prevention of skin cancer due to UV exposure, or views relating to skin cancer, sunbathing or tanning? Studies that include a small proportion of participants who have had an episode of skin cancer will be included here; studies focused primarily on secondary prevention (ie aiming to prevent a re-occurrence of skin cancer), screening programmes (which solely aim to detect the occurrence of skin cancer or activities to assess its incidence among specific groups of people), diagnosis, treatment or management of skin cancer will be excluded.	YES/UNCLEAR – go to Q2	NO – exclude
2.	Was the study published in 1990 or later?	YES/UNCLEAR – go to Q3	NO – exclude
3.	Is the study published in English?	YES/UNCLEAR – go to Q4	NO – exclude
4.	Does the study present (i) views relating to environmental change; (ii) views relating to resource provision; (iii) views relating to multi-method interventions including combination of (i) and (ii); (iv) a combination of either (i) or (ii) or both of these with provision of information[5]; (v) views on the potential barriers or facilitators relating to skin cancer prevention activities?	YES/UNCLEAR – go to Q5	NO (views relate only to skin cancer-related information or education) – exclude
5.	Is the study a primary qualitative study (e.g. surveys (with open-ended questions), interviews, case studies, observational studies (participant observation) or	Primary qualitative study – go to Q6 Review including qualitative studies – retain for references	Other – exclude

[5] Includes information provided via: one-to-one or group-based advice; mass media campaigns; leaflets and other printed information such as posters and teaching resources; new media such as the internet and text-messaging.

	ethnographic or action research), or a review including such studies? Intervention studies which report qualitative data on perceptions ('process evaluations') will be included here. Systematic reviews including such studies will be retained for references. [6]		
6.	Was the study conducted in a country which is a current member of the OECD?[7]	YES/UNCLEAR – include	NO – retain in 'non-OECD' list for review later

[6] A systematic review is defined as one which clearly reports its search strategies and inclusion criteria. Systematic reviews will not be included in the review, but will be retained and their lists of included primary studies screened for inclusion once the first stage of full text screening is completed.

[7] Current members of the OECD are: Australia; Austria; Belgium; Canada; Czech Republic; Denmark; Finland; France; Germany; Greece; Hungary; Iceland; Ireland; Italy; Japan; Luxembourg; Mexico; Netherlands; New Zealand; Norway; Poland; Portugal; Slovakia; South Korea; Spain; Sweden; Switzerland; Turkey; UK; USA.

10.0 Appendix C. Example Quality Appraisal form

Study identification Include author, title, reference, year of publication	Paul, C., Tzelepis, F., Parfitt, N. et al. (2008) How to improve adolescents' sun protection behaviour? Age and gender issues. American Journal of Health Behaviour. 32:4: 387 – 98
Guidance topic:	Sun protection resources and changes to the environment to prevent skin cancer: qualitative evidence review.
Checklist completed by:	FJ, TL

Theoretical Approach		
1. Is a qualitative approach appropriate? For example: • Does the research question seek to understand processes or structures, or illuminate subjective experiences or meanings? • Could a quantitative approach better have addressed the research question?	✓ Appropriate ○ Inappropriate ○ Not sure	**Comments:** This study illuminates subjective experiences and meanings by investigating why people behave towards sun practice the way they do. The qualitative approach fits the research question well.
2. Is the study clear in what it seeks to do? For example: • Is the purpose of the study discussed aims/objectives/research question/s?	✓ Clear ○ Unclear ○ Mixed	**Comments:** The aim of the study is clearly stated: To explore adolescents' self-reported reasons for sun protection, as adolescents as a group continue to have poor

• Is there adequate /appropriate reference to the literature? • Are underpinning values/assumptions/theory discussed?		sun protection practices.

Study design		
3. How defensible/rigorous is the research design/methodology? For example: • Is the design appropriate to the research question? • Is a rationale given for using a qualitative approach? • Are there clear accounts of the rationale/justification for the sampling, data collection and data analysis techniques used? • Is the selection of cases/sampling strategy theoretically justified?	✓ Defensible ○ Indefensible ○ Not sure	**Comments:** The study design is appropriate for research question. Sampling, data collection and analysis information are set out coherently with a rationale for the methods chosen.

Data collection		
4. How well was the data		**Comments:**

collection carried out? For example: • Are the data collection methods clearly described? • Were the appropriate data collected to address the research question? • Was the data collection and record keeping systematic?	✓ Appropriate ○ Inappropriate ○ Not sure/ inadequately reported	The authors clearly describe how data has been collected. For example, the questions posed during the focus group was provided and described.

Trustworthiness		
5. Is the role of the researcher clearly described? For example: • Has the relationship between the researcher and the participants been adequately considered? • Does the paper describe how the research was explained and presented to the participants?	○ Clearly described ✓ Unclear ○ Not described	**Comments:** Little information is provided relating to the role of the researcher or the relationship/instruction between the researcher and participant.
6. Is the context clearly described? For example: • Are the characteristics of the participants and settings clearly defined?	✓ Clear ○ Unclear ○ Not sure	**Comments:** The characteristics of the participants are described well including age, skin colour, socio-demographic information.

• Were observations made in a sufficient variety of circumstances? • Was context bias considered?		Observations have been made in two sets of circumstances: male and female.
7. Were the methods reliable? For example: • Was data collected by more than one method? • Is there justification for triangulation, or for not triangulating? • Do the methods investigate what they claim to?	✓ Reliable ○ Unreliable ○ Not sure	**Comments:** Auditing involved verifying that the transcripts were consistent with the extracted themes; another CP independently analyzed the data and reconciliation by discussion was reached in the events of disagreements.

Analysis		
8. Is the data analysis sufficiently rigorous? For example: • Is the procedure explicit – i.e. is it clear how the data was analysed to arrive at the results? • How systematic is the analysis, is the procedure reliable/dependable? • Is it clear how the themes	✓ Rigorous ○ Not rigorous ○ Not sure/ not reported	**Comments:** The procedure is explicit and it is clear how themes were derived.

and concepts were derived from the data?		
9. Is the data 'rich'? For example: • How well are the contexts of the data described? • Has the diversity of perspective and content been explored? • How well has the detail and depth been demonstrated? • Are responses compared and contrasted across groups/sites?	✓ Rich ○ Poor ○ Not sure/ not reported	**Comments:** The diversity of perspectives and content has been explored in detail; responses have been compared across different groups.
10. Is the analysis reliable? For example: • Did more than one researcher theme and code transcripts/data? • If so, how were differences resolved? • Did participants feed back on the transcripts/data if possible and relevant? • Were negative/discrepant results addressed or	✓ Reliable ○ Unreliable ○ Not sure/ not reported	**Comments:** Two researchers coded the data and reconciliation was reached by discussion in the event of disagreements.

ignored?		
11. Are the findings convincing? For example: • Are the findings clearly presented? • Are the findings internally coherent? • Are extracts from the original data included? • Are the data appropriately referenced? • Is the reporting clear and coherent?	✓ Convincing ○ Not convincing ○ Unsure	**Comments:** The findings presented in this study are coherent and clear. Extracts from the original data have been inserted where applicable to support the statements of findings.
12. Are the findings relevant to the aims of the study?	✓ Relevant ○ Irrelevant ○ Partially relevant	**Comments:** Findings concern adolescents' self-reported sun practice behaviours and perceptions, which is consistent with the aims of the study.
13. Conclusions For example: • How clear are the links between data, interpretation and conclusions?	✓ Adequate ○ Inadequate ○ Not sure	**Comments:** The authors are clear about what information is from study participants, what has been interpreted and what conclusions have been made. Conclusions are set out

• Are the conclusions plausible and coherent? • Have alternative explanations been explored and discounted? • Does this enhance understanding of the research topic? • Are the implications of the research clearly defined? • Is there adequate discussion of any limitations encountered?		thematically, consistent with the study findings. Implications of the findings are set out. Little information on limitations is offered.

Ethics		
14. How clear and coherent is the reporting of ethics? For example: • Have ethical issues been taken into consideration? • Are they adequately discussed e.g. do they address consent and anonymity? • Have the consequences of the research been	✓ Appropriate o Inappropriate o Not sure	**Comments:** Consent was sought.

considered i.e. raising expectations, changing behaviour? • Was the study approved by an ethics committee?		

Overall Assessment		
As far as can be ascertained from the paper, how well was the study conducted? (see guidance notes)	✓ ++ ○ + ○ -	**Comments:** Overall this study is well-conducted and clearly reported.

11.0 Appendix D. Evidence tables

Studies marked with an asterisk (*) are also included in the phase 1 qualitative evidence review.

Study Details	Research Parameters	Populations and sample selection	Outcomes and methods of analysis/Results	Notes
Authors: **Abroms L, Jorgensen CM, Southwell BG, Geller AC, Emmons KM** **Year: 2003** **Citation:** **Gender differences in young adults' beliefs about sunscreen use. Health Education & Behaviour. 30:1: 29-43** **Quality Score:** **+**	**What was/were the research questions:** What are the behavioural and normative beliefs underlying sunscreen use, and do male and female young adults differ in these beliefs? **What theoretical approach (e.g. grounded theory, IPA) does the study take (if specified):** The theory of reasoned action (TRA) **How were the data collected:** - **What methods:** focus group - **By whom:** professional facilitator - **What setting(s)**: urban and suburban areas	**What population were the sample recruited from:** from proprietary lists of volunteers maintained by the focus group facilities **How were they recruited:** By professional recruiters (quota sampling method) **How many participants were recruited:** 52 **Were there specific exclusion criteria:** Participants or their families worked in advertising or health care **Were there specific inclusion criteria:** 18-25 years, middle and low income, no history of	**Brief description of method and process of analysis:** Focus groups transcribed; analysed into themes and subthemes by two coders (who had not been involved in the design of focus groups). Themes defined as points which were frequently or extensively discussed by the participants. Differences between coders were resolved with reference to a third coder. All analyses were stratified by gender. Analysis was guided by the Theory of Reasoned Action (Ajzen & Fishbein). **Key themes (with illustrative quotes if available) relevant to this review:** Behaviour. Males reported using sunscreen in a limited range of situations, e.g. at the beach, and often applied it only when they noticed they were becoming sunburnt. "Well if I'm going to the beach, I will put [sunscreen] on. But other than that, if I'm just going outside for an outdoor activity, I really don't think about it." Females used sunscreen more, and in more situations, than males. Some women reported reapplying sunscreen and/or using it on a daily basis. Behavioural beliefs Overall males	**Limitations identified by author:** Limited generalisability because small sample size; only 18-25 year olds; limited to 3 areas in USA; and reliant on proprietary lists from focus group companies. Males in the study were more likely to report medium rather than light skin tone than females. Analysis was driven by TRA constructs and so may have missed some factors. Constructs such as evaluation of outcomes and the motivation to comply were not measured quantitatively, so the importance of beliefs for behaviour is not fully clear. **Limitations identified by review team:**

	- **When:** Autumn 1997	skin cancer	expressed more negative attitudes towards sunscreen use than females. For males, sunscreen enabled them to stay in the sun longer. "That's the only time I worry about it—when I go [surfing] 2 days in a row." Health concerns, or events such as having a mole removed, motivated sunscreen use. "I'll put some sunscreen on. I don't want to get too tan because the next thing you know, I will be having tumours lanced." Sunscreen use was seen as preventing peeling skin or uneven tanning; however, none of the males reported using sunscreen to minimize long-term impacts on appearance. Males reported that sunscreen was inconvenient and took too much time and effort, or was difficult to remember. Sunscreen use was seen as not masculine by some participants, and the texture and smell were seen as unpleasant. "[I don't like sunscreen] . . . because we're men. . . . We don't like to put oil on. Then you get the stuff on your hands and you smell like a coconut." Men felt that it was unacceptable to ask other men for help in applying sunscreen. "I think it's like a masculine thing . . . I mean it's all right for [your girlfriend] to put suntan lotion on your back [at the beach], but if you're down there with the guys, you're not going to be saying, "Hey, buddy, rub some lotion on me."". Males also noted that when playing sports, sunscreen sweated into their eyes and caused stinging and difficulty seeing. They reported that	Limited information on the context of data collection (e.g. gender of facilitator, given that gender differences were a focus). Sampling from proprietary lists may have introduced bias into sample - it is unclear how these lists were compiled. Thematic analysis is limited in extent. Heterogeneity within gender groups, and impact of mixed-gender versus single-gender groups, are not explored. **Evidence gaps and/or recommendations for future research:** Develop understanding of why men are less likely to use sunscreen. Understand whether and how beliefs are linked to behaviour using quantitative methods. **Source of funding:** Centres for Disease Control and Prevention,

			sunscreen wore off and lost effectiveness. They reported that the high price of sunscreen was a negative aspect of sunscreen use. Females reported positive attitudes to sunscreen because it enhanced appearance, both by preventing short-term problems (e.g. peeling) and in terms of slowing down long-term aging. As young adults, they saw signs of skin aging (e.g. wrinkles) and this motivated sunscreen use. "I did nothing [for sun protection when I was young]. Now I am beginning to put sun block on my face because I can see the effects. I can see wrinkles and my skin isn't as clear as it used to be." Females also expressed concerns about skin cancer. Some women reported using sunscreen so they could stay in the sun longer, e.g. for sports. Females had concerns about the inconvenience of using sunscreen, and some said it was not reliable in preventing sunburn. Some also said it caused acne. <u>Normative beliefs</u> Male sources of normative beliefs included girlfriends, parents, other adults, friends, and the mass media. Of these, girlfriends were the most influential. In some cases girlfriends' insistence overcame the men's reluctance to use sunscreen, although not always. Parents sometimes often offered encouragement, although this was not always taken seriously. "[My mom says,] "You're going to die [from working as a lifeguard without sunscreen]. You're going to get skin cancer." All right, mom. Have a	with additional research support for analysis through CDC/ATPM Cooperative Agreement No. T260 awarded to Boston University

			good day. I'm going to work. Leave me alone." Males noted that friends and peers did not use sunscreen and it was not seen as "cool". The mass media were cited by several males as a source of information on the dangers of sunscreen use; however, they also pointed out that TV actors (e.g. in *Baywatch*) are never seen using sunscreen. Friends and girlfriends were the most influential sources of influence, and were more likely than parents to be with males when sunscreen decisions were made. For females, mothers were an important source of normative beliefs. Mothers verbally encouraged daughters & in some cases supplied sunscreen. Females were generally willing to comply, but in some cases were annoyed by repeated requests. Most females saw their friends and peers as encouraging sunscreen use, and encouraged their friends themselves, although some saw peers as discouraging sunscreen use. Boyfriends and husbands were generally indifferent to sunscreen use, although a few discouraged it in favour of getting a tan.	

Study Details	Research Parameters	Populations and sample selection	Outcomes and methods of analysis/Results	Notes
Authors: **Bergenmar M, Brandberg Y** **Year:** **2001** **Citation:** **Sunbathing and sun-protection behaviours and attitudes of young Swedish adults with hereditary risk for malignant melanoma. Cancer Nursing. 24:5: 341-50** **Quality Score:** **++**	**What was/were the research questions:** The purpose of this paper: 1) investigate perception of sun related behaviour, attitudes toward sunbathing and sun protection (among young people with hereditary risk of melanoma); 2) present data from questionnaires on sun-related behaviours coherence of these behaviours during 15-month period; 3) describe an intervention aimed at changing sun related behaviours of this group of people **What theoretical approach (e.g. grounded theory, IPA) does the study take (if specified):** None stated **How were the data collected:** - **What methods:**	**What population were the sample recruited from:** Patients (scheduled for a visit) from the pigmented lesion clinic in Stockholm-Gotland region **How were they recruited:** 15 consecutive patients who had appointment were invited by letter to participate **How many participants were recruited:** n=10 **Were there specific exclusion criteria:** Patients with malignant disease, melanoma or other; those who participated in the former "Sun-Diary study" **Were there specific inclusion criteria:** Patients in melanoma-prone families with	**Brief description of method and process of analysis:** Nurse conducted interview at the clinic; typically lasted about 1 hour with 10 open-ended questions. Responses written and read back to respondent to correct misunderstandings. Interviews were then typed. Content analysis was used to analyse interviews. Themes emerging from responses categorized by 2 investigators and checked for consistency. **Key themes (with illustrative quotes if available) relevant to this review:** [Note: data are only extracted from interviews and not surveys (because the latter are not qualitative).] Do you use sun beds? Most of the respondents sunbathe, five used sun beds, stating "occasionally during the winter" to "once a month during the winter", a minority of men used sun beds regularly but stopped; no interviewees reported sun bed use during the summer. Where do you sunbathe? Most people said they sunbathed at "the summer cottage" and some said "sailing", "abroad on vacation" and "home in the yard". On vacation, how do you spend your sunny day? All participants on holiday had high UV exposure without taking any sun protection measured because most said it was the best time to get a tan. On vacation, what do you wear	**Limitations identified by author:** Validity of interviews is in question because of small sample size; interviews are sensitive to social desirability - especially because interviewer was a former nurse. **Limitations identified by review team:** Small sample size. Many questions surrounded sun behaviour on holiday, which might be substantially different from daily practices - it was not apart of the aims of this study to investigate primarily holiday-related behaviours. Sampling: participants drawn from list of appointments in a consecutive time period - this may have introduced bias. Sample consists of people at elevated clinical risk for

	Interview; questionnaire. Only information on interviews is extracted here. - **By whom:** a nurse (MB) conducted the interviews - **What setting(s)**: Pigmented Lesion Clinic - **When:** 1 April 1997	clinically dysplastic nevi in the Stockholm-Gotland region; aged 18-30 years (as of Jan 1997); attended the Regional Pigmented Lesion Clinic at least twice during the last 2 years	on sunny day? Most people wear "not more than necessary", which was described as bikini. Positive aspects When asked what were the most positive aspects of sunbathing half said "to get a tan" or simply sunbathing for the sake of it or "...feels healthy to be outdoors and in the sun...". Sun protection Most respondents use sunscreen, 4 stated use of clothes, "when my shoulders burn or when I get red on the chest, I put on a T-shirt". Attending Clinic: "you continue sunbathing as usual but you strictly follow the recommended intervals for the skin examinations at the clinic."; "Planning to sunbathe gives me a guilty conscience. I don't consider myself one who would sunbathe on a pier; I lie on a pier reading a book. I realize there is not much difference."	melanoma, so findings may not be generalisable to other populations. **Evidence gaps and/or recommendations for future research:** Not stated **Source of funding:** Cancer Society in Stockholm and the King Gustaf V Jubilee Fund

Study Details	Research Parameters	Populations and sample selection	Outcomes and methods of analysis/Results	Notes
Authors: **Calder N, Aitken R** **Year: 2008** **Citation: An exploratory study of the influences that compromise the sun protection of young adults. International Journal of Consumer Studies 32: 6: 579-587.** **Quality Score:** **++**	**What was/were the research questions:** To understand the influences on UV risk behaviours and barriers to adopting protective behaviours. **What theoretical approach (e.g. grounded theory, IPA) does the study take (if specified):** Not stated **How were the data collected:** - **What methods:** focus group - **By whom:** Researchers - **What setting(s)**: Not stated - **When:** Not stated	**What population were the sample recruited from:** Young people in New Zealand **How were they recruited:** convenience sampling **How many participants were recruited:** 29 **Were there specific exclusion criteria:** NS **Were there specific inclusion criteria:** 18-22 years old	**Brief description of method and process of analysis:** Focus groups transcribed by researchers. 'Bootstrapping' content analysis used to inductively and iteratively develop themes from the data, moving from literal responses to more integrative themes. **Key themes (with illustrative quotes if available) relevant to this review:** Value of a tan. All participants felt that a tan looked attractive. "It represents that you are active, you don't just sit inside at a computer all day" (male, 21). Positive effect on mood. Being in the sun improves your mood. "When you have a day in the sun, you feel a bit more sparklier!" (female, 20). Media. The media portray it as being "beautiful to be brown". Peer effects. There is peer pressure to engage in outdoor activities and get a tan. Gender differences apparent relating to sunbed use: "If you went to sun beds, you wouldn't tell anyone" (male, 21). Risk orientation. Most participants did not think about the long-term risks involved in their behaviour. Participants saw skin cancer as easily treatable: "Well you don't really hear about death from melanoma, well I don't I only hear about things getting cut out." (female, 20). Participants were optimistic and did not think they had a high risk of cancer. "It's NOT going to	**Limitations identified by author:** None stated **Limitations identified by review team:** Nature of the sampling process is unclear. The analytic constructs are not all well-defined. **Evidence gaps and/or recommendations for future research:** None stated. **Source of funding:** Not stated

			happen to you, even if you do see those images, it's kind of like, oh well" (female, 20). "I know what the risks are but I kind of shove it out of my mind most of the time, like when I think about it, it is just going to make me feel bad, but it is not going to stop me from doing it, because until it happens to me, which here's hoping it doesn't, I am still going to keep putting myself at risk" (female, 20). Fashion. Fashion was mentioned as a barrier to wearing protective clothing, especially among female respondents. Rebellion. Some participants expressed rebellious attitudes towards parents' warnings about risk behaviours. Experience. The experience of severe sunburn, or knowing someone with cancer, was a motivation for protection behaviours (or at least for feeling guilt about not engaging in them). "I feel selfish exposing myself to the sun, when I have already seen how mum has suffered" (female, 19).	

Study Details	Research Parameters	Populations and sample selection	Outcomes and methods of analysis/Results	Notes
Authors: **Clarke LH, Korotchenko A** **Year:** **2009** **Citation:** **Older women and sun tanning: the negotiation of health and appearance risks. Sociology of Health and Illness. 31:5: 748-61** **Quality Score:** **+**	**What was/were the research questions:** To examine older women's experiences and perceptions of sunbathing, sun avoidance, and suntanned appearances. **What theoretical approach (e.g. grounded theory, IPA) does the study take (if specified):** NS **How were the data collected:** - **What methods:** Semi-structured interview - **By whom:** Not stated - **What setting(s)**: Not stated - **When:** Not stated	**What population were the sample recruited from:** Western Canada **How were they recruited:** advertisements from local newspapers (non-probability sampling) **How many participants were recruited:** n=36 **Were there specific exclusion criteria:** NS **Were there specific inclusion criteria:** NS	**Brief description of method and process of analysis:** Each participant, recruited from advertisements in local newspapers, was interviewed once for 63.7 interview hours. The semi-structured interviews consisted of open ended questions focusing on women's beautify work practices (i.e. fashion, hair and nail care etc), including sunbathing. With reference to sunbathing, women were asked about attitudes/ perceptions and behaviour relating to sun tanning. Interviews were recorded and transcribed. Data was analysed using Strauss and Corbin's (1998: 101-142) concepts of open and axial coding - where the transcribed interviews are read over to create an initial codebook (sun tanning is open code). This resulted in seven axial codes (subcategories of sun tanning in general) The sun codes included: aged skin, paleness, darkness, health risks, appearance risks, motivations, and natural /unnatural sun tanning. Three themes were derived from these codes: the social context of sunbathing and suntanned appearances, the perceptions of sunbathers, and the perspectives of women who did not suntan. **Key themes (with illustrative quotes if available) relevant to this review:** The changing cultural context of sun	**Limitations identified by author:** This study could be criticised for using a small and unrepresentative sample **Limitations identified by review team:** Non-probability sampling may introduce bias. Some aspects of methods were not clearly reported (where, when, how interviews were conducted; who carried out coding and analysis). **Evidence gaps and/or recommendations for future research:** Important to focus research on the experiences of lesbian women as well as women of differing racial-ethnic status. It would also be useful to conduct longitudinal research with a diverse

			tanning and beliefs about personal risk. Interviewees referred to historical context - parents/grandparents would say: "'Don't go out into the sun. Your skin should be milky white. At least white people should be white". Class issues were also presented: "When I was a child, anybody that was brown, they were labourers. This is an awful thing to admit, but the upper class was never brown. And it was paleness that showed that we were a different class. People did not go out and deliberately tan."; "'You don't belong in this house. You better go down on the [Aboriginal] Reserve.'" Interviewees noted how this changed when they were in their twenties when tanning became popularised and again in recent years, where sun protection is encouraged. <u>Tanning and appearance risks-the perceptions and experiences of sunbathers.</u> The principal motivation for sun tanning is to improve appearance. "I just prefer the tan. I think a tanned complexion looks nicer on a person than a pale complexion" Words like "ugly" and "pasty" used to describe white complexions. Health benefits of sun / tanning: "I firmly believe that if you have a bit of a tan it's good for your health. And, of course, they talk about the importance of Vitamin D". A de-motivating factor was the potential long-term appearance risks associated with sunbathing, such as wrinkles. A common trend was that	group of men and women in order to capture more fully the impact of changing social norms and medical knowledge pertaining to sunbathing, sun avoidance, and sun protection. Survey research with a large sample of older adults would further serve to ascertain general trends in the population with regard to sunbathing and sun avoidance, and how these patterns are gendered **Source of funding:** Michael Smith Foundation for Health Research Career Scholar Award and a Michael Smith Foundation for Health Research Establishment Grant

			women thought of tanning beds as un-natural and dangerous. “I put on sunscreen now and I’ll do, basically, a little light tanning. Nothing too extreme. I would never go and sit on one of those tanning beds…We’re all very conscious health wise about the dangers of tanning…I wouldn’t say I would stop completely…I think you have to strike a healthy medium and do what’s safe.” Protection methods noted were sunscreen on face and hats, but little said about rest of body. <u>Tanning as a health risk: the perceptions and experiences of women who did not suntan:</u> The majority of the 23 respondents who don't tan still had said they associate tanned skin with good health and better appearances, even though they don't suntan. Many women acquired knowledge of sunbathing dangers through personal experience. Other women noted that they no longer suntan because it was too much effort or couldn't tolerate prolonged exposure. “I think a bit of a tan does make you look healthier. But…I don’t really like dark, dark skins from tanning anymore.”	

Study Details	Research Parameters	Populations and sample selection	Outcomes and methods of analysis/Results	Notes
Authors: **Collins DC, Kearns RA, Mitchell H** **Year: 2006** **Citation:** **An integral part of the children's education: placing sun protection in Auckland primary schools. Health and Place. 12:4: 436-48** **Quality Score:** **-**	**What was/were the research questions:** This article assesses how selected Auckland primary schools responded to public health messages regarding sun protection by examining policy-level changes and practical interventions in the physical environment of the school. **What theoretical approach (e.g. grounded theory, IPA) does the study take (if specified):** Geography of public health **How were the data collected:** - **What methods:** Interview; media and internet analysis - **By whom:** Not stated - **What**	**What population were the sample recruited from:** Primary schools in Auckland, New Zealand **How were they recruited:** Schools were sampled by random stratified sample (using quotas from socio-economic status deciles of schools). Recruitment NS **How many participants were recruited:** 20 (for interviews) **Were there specific exclusion criteria:** Not stated **Were there specific inclusion criteria:** Not stated	**Brief description of method and process of analysis:** Not stated **Key themes (with illustrative quotes if available) relevant to this review:** Awareness: Interview respondents largely agreed that protection and awareness is important, adding in some cases that this is "vital". For some schools, addressing sun/UV exposure is a part of a larger imitative to protect children and educate about risks. Some interviewees noted that health education in general is effective among younger children (''they are the best listeners''; they may establish ''good life-long habits''). However, one participant stated: ''Well I see schools that have detentions for children who do not wear hats which I think is just ridiculous. I think it is an intrusion on the children's rights''. Some interviewees also felt that sun protection distracted attention from the school's core tasks such as teaching. Physical Protection outdoors: All interviewees stated that their school provided physical protection from the sun, such as, strategically planted trees (n = 20), and artificial shade structures (n = 18). 14 schools provided more than three areas of artificial shade structures. Since schools are self-governing these are costly and not provided by Ministry - nine	**Limitations identified by author:** None stated **Limitations identified by review team:** Little information on data analysis methods. Organisation of findings is not very clear. It is not always clear what data comes from which phase of the study (interviews, media analysis); methods for the media analysis are not well reported. **Evidence gaps and/or recommendations for future research:** NS **Source of funding:** NS

	setting(s): telephone interviews (one in person - unknown setting) - **When:** Late 2002		schools had funding from outside sources to provide such shade. Outdoor clothing policy: ‘‘No hat, no play’’ and ‘‘No hat, play in the shade’’ regulations were in place, with some staff acting as role models for this policy. No schools required pupils to wear sunscreen, but 70% provided it free of charge, most in every classroom. Several schools rescheduled outdoor events to early morning or late afternoon. Low-SES schools stated that although they would like to implement a compulsory hat rule, parents might not be able to afford it. One low-SES school donated hats to children from poor families. Some schools took particular measures to encourage sun protection among Maori and Pacific Islander pupils.	

Study Details	Research Parameters	Populations and sample selection	Outcomes and methods of analysis/Results	Notes
Authors: **Cancer Research UK (CRUK)** **Year: n.d.a** **Citation:** **Qualitative exploration of sunburn: Summary findings of qualitative research with a cross section of people of different ages and social demographic status …** **Quality Score:** **-**	**What was/were the research questions:** To assess the knowledge, attitudes and understanding of sunburn among adults and teenagers in the UK. The study addresses the following: experience of sunburn and language used to describe it; understanding of sunburn/beliefs around sunburn; health risks of sunburn; messaging around sunburn **What theoretical approach (e.g. grounded theory, IPA) does the study take (if specified):** Not stated **How were the data collected:** - **What methods:** focus group - **By whom:** Not stated	**What population were the sample recruited from:** Not stated **How were they recruited:** Not stated **How many participants were recruited:** 152-216 approximately. **Were there specific exclusion criteria:** Not stated **Were there specific inclusion criteria:** Not stated	**Brief description of method and process of analysis:** NS **Key themes (with illustrative quotes if available) relevant to this review:** Experiences, Perceptions, Behaviour: Respondents noted accidental tanning leading to burn (i.e. falling asleep); others actively sunbathe, especially following poor weather or on holiday in desperation to get a tan); the power of the UK sun is underestimated, so people don't often carry sunscreen with them; younger people noted that redness from sun tanning is apart of the tanning journey: "To get a tan, you have to go red first – then you go brown." (Girl, 15-16. BC1, Bristol); many participants believe that skin heals itself; the link between sunburn and skin cancer is spontaneously made (media, school, sun-related products), but there is little understanding of how one causes the other (this is a part of the reason people to some extent don't consider the two to be related); parents, especially of children 0-4 years, are overall generally very careful to protect their children from the sun. Messages: key messages which 'hit home' include: emphasizing dangers of occasional burning and referring to cell/DNA damage.	**Limitations identified by author:** Not stated **Limitations identified by review team:** The study report was a brief summary with little detail on either methods or findings. **Evidence gaps and/or recommendations for future research:** Not stated **Source of funding:** Cancer Research UK

	- **What setting(s):** Leeds, Manchester, Bristol, North London, Sunbury, UK - **When:** November-December 2008		Differences in sample: Parents of 0-4 year old children are always protecting their children by covering up and applying sunscreen, “sometimes at the expense of themselves”. Parents of 5-15 years play a big role in their children’s protection, but over time lose authority; young people, at the age of 13-15 begin wanting a tan and strive for independence from parents and therefore pull away. At around 16-18 years young people are often holidaying with peers (context of risk). Young adults, 19-30 years prize having a tan and take risks in the sun. However, when approaching the age of 30 more responsibility about health kicks in. Gender Differences: Girls/young women – want tans but more likely to use SPFs; some intentionally sunbathe and others are more careful. Boys/Young men – less concerned about tans; reliance on mothers and girlfriend for protection; show more interest in the ‘science’ of sunburn. Mothers – responsible for children’s protection; aware of long term ageing effect of sun. Fathers – take less care with own protection; C2D (skilled working class) are least likely to know much on sun and cell damage; BC1 (lower-middle economic status) have a long term perspective; more aware of health issues; more inclined to ‘believe’ information from trusted sources; BC1 fathers are more hands-on with children –	

			but C2D fathers are equally protective.	

Study Details	Research Parameters	Populations and sample selection	Outcomes and methods of analysis/Results	Notes
Authors: **Cancer Research UK** **Year:** **n.d.b** **Citation:** **Developing the 2008 SunSmart campaign: summary findings of qualitative research with young people ...** **Quality Score:** **-**	**What was/were the research questions:** To identify motivations for seeking a tan and using sunbeds; factors that will deter young people from using sunbeds; factors that encourage them to stay safe in the sun. To investigate the awareness of the link between excessive exposure to UVR and the associated health risks; explore perceived relevance of skin cancer to this age group; identify communication channels to reach target audience best; explore ideas for impactful campaign formats and creative concepts. **What theoretical approach (e.g. grounded theory, IPA) does the study take (if specified):** Not stated	**What population were the sample recruited from:** Not stated **How were they recruited:** Not stated **How many participants were recruited:** 32-64 focus group participants; 6 participants for in-depth interviews **Were there specific exclusion criteria:** Not stated **Were there specific inclusion criteria:** Not stated	**Brief description of method and process of analysis:** Eight 90-minute groups and six 60-minute interviews were conducted across four different locations. The interviews were conducted with female sunbed users, under the age of 18 years. Analysis process NS. **Key themes (with illustrative quotes if available) relevant to this review:** **-there is a belief that 'skin heals itself':** *"It always repairs."* (Boy 14-15, Kent). *"You think of it as sunburn, not damage; you burn and it heals*."(Girl, 17, London) -do not know what constitutes 'damaged skin' and lack of knowledge about irreversible damage of sun/sunbed use -skin ageing is acknowledged as an issue amongst women, but stated that it's something their mothers are preoccupied with rather than themselves. -there is an association of skin cancer effecting older people and most participants don't view it as the most serious of cancers: *"I think it would affect older people more – they've been in the sun more"* (Boy, 12-13, Cardiff) <u>Behaviour</u> -the reported use of sunscreen suggests it is often inadequately applied with application taking place post burning:"	**Limitations identified by author:** Not stated **Limitations identified by review team:** The study report was a brief summary with little detail on either methods or findings. **Evidence gaps and/or recommendations for future research:** Not stated **Source of funding:** Cancer Research UK

	How were the data collected: - **What methods:** Focus groups and in-depth interviews - **By whom:** Not stated - **What setting(s):** Not stated - **When:** February-March 2008		*Mum tells you to put it on, you're going to get burnt. If she wasn't there, I couldn't be bothered to put it on."* (Boy, 14-15, Kent) -Fake tanning options are popular, and there are some satisfied users. However, there is also an association with having an unnatural 'orange' look. <u>Policy/Campaign:</u> The rules/regulations in sun bed establishments appear to have a great degree of flexibility, for example in terms of age, time spent there, use of goggles, etc: *"They don't ask your age or explain the risks. There's one person on the desk to give change."* (Girl, 16, Cardiff) -young people experience a heavy load of health cautions and advice; hard hitting messages are recommended to impact behaviour	

Study Details	Research Parameters	Populations and sample selection	Outcomes and methods of analysis/Results	Notes
Authors: **Cancer Research UK** **Year:** **n.d.c** **Citation:** **Men, outdoor workers and sun protection: Summary findings of qualitative investigations of attitudes ...** **Quality Score:** **-**	**What was/were the research questions:** Qualitative research among men (20-50 years), with a focus on outdoor workers, to investigate their attitudes towards the sun, sun protection and skin cancer **What theoretical approach (e.g. grounded theory, IPA) does the study take (if specified):** Not stated **How were the data collected:** - **What methods:** focus group, online interview, in-depth interview - **By whom:** Not stated - **What setting(s):** Not stated	**What population were the sample recruited from:** Not stated (outdoor workers) **How were they recruited:** Not stated **How many participants were recruited:** Not stated **Were there specific exclusion criteria:** Not stated **Were there specific inclusion criteria:** Not stated	**Brief description of method and process of analysis:** NS **Key themes (with illustrative quotes if available) relevant to this review:** <u>General Cancer Awareness and Understanding:</u> Mixed awareness and understanding of the personal risk of cancer. Respondents tended to fall into three broad camps: *I.* Fatalists (minority): *"If you're going to get cancer you're going to get it."* II. Ostriches (majority): *"It's not something that I like to think about."* III. Realists (small minority): These respondents were relatively well-informed about cancer and the general risk factors. <u>In general:</u> Respondents with children were very aware of skin cancer and the danger posed to young children. Many (the wives/mothers) were very careful with children: *"The kids…you are very aware of them not getting burnt…more delicate skin".* There is a perception that women were more at risk than men of developing/dying from skin cancer because of the active pursuit of the tan and sunbed use: *"Women, because they*	**Limitations identified by author:** Not stated **Limitations identified by review team:** The study report was a brief summary with little detail on either methods or findings. **Evidence gaps and/or recommendations for future research:** NS **Source of funding:** Cancer Research UK

	- **When:** Not stated		*go sunbedding (sic), are more likely to get it."* There was broad awareness that lighter skinned, fairer haired people and those susceptible to moles/freckles were more at risk. *"If you're fair skinned you have to watch out."* <u>Awareness of the Sun</u> The 'Fatalists' and 'Ostriches' imagined that the weather in the UK was never sufficiently sunny to increase the skin cancer risk factor, and it is therefore not a priority issue for most: *"We don't get the sun often enough, just now and again."* *"I don't really see living in the UK as a real threat."* *"It's too cloudy and it never hot enough"* <u>Risks for Outdoor Workers</u> There is limited knowledge of the UV index: <u>Sun protection of outdoor workers</u> There was varying understanding of what constitutes sun protection – Comments: *"I put cream on first thing but not at the back of my neck and I never reapply."* There was a belief that cloudy weather and moving around (as opposed to lying in the sun), cool temperatures (on bright days) all counteracted any damaging effects of the sun. *"I take my shirt off if I'm gardening and I don't put cream on. I'm moving around so I don't see how I can burn."*	

			At best the men would use suntan products and cover up on holiday abroad when they had more time, inclination and also partners' persuasion. *"I do it when I'm on holiday but you have the time then." ""When we're abroad the wife will remind me and then I do it."* <u>Barriers to sun protection included:</u> Don't recognize the need; don't think about it; can't be bothered; sun protection products not to hand; expense; apply once and then forget. Personal – peer group pressure, impractical and uncomfortable (rubbing in dust/dirt); don't think about it once on site and working; belief that they are used to the sun because of history of exposure. Corporate – no management support; poor/no HSE; poor financial input. Outdoor workers – 3 categories that have impact on perceptions of sun protection at work: 1.Employees of large, well structures organizations: -some told by management about sun protection and part of HSE; most ready to embrace changes in behaviour if they were practical and initiated and financed by management (i.e. provision of sunscreen, hard-gat neck covers, cover-up mandates): *"I'd certainly take it up but you want it to be supported by management and then you follow it*	

			through. 2. Employees of smaller, informally organised companies (e.g. small building businesses and scaffolding companies) -haphazard regarding HSE: *"Our bosses don't think about it. I suppose they are a small concern and it's not a priority to them."* -macho culture of outdoor workers flourish without senior control: *"It's man's work…"* 3. Self-employed sub-contracted individuals (e.g. couriers, builders, roofers) -responsible for own welfare (even if part of large organization): *"I'm basically sub-contracted out and I'm my own boss even though I'm working for a big company. I have to take responsibility for myself."* -might be receptive to external messages in workplace -management generally laissez-faire: *"…it's up to me…you have to convince me because it's me who is responsible."* <u>Early Detection</u> -few to none regularly check skin or moles for changes, unless they had a previous scare. -If there was unusual activity the 'ostriches' stated that they would wait until the problem was really quite bad and then tell their partner who would	

			send them to the GP; others divided between those who would go the GP immediately and others (the vast majority) who keep an eye on the area, tell their partner and see the GP with a little persuasion from their partner. Comments included: -*"…wouldn't know what to look for."* - *"I didn't realise it was something that you should do."* - *"I have a look now and then but not that often…hardly ever actually."*	

Study Details	Research Parameters	Populations and sample selection	Outcomes and methods of analysis/Results	Notes
Authors: **Curtis B, Pollock K** **Year:** **2009** **Citation:** **Understanding sun exposure in adolescent girls in the UK. British Journal of School Nursing. 4: 4: 175-80** **Quality Score:** **-**	**What was/were the research questions:** The aim of this study was to explore influences on the sun exposure behaviours of girls in the UK, aged 12-15 years, and reflect on the role of the school nurse in relation to the study findings. **What theoretical approach (e.g. grounded theory, IPA) does the study take (if specified):** Not stated **How were the data collected:** - **What methods:** Focus groups - **By whom:** Not stated - **What setting(s):** Secondary schools in	**What population were the sample recruited from:** Secondary schools in Nottinghamshire **How were they recruited:** Letters of invitation were sent to eight secondary schools in central Nottingham. Two responded positively. Pupils were enrolled from a range of socio-economic backgrounds. All 12-15-year-old girls (year groups 8-10, three classes from each school) were invited to participate in the study. **How many participants were recruited:** 28 **Were there specific exclusion criteria:** None **Were there specific inclusion criteria:** 12–15- year-old girls (year	**Brief description of method and process of analysis:** The group discussions were audio taped, transcribed and categorized into common themes. Supporting, contradictory and majority themes were indentified, allowing relationships between these to be scrutinized. **Key themes (with illustrative quotes if available) relevant to this review:** <u>A desire for a tan:</u> Some girls stated no desire to get a tan, but then later reported sunbathing behaviours. For example: *'I don't know that everyone cares. I'm not bothered about a tan.' (Rebecca, Year 8) 'I think the best ones are food oil.' (Rebecca, Year 8).* A few girls stated that they enjoy sunbathing, but most said they did not enjoy it but engaged in sunbathing in order to obtain a tan. A tan was considered desirable to increase physical beauty, was also thought to be representative of a healthy body, to look good for boys, symbolic of a desirable personality and lifestyle. *'It's a change in a person, so you get to see a different side to them.' (Caroline, Year 10).* Also, tans were more sought after in the summer months, when its less acceptable to appear pale: *'In the summer, it's everywhere, tanned models*	**Limitations identified by author:** Participation in study may have been influenced by friends, and therefore resulting in specific friendship groups taking part. Students who are less comfortable with talking in groups are less likely to participate. Therefore, results may not be entirely representative. **Limitations identified by review team:** Limited description of data collection or analysis methods. **Evidence gaps and/or recommendations for future research:** An innovative approach to health promotion in schools is required. Nurses are suggested to take the leading role. However, nurses must be empowered and provided with an

	Nottinghamshire - **When:** July 2007	groups 8–10)	*and stuff. Normal skin colours are seen as pale … you want to fit in.' (Olivia, Year 10).* Pale skin tones were described as: *'horrible' and 'pasty' (Laura, Year 10).* Attitudes to sun protection Applying sunscreen was the most frequently mentioned sun protection practice. However, SPF's as low as four were considered acceptable. Respondents considered the SPF level to correlate with the length of time spent in the sun: 'With factor 15, you can stay in the sun 15 times more.' (Laura, Year 10). Nine of the respondents did not wear sunscreen in England because the sun is not considered strong enough (despite reporting burning of skin in the UK). One girl (year 10) did not use sunscreen in any circumstance: *'I don't like sun cream. I burn just being out all day, so I just put after-sun on.' (Sophie, Year 10).* Why girls dislike applying sunscreen: The length of time it took to rub in; The fact that some attracted insects; Sand gets mixed in; It is easy to forget to apply or reapply; Lack of motivation; The fear that the use of sunscreen would prevent a tan. Girls favoured sunscreens that intensified tans that were glittery or scented. However, these products were noted to be expensive. Alternative methods of sun protection mentioned by respondents: Hats; Sun	understanding of these complex influences and behaviours of young people. **Source of funding:** Not stated

			glasses; Parasols; Staying in the shade. However, only two girls complied with these methods. Most considered them to be unfashionable and had the potential to cause tan lines. <u>Risk Perception:</u> Respondents considered themselves too young to be effected by dangers of sun exposure*: 'You don't think about it happening … we are young, and the possibility is so far in the future' (Judith, Year 8). 'You know you shouldn't, but you want a tan so it seems worth it.' (Jessica, Year 10).* Risks of sun exposure were considered not applicable to UK residents: *'It's not like we get lots of sun anyway, when we have it people want to make the most of it, I don't think we're that much at risk.' (Katie, Year 8)* <u>Misconceptions</u> Respondents were aware that sun exposure lead to burning and increased risk of skin cancer. Knowledge did not extend beyond this. <u>External influences</u> The influence of peers encourages sun exposure and participants desired a tan in order to impress friends and boys. Influence from parents was positive and encouraged healthy behaviour: '*My Mum proper pesters me to put suntan lotion on.' (Lauren, Year 9).* However,	

			we can't tell if the positive parental influence counteracts the persuasive peer influences. *Media*: Models and celebrities are noted to be brown: *'You see models looking so good, especially when you read magazines on the beach, and they are all fine.' (Harriet, Year 9).* Health promotion messages were noted to have not targeted the age group of respondents and focused on younger children or adults. Respondents noted that in the health promotion messages, the models are still tan/brown: *'People are so tanned in [sun safety] adverts, it just makes you want to tan more.' (Beth, Year 8).* *Schools:* Positive behaviour was noted to be influenced by schools, stating that their schools provided little education on sun safety. Many respondents noted that 'good' (Rebecca, year 8) girls compiled with the school recommendations. The girls in the focus groups were eager to note times of non-compliance and examples of not listening to sun safety recommendations. It is unclear whether this is due to a desire for independence, rebellion, conforming to cultural norms or impressing peers. Respondents from all focus groups said that they felt bombarded with health messages concerning smoking, healthy	

			eating. These were considered more important health concerns than skin cancer. *'I don't think it's that important … it's quite important, but there's other stuff, like smoking, that's more important.' (Sarah, Year 8)*	

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Authors: **Escoffery C, Glanz K, Eliott T** **Year: 2008** **Citation:** **Process evaluation of the Pool Cool Diffusion Trial for skin cancer prevention across 2 years. Health Education Research. 23:4: 732-43** **Quality Score:** **++**	**What was/were the research questions:** Process evaluation of Pool Cool Diffusion Trial, looking at implementation of intervention, barriers and facilitators. **What theoretical approach (e.g. grounded theory, IPA) does the study take (if specified):** Not stated **How were the data collected:** - **What methods:** site visits; observations; interviews - **By whom:** evaluation team - **What setting(s)**: telephone and at pools - **When:** 2003-04, exact dates NS	**What population were the sample recruited from:** Swimming pools in metropolitan areas in the USA **How were they recruited:** A probability sample was used for the 40 pool site visits from eight metropolitan regions. The sample was selected in regional clusters. All pools in the cluster were recruited unless they were unable to participate. A probability sample (stratified) was used for 80 telephone interviews from 15 regions. Both samples were stratified to obtain equal numbers of pools in the 'basic' and 'enhanced' intervention conditions. **How many participants were recruited:** 40 pool site visits; 80 telephone interviews	**Brief description of method and process of analysis:** Method: site visits - observation and interview; and telephone interview. Interview: 57-item guide used for collection of information on program participation, implementation and challenges (table 1), with closed- and open-ended questions. Site visits: observing following measures - pool environment; sun safety practices of staff; validate responses about sun safety practice and program implementation. Evaluators used observation checklist to document availability of sunscreen, shade structure, sun signs, clothing, and lifeguard practice. Process of analysis: recorded data manually; all data inserted into database that would randomly select interviews that was checked for entry errors; quantitative data in SPSS (chi-squared and t-test); qualitative data - codebook developed to record themes; 2 evaluators coded responses; reconciliation conducted; kappa statistic to measure reliability. **Key themes (with illustrative quotes if available) relevant to this review:** [Note: only qualitative data has been extracted here.] Sun-signs, sunscreen pump and shade structure were viewed positively and	**Limitations identified by author:** The following points were identified as limitations by the authors: 1) Data were collected from only 25% of the pools implementing the program. 2) Pools that participated in the evaluation may be different from pools that did not respond. 3) Comparison across the 2 years was based on two cross-sectional samples rather than a panel that was followed across 2 years. 4) Interview data were based on reports from one staff member per pool. 5) Due to logistical constraints (i.e. travel costs), site visit/observation data were collected by a single observer. **Limitations identified by review team:** Little qualitative data is

		Were there specific exclusion criteria: Not stated **Were there specific inclusion criteria:** Not stated	implemented well (more so in the second year of the program). Pool contacts stated that there are particular materials that were used more frequently such as: the Mini Big Book, sun safety signs, sunscreen, Leader's Guide or activities. The Pool Cool program also made staff and patrons more conscious of sun safety.	reported in the study findings. Views of participants are not a central focus. **Evidence gaps and/or recommendations for future research:** More attention is needed to how process data can be used in evaluation of interventions. **Source of funding:** National Cancer Institute (CA92505).

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
*** Authors: Geller AC, Zwirn J, Rutsch L, Gorham S.A, Viswanath V, Emoons K.M** **Year: 2008** **Citation: Multiple levels of influence on the adoption of sun protection policies in elementary school in Massachusetts. Archives of Dermatology 144 (4): 491-496** **Quality score:** **++**	**What was/were the research questions:** To understand the factors that may influence sun protection policy development in elementary schools that would be required if the CDC guidelines were to be implemented. **What theoretical approach (e.g. Grounded Theory, IPA) does the study take (if specified):** NR **How were the data collected:** - **What method (s):** Interviews with individuals or two people. (survey data also collected – not reported here). - **By whom:** NR - **What setting(s):** Massachusetts. - **When:** NR	**What population were the sample recruited from:** Elementary school superintendents, principals, teachers, school nurses, parent-teacher organisation presidents & chairs. **How were they recruited:** Not clear - 381 districts put into 9 categories based on student enrolment and income. "within each district, we chose to interview representatives of elementary schools." Not clear if all approached took part? **How many participants were recruited:** 9 superintendents, 18 principals, 18 school nurses, 16 PTO presidents. **Were there specific exclusion criteria:** NR	**Brief description of method and process of analysis:** Full outline of questions provided. Interviews audio taped and transcribed. Initial reading and re-reading to identify brad themes. After these were identified, systematic line-by line coding "based on an initial theory driven code list". NVivo used to facilitate analysis. 2 staff members coded and discrepancies addressed and resolved. **Key themes (with illustrative quotes if available) relevant to this review:** <u>Attitudes toward sun protection policies.</u> Skin cancer prevention was not high priority – because - pupils had limited time outdoors and - there was lack of funding for health classes. Barriers to adopting school based policy were: - Teachers and parents too overwhelmed to make the effort and - finding funding. There was interested and openness to the idea however. The term "policy" was felt to imply legislative mandates and regulation, so "practices" was preferred. <u>Curriculum</u>	**Limitations identified by author:** Available funds were a concern, but ideas for funding beyond fundraising wee not explored. Administrators in charge of buildings were not interviewed. Use of only 9 districts may not be representative. Formal validation of responses not attempted. All expressed willingness to adopt a sun protection policy but no school had one – social desirability bias is a possibility. **Limitations identified by review team**: Not clear what is meant by "theory-driven code list" here – were the thematic headers reported derived from existing literature or conceptual framework? No quotes are provided, hampering any assessment of the validity of the findings

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		Were there specific inclusion criteria: NR	Integrated sun protection information into health education, physical education or science courses. Challenges included: - who would teach it due to lack of time, - what grades be taught - what lessons should be chosen - how often to teach. <u>Environment</u> Improvements suggested were planning shade trees, building shade structures, incorporating shade into any renovation or new building. Costs were the main barrier to expanding and it was seen as unrealistic to change shade. Possible locations were also unclear. <u>Scheduling</u> - Limited scheduling options to avoid 10am to 2pm. - Lack of flexibility in schedules. - Time to apply sunscreen. - Limited resources to address all issues by which schools are “bombarded”. - It was thought that the amount of time spent outdoors was insufficient to cause significant risk. <u>Community</u> Several possible locations for distributing sun protection information were suggested. But drawbacks such as low attendance at community events and perceived low priority	Despite long lists of possible activities reported, there seems to be much resistance to their implementation and many are regarded as impractical. Analysis is descriptive rather than explanatory. **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** Curt & Shonda Schiiling SHADE foundation

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			of skin cancer in most families were raised. <u>Sunscreen</u> Possibilities included getting pupils to bring their own sunscreen or having school provided pumps in classroom, with teachers encouraging use before outdoor activities. Alternatives were getting parents to apply sunscreen before school and including questions about allergies on health questionnaires. Challenges: - Nurses and teachers were concerned about availability and efforts to apply before outdoor activity. - Monitoring sunscreen use - Sunscreen allergies - Parental permission for use - Expense. <u>School staff</u> Staff need training. There is an issue about staff liability in the event of sunburn, allergies to sunscreen etc. <u>Communication</u> A key issue in the implementation of sun protection policies is communication with parents. Staff suggested a number of ways of doing this however, parental participation presented a major challenge.	

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*** Authors: Gerbert B, Johnston K, Bleecker T, McPhee, S** **Year: 1996** **Citation: Attitudes about skin cancer prevention: a qualitative study. Journal of Cancer Education 11(2): 96-100** **Quality score:** **++**	**What was/were the research questions:** To explore why people do or do not engage in skin cancer prevention. **What theoretical approach (e.g. Grounded Theory, IPA) does the study take (if specified):** NR for methods. Findings are discussed in relation to the Health Belief Model (HBM). **How were the data collected:** - **What method (s):** Focus group discussions (FGDs) - **By whom:** NR - **What setting(s):** University of California, San Francisco, USA. - **When:** June 1994	**What population were the sample recruited from:** Students. **How were they recruited:** Convenience sample of 56 screened. Method of contact not clear. After exclusions, 33 did a screening questionnaire allowed them to be categorised into "low concern" group (LC) (who did not practice sun protection) and a high concern (HC) group who did, and were invited to participate. **How many participants were recruited:** 16. 6 in the high-concern, and 10 in the low concern group. **Were there specific exclusion criteria:** Those reporting that their skin rarely or never burnt, refusal. **Were there specific**	**Brief description of method and process of analysis:** 2-hr FGDs were audio taped, and brief field notes written after the session. Tapes transcribed, and these were read and coded independently by the team for attitudes, beliefs and practices about skin cancer protection. These were then discussed and ideas generated as a group. Important and frequently mentioned ideas (such as knowledge of skin cancer and experiences of it) were grouped together into categories. Themes form the 2 groups were compared. **Key themes (with illustrative quotes if available) relevant to this review:** 7 themes: <u>Benefits of sun exposure</u> Sun exposure made LC respondents feel good – looking and feeling better, looking & feeling healthier, improved self esteem, getting vitamin D, enjoying the outdoors. "It makes you feel healthier when you're out in the sun." HC group mentioned positives but also indicated awareness of risks, and trying to change those beliefs. "I'm trying to change. The more movie stars I see that have real white faces…but its hard [and] sometimes I get a little sun and I think "Oh, this looks great." (RG edits)	**Limitations identified by author:** Non generalisable due to method and sample size. **Limitations identified by review team**: Not clear how the initial contact was made. Not clear how thematic categories were developed but there were multiple coders. Not all the differences reported between the two groups seem solid – may not be appropriate to try to do this kind of comparison using this method? Contradictory comments re transferability as suggestions for future media campaigns are made while methods derided for its lack of gereralisability. **Evidence gaps and/or recommendations for future research:** Authors suggest larger and

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
		inclusion criteria: NR	<u>Salience of skin cancer prevention</u> Most in the LC group did not think about using sunscreen and many had been sunburned. HC group thought about sunscreen, agreed it was important and were more likely to use sunscreen for everyday exposure, although this was mixed. "On a bright day I will generally do it, but I'm less thoughtful on overcast days." <u>Perceived seriousness of the sun's harmful effects</u> LC group could easily list negative consequences of sunlight, but did not view these as serious. "I'll deal with it when it happens, you know, 50 years or so." In some cases, aging & skin damage was considered more "real" and serious than skin cancer. HC group considered the harms of sunlight to be potentially serious, although they were mixed as to whether cancer or aging was the most serious. Concern about aging might motivate skin cancer prevention behaviour. <u>Personal connection to skin cancer</u> In the LC group – one participant had any contact with skin cancer – a form that was easily managed.	more diverse samples, and use of theories such as the HBM. **Source of funding:** NR

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			In the HC group, many knew people who had cancer or precancerous moles. The later discussed in the context of their own moles and lesions. <u>Media attention regarding skin cancer</u> LC group suggested that the attractiveness of a tan was the main media emphasis, and only one mentioned negative media content. "When there was first the big scare about the hole on the ozone layer, abound how we were all going to get skin cancer…for a while I was wearing sunscreen…But that lasted maybe three weeks." (my edit) The HC groups were aware of a great deal of publicity about the negative effects of sunlight, which motivated sunscreen use. <u>Problems with sunscreens</u> LC group listed numerous problems associated with sunscreen (unprompted) – cost, potential carcinogens, oily, messy, drying etc to wear & a hassle to put on. Also seen to get in the way of getting a tan and one was "too lazy" to use it. HC group had to be prompted to mention negatives – although these were similar. <u>Prevention "have-tos"</u> Both groups noted that there were many "have- tos" in health promotion messages.	

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			"It's a constant barrage of "do this, do that"" Skin cancer prevention was often not on the personal lift of "have-tos" of LC group. For the HC group, it was on the list, if not at the top. Findings are discussed in relation to the Health Belief Model of prevention: • Perceived susceptibility to illness • Perceived severity to illness • Perceived benefits of taking action • Perceived barriers to preventative action • Cues to action Those who know people who have been affected by skin cancer have increased perceptions of susceptibility, and their ideas about the seriousness fit with perceived severity. Views that sunscreen would protect against wrinkles, and cancer indicate potential benefits, while love for sun, perceived benefits of sun, negative aspects of sunscreen are barriers to action. Finally, perceptions of media are cues to action. All areas need attention in the future to enhance protective behaviour.	

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*** Authors: Gillespie AM, Lowe JB, Balanda KP** **Year: 1993** **Citation: Qualitative Methods in Adolescent Skin Protection. Health Promotion Journal of Australia. 3 (3): 10-14** **Quality score:** **-**	**What was/were the research questions:** Describes the first phase of a larger project to develop and evaluate a comprehensive school based sun protection intervention. **What theoretical approach (e.g. Grounded Theory, IPA) does the study take (if specified):** Mixed methods. Health belief model (HBM) informs the questions and analysis framework **How were the data collected:** - **What method (s):** 36 focus group discussions (FGD) - **By whom:** Trained Heath education consultants in each region (n=12) - **What setting(s):** In school - **When:**	**What population were the sample recruited from:** School grades 3, 5, 7 (primary), 8, 9, 11 (secondary) (average age 8-16) from 24 schools across the state of Queensland, Australia **How were they recruited:** Students were randomly selected from class lists. **How many participants were recruited:** 6 groups from each of the 6 school years. No more than 10 per group. **Were there specific exclusion criteria:** NR **Were there specific inclusion criteria:** NR	**Brief description of method and process of analysis:** Semi-structure topic guide. With questions based on the health belief model (the themes are also reported based on these topic areas). Data analysed by age – primary grades 3-5, transition grades 7&8, secondary grades 9-11. **Key themes (with illustrative quotes if available) relevant to this review:** <u>Knowledge</u> All grades had high and similar general knowledge of sun protection. From early grades students knew about damaging effects such as sunburn, heat stroke, dehydration, sun spots, heat rash and even melanoma. Older students seemed more aware of melanoma and high skin cancer rates in Queensland. All were aware of the advantages of being protected form the sun when outside. Teachers, family and friends were important sources of sun protection information. Older students preferred to listen to peers while primary children relied on authority figures. Mass media sources were seen as credible, but not the most important. <u>Severity and susceptibility</u> Older students were more likely to know of an older person who had experienced skin cancer of some form.	**Limitations identified by author:** NR **Limitations identified by review team**: The aim is not very clear – as it is not describes how the findings are expected to influence the programme. Very few details about methods are provided, for example, it isn't clear how the children were recruited, it is not known if the groups were recorded, no details about how the FGDs were analysed, or by whom, is given. It seems to be a sort of framework analysis, based on the 5 motivation of the HBM, though this isn't named. Analysis is descriptive rather than explanatory. There are few quotes – none at all in relation to most of the themes, making it difficult to assess validity. No ethical issues about researching with children are outlined. It isn't clear if they could refuse to take

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	NR		All three age groups saw skin cancer as a problem of adulthood and did not report worrying about experiencing it themselves. All felt that fair skinned people had the most to worry about, and many thought that their skin was more resilient. Older students were more concerned about whether they had a good tan than about adverse effects of the sun. Personal susceptibility is not a strong motivator for sun protection for young people. The authors suggest that a focus on short term effects such as appearance, might be more pertinent in messages aimed at young people & that closer examination of their skin type might also help them to make informed decisions. <u>Perceived benefits and barriers in sun protection</u> Perceived benefits of sun protection are outweighed by perceived barriers. All students expressed the main benefits of sun protection in terms of immediate concerns rather than long term damage, avoiding being “hot and sweaty”, and having the “sun in your eyes”. Protective clothing was disliked because it added to the discomfort of already extreme heat. The winter was thought “hardly hot enough to worry about sun protection.” Being outdoors was generally perceived as being more fun, offering greater freedom and being healthier than being indoors, especially by younger children.	part. No mention of parental or child consent is made. **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** NR

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
			Sunscreen was not worn because: “it takes too long” “I thought I’d only be out for a short time.” Some found sunscreen irritating (to eyes and mouth) and easier to remember if they were going to be in the sun all day (at the beach or sports day). Most of the barriers at school relate to structural characteristics of the school system. While there was shade at school, this was hard to use sometimes. It was difficult to avoid midday sun as this was lunchtime, and when playing sport. Sun protective clothing and hats were more acceptable if they were fashionable. The desire for a “good tan” is a strong and consistent barrier to sun protection and this was evident in primary school, increasingly important for older students who were more concerned about a good tan than about adverse effects or skin cancer. <u>Cues to action and reinforcement</u> Older students believed that a tan would make them more attractive and reference was made to the appeal of media images. Primary students reported more influence by parents and teachers about behaviour in the sun – hats are compulsory for outdoor activities in primary schools but not secondary schools. Parents mostly provide positive reinforcement for sun protection and most students thought their parents were not interested in getting a tan – some were	

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			careful due to having been treated for skin cancer. Three groups indicated they would encourage friend to cover up if they were getting sunburned but this was commoner in younger pupils. <u>Current behaviour and norms</u> Many activities were undertaken outdoors and older students were more likely than younger to be outdoors without engaging on any particular activity. Clubs and facilities used may be possible sites for sun protection promotion. Primary students than were more likely than secondary to wear hats last time they were in the sun. Older students were more likely to report not using sun protection the last time they were in the sun. Inconsistent behaviour was reported, with transitional students (years 7&8) showing rebellious factors – wanting to defy parents and teachers.	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
*** Authors: Glanz K, Carbone E, Song V** **Year: 1999** **Citation: Formative research for developing targeted skin cancer prevention programs for children in multiethnic Hawaii. Health Services Research 14 (2): 155-166** **Quality score:** **++**	**What was/were the research questions:** Formative research to help design a successful skin cancer prevention program - *SunSmart*. Aims were to: - collect data that would help to formulate a successful program. - help contribute to a broader base of knowledge about children's, parents and recreations staffs' beliefs and behaviours related to skin protection. Objectives were to: -learn what the children, parents and caregivers in Hawaii knew, thought and did about skin cancer and sun protection. - get ideas from the target audiences about the appeal	**What population were the sample recruited from:** Children and their parents form 3 public and one private elementary schools in Hawaii, recreation staff from the private school and the YMCA. Children 53% boys, 1/3 Caucasian, 1/3 fair skinned Asian or mixed, 1/5 dark skinned Asian/ Filipino/ Native Hawaiian (as judged by session observers). Parents 87% female. Caucasian (27%), Filipino (40%), Japanese (13%), Native Hawaiian mixed (20%). Recreation staff 48% men, 48%	**Brief description of method and process of analysis:** All sessions were tape recorded. There were 2 observers present as well as pairs of moderators. The former completed observation protocols, took notes on ideas and comments of participants. Classroom teachers were also present which "did not seem to inhibit discussion among the first through third grade children." The quantitative surveys were used to stimulate discussion in the groups. Children's groups began with a hat-making activity and by asking children to tell their names and favourite games. Discussion guides included constructs from the SCT and HBM "so that it would be possible to evaluate the constructs applicability to the program." Parent, child and recreation leader guides were parallel but separate. Participants received Sun Safe gifts at the end. Children's groups were not transcribed as they were very fast and the groups were large, so thought not to be helpful. Analysis focused on looking for patterns to identify themes that were common to several participants. Multiple people reviewed the notes and transcripts, and initial analysis was done blind by one person who was present and one who was not. Where linked, the quantitative data was used to help interpret qualitative findings. **Key themes (with illustrative quotes if available) relevant to this review:** All groups expressed a general feeling that using sunscreen was, by itself, the most important practice. In relation to HBM: Risk/severity - children do not understand what skin cancer is or risk of cancer, therefore any messages that address cancer should address adults first. Barriers – long sleeves and wide-brimmed hats seen by children as too extreme. Benefits – most comments were about sunscreen, so more mention of other	**Limitations identified by author:** Data extrapolated form the parents are based on a small non-randomly selected number of participants. **Limitations identified by review team**: Aims and objectives are given, not clear why - they have reworded them, and changed the order, but they are very similar, but not identical. The impact of not transcribing the children's groups is not clear – presumably the observer's notes were the data, although if the discussions were as fast moving as

<table>
<tr><th>Study details</th><th>Research parameters</th><th>Population and sample selection</th><th>Outcomes and methods of analysis
Findings</th><th>Notes</th></tr>
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<td></td>
<td>and feasibility of various educational materials, strategies and sun safety policies.

What theoretical approach (e.g. Grounded Theory, IPA) does the study take (if specified):
Not for methodology. Miles and Huberman (1994) are referenced in relation to the triangulation potential of mixed methods.

Social Cognitive Theory (SCT) and Health Belief Model (HBM) provided the framework for the research overall.

Social Cognitive Theory suggests that behaviour is influenced by social and physical</td>
<td>Caucasian, Japanese (24%) Filipino 12%, Native Hawaiian, mixed, other (16%).

How were they recruited:
Purposive samples in terms of ethnicity, rural or urban locations and public or private schools. Schools were recruited by contacting principals and classes were selected by them. Intact classes preferred as the most comfortable environment for students. Informed consent sought from parents. Parents recruited by letter sent with the consent forms for the children.</td>
<td>methods should be made.

In relation to SCT:
Roles – parents were central, recreation staff were willing to be role model.
Social norms – need to promote acceptable change, as most are used to light dressing and there is a mix of light and dark skin tones in the population.

(Table reproduced verbatim)
<table>
<tr><th>Issue or concept</th><th>Observation</th><th>Supporting comments of conclusion</th></tr>
<tr><td>Children</td><td></td><td></td></tr>
<tr><td>Perceived Risk</td><td>Risk of sunburn is high</td><td>Sunburn is uncomfortable, but lasts only a few days</td></tr>
<tr><td>Perceived Severity</td><td>Consequences of skin cancer misunderstood by children</td><td>‘Its when you get sunburned all over you’
‘Its when you go out in the sun and get sun spots’
It gives you a bad headache and you can’t think of anything’</td></tr>
<tr><td>Barriers to sun protection</td><td>Protective clothing uncomfortable in hot weather</td><td>‘Long sleeves are too hot and make you tired’
‘Tank tops are cooler, more comfortable’
‘With long pants you get all hot and sweaty’
Wide brim hats…ugly, itchy, get in the way</td></tr>
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<td>suggested, data may well have been lost.

Evidence gaps and/or recommendations for future research:
Future studies may need more aggressive recruiting strategies to include more parents.

Source of funding:
Department of health, State of Hawaii and Chronic Disease Prevention Control Program of CDC.</td>
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Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings			Notes
	environments, along with the features of the behaviour. In this context, this might include personal behaviours, role models, perceived norms and the availability of sunscreen and shaded areas. HBM constructs of particular interest are perceptions of susceptibility, perceived severity, and the benefits to and barriers to sun protection behaviours. **How were the data collected:** - **What method (s):** Mixed methods – quantitative (survey on demographics and sun protection and exposure habits – children's survey used pictures) and	**How many participants were recruited:** 216 children (in 12 groups of 8-28) 15 parents (5 groups, interviews at 2 schools where there were too few participants for a group) 27 recreation staff (3 groups of 8-11) **Were there specific exclusion criteria:** NR **Were there specific inclusion criteria:** NR			during sports, don't stay on when you run	
			Benefits of sun protection	…….	……..	
			Role models	Parents determine clothing they wear	Parents tell them what to wear or may tell them to change	
				Parental guidance most important	Listen mostly to parents' guidance	
				Non-parental role models ok	Coaches, teachers, lifeguards and 'Summer Fun' leaders are people they would listen to and imitate	
			Perceived norms, support	Sunscreen more important at beach	Most kids do not use sunscreen when they go out to play	
				Dependent on parents/family for sunscreen	Parents and relatives apply sunscreen, but older kids apply it themselves more often	
			Environmental supports	……	……	
			Issue or concept	Observation	Supporting comments of conclusion	
			Views on: educational material and strategies, sun safety polices	Learning should be fun and relevant	Would join in fun activities, like the hat-making game, to learn about sun safety	
			Parents			
			Perceived risk	Exposure leads to	'The children are always	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings			Notes
	qualitative. 12 Group discussions, 5 focus group discussions (FGDs) & 3 semi-structured interviews - **By whom:** Pairs of trained moderators with health promotion experience. - **What setting(s):** Children at school, in classroom or out of it depending on proportion of class participating. Parents at school during lunchtime or evening. Recreation leaders at the private school. Schools were on one of two Hawaiian islands - **When:** **Details of the skin prevention programme**			resistance	in the sun and they rarely get sick…the more exposure they get whatever, the more resistant they are' 'For us Filipinos, we have this belief that if you expose the children early to the sun, the more resistant they are'	
				No risk/no protection needed in the winter	'During the winter I don't use sunscreen, but in the summer I do'	
			Perceived severity	Skin cancer not very serious	Belief that getting 'spots removed' is treatment or cure	
			Barriers to sun protection	Barriers to applying sunscreen on kids	Expensive, inconvenient, time consuming/too busy 'The reason I don't put it on my oldest is because he complains so horribly and he's always in such a hurry' Did not know where to buy sunscreen (one parent)	
			Benefits of sun protection	Starting at an early age	For the kids, starting young makes it easier	
			Role models	Parents should be role models	Know they do not model sun-safe habits for their kids	
			Perceived norms, support	Sunscreen use not a norm in Hawaii	'You rarely see local people putting on sunscreen'	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings			Notes
	SunSmart is a skin cancer prevention programme in Hawaii designed for elementary school in grades 1-3 (aged 6-8), together with their parents and recreation leaders. Long term goal is to disseminate effective skin cancer prevention programs statewide. Recreation leaders include lifeguards, coaches and "summer fun" leaders at YMCA and parks based day camp programs. Objectives of *SunSmart* are: 10 To increase awareness, intentions, skills and practices among parents, recreations staff and 6-8 year old children. 2) To increase environmental supports and policies to promote				'The majority of people I know don't even think about it….I just don't think about it'	
			Environmental supports	Make adopting sun safe habits easier	Easier to get children to follow sun safety practices if it is a routine part of recreation or school programs	
			Issue or concept	Observation	Supporting comments of conclusion	
			Views on: education materials and strategies, sun safety policies	Supportive of parent, child education, school policy initiatives	'I think you gotta educate the parents first and tell them of the consequences' 'I think you should do more stuff in school!' Stronger policies, like including it in school or day camp Back-packs are a good idea Could include in cost of sport uniforms and supply fees	
			Recreation Staff			
			Perceived risk	If I do not sunburn, not at risk	'I don't use anything, I don't use sunscreen and I don't use a hat, and I really don't get burnt'	
			Perceived severity	Aware, but do not think about it	One female coach had been diagnosed with melanoma and knew how	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings			Notes
	skin cancer prevention in outdoor recreations settings for youth.				serious it could be, but had not given the message to co-workers in the past	
			Barriers to sun protection	Obstacles to sport coaching, etc.	Hats and sunglasses make it hard to maintain eye contact and hats do not stay on in wind and active times	
			Benefits of sun protection	Good to start young, outdoors	Making it a routine would lead to less resistance	
				Sunscreen the key safety habit	Felt that sunscreen alone was most important practice	
			Role models	Opportunity to be role models	Could be role models and visibly practice sun safety, but have not always been exemplars in the past	
			Perceived norms	Uneven use of sun protection	Often covering up treated like fashion, not safety and highly variable among staff	
			Issue or concept	Observation	Supporting comments of conclusion	
			Environmental supports	Fit with health/safety message	Encouraging drinking water on hot days is routine, so these moments could be used to stress sun safety too	
			Views on educational materials and	Lack of education for staff	'We don't do enough of educating the parents because we ourselves	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings			Notes
			strategies, sun safety policies		aren't very educated'	
				Willing to make policy/structural changes	Scheduling outdoor activity to avoid peak sun, providing convenient shaded areas and sunscreen…good options Could send newsletters to parents, have sun-smart contests, conduct interactive/involving activities	

Study Details	Research Parameters	Populations and sample selection	Outcomes and methods of analysis/Results	Notes
Authors: **Grey A** **Year:** **1998** **Citation:** **The develop-ment of a 'Sun Safe Code'. Health Promotion International. 13: 277-84** **Quality Score:** **-**	**What was/were the research questions:** To develop and test a 'Sun Safe Code'. **What theoretical approach (e.g. grounded theory, IPA) does the study take (if specified):** None stated **How were the data collected:** - **What methods:** (1) Individual interviews with people recruited from the street (Oldham and High Wycombe); (2) group interviews (7-8 people; Watford, Birmingham, Brighton, Newcastle) - **By whom:** Not stated - **What setting(s)**: Individual interviews in "a church hall or similar location"; groups NS	**What population were the sample recruited from:** General population **How were they recruited:** Individual: spontaneous recruitment from the street. Group: identified by freelance recruiters by telephone, selected according to knowledge, attitude and behaviour characteristics [apparently quota sampling, although not fully clear]. **How many participants were recruited:** Individual: 32. Group: 8 groups of 7-8 people each [a further 59 were recruited to the second phase looking specifically at the design of the Sun Safe materials; data on this second phase are not extracted here]. **Were there specific**	**Brief description of method and process of analysis:** Interviews and group discussions were taped and transcribed. The data were analysed by reading the transcripts and annotating the margins, summarising and interpreting relevant points. **Key themes (with illustrative quotes if available) relevant to this review:** [NB only data on general attitudes have been extracted here, not on reactions to the Sun Safe Code.] Sun protection tends to be reactive and motivated by burning: "I only bother with sun cream when I can actually feel that I am burning" (male, 34-55 y); "I put cream on my son every half hour, but for me I put it on once and then I think that's OK. If I start burning then I will put on some more" (female, 19-24 y). Participants generally had limited knowledge about broad-spectrum (UVA/B) protection and many did not understand the meaning of SPFs. Many mothers felt that children looked "healthy" with "a bit of colour".	**Limitations identified by author:** None stated **Limitations identified by review team:** This study is primarily a market research exercise on a specific set of materials. Sampling procedures are subject to bias and data analysis procedures are not well described. Limited data are presented and there is little information on context. **Evidence gaps and/or recommendations for future research:** None stated **Source of funding:** Health Education Authority

	- **When:** September 1996	**exclusion criteria:** Those who completely rejected the idea of being out in the sun. **Were there specific inclusion criteria:** NS		

Study Details	Research Parameters	Populations and sample selection	Outcomes and methods of analysis/Results	Notes
Authors: **Hay J, Shuk E, Zapoloska J, Ostroff J, Lischewiski J, Brady M.S, Berwick M** **Year:** **2009** **Citation:** **Skin cancer risk discussions in melanoma-affected families. Journal of Family Communication 9:4: 209 – 32** **Quality Score:** **++**	**What was/were the research questions:** To examine communication in families after melanoma diagnosis, family members' responses and processes by which families encourage protective behaviours. **What theoretical approach (e.g. grounded theory, IPA) does the study take (if specified):** Communication Privacy Management; social influence theory **How were the data collected:** - **What methods:** Open-ended semi-structured interviews. Part of the interview used a narrative format. For each family 3 interviews were conducted, one with the parent, one with the (adult) child and one with both together. The	**What population were the sample recruited from:** Melanoma patients undergoing surgery, and their adult children **How were they recruited:** Eligible participants were identified from clinic schedules. With physician approval, a research assistant approached them to assess their interest in participating. Patients recruited were approached again after two weeks to see if an adult child willing to participate had been identified. Each family was paid $75. **How many participants were recruited:** 19 family pairs **Were there specific exclusion criteria:** NS	**Brief description of method and process of analysis:** Coders included behavioural scientists, qualitative methodologists and graduate psychology students. Text coding was begun before data collection was complete to allow iterative changes to interview guides. All coders worked on an initial sample, conducting thematic coding using Atlas.ti software. Subsequent coding was by one researcher only. Key constructs were then identified by discussion across the research team as a whole, with a focus on constructs identified by multiple analysts independently ('analyst triangulation'). **Key themes (with illustrative quotes if available) relevant to this review:** [NB. Not all data have been extracted here - only data which are relevant to prevention (rather than e.g. disclosure of diagnosis); however, data regarding both patients and family members have been extracted, as they are not clearly distinguished.] Risk awareness. Participants frequently discussed risk behaviours and prevention with family members soon after diagnosis. Ad-hoc reminders. Many participants reported reminding family members to use sunscreen or wear hats or long-sleeved	**Limitations identified by author:** Recruitment may have introduced bias towards patients with good family communication (although steps were taken to counteract this and minimise social desirability bias). Children under 18 were not included. All participants were of Caucasian ethnicity. **Limitations identified by review team:** None **Evidence gaps and/or recommendations for future research:** None stated. **Source of funding:** National Institutes of Health (grant number K07 CA98106).

	interviews were preceded by unstructured interaction with no researcher present, to provide a sample of normal health-related interaction. - **By whom:** Patient interview by the primary investigator; family member by a qualitative methods specialist; joint interview by both together. - **What setting(s)**: Clinic (Memorial Sloan-Kettering Cancer Centre) - **When:** Not stated	**Were there specific inclusion criteria:** Both patients and family members aged ≥18 years; fluent in English; patient diagnosed 3-18 months prior to participation.	shirts when in the sun. In some cases there was a co-ordinated effort by family members. “When we’re together usually on Dad’s boat and as we’re kind of getting our stuff together, who has sunscreen? Did you put it on? . . . Did you put your hat on? Put some stuff on your nose; put some stuff on your ears. So we all, it’s kind of like a joint, I do some stuff for the kids, so we all make sure everybody is kind of lathered up. Right, (and) reminding each other that we’ve been out too long . . . And my husband will say, did you put sunscreen on the kids? And we all make sure.” Scare tactics. Some participants used forceful messages to frighten family members into prevention behaviours: "you don't want to end up like me". Performance of the behaviour. Some participants performed behaviour such as wearing hats to encourage family members. Moderators of persuasive strategies. Some participants had 'all-or-nothing' views of the causes of melanoma which discouraged social influence communication, e.g. thinking that if it was due to sun exposure, it was not genetic. Patients who thought genetic factors were important were more likely to communicate with family members about risk. Women tended to take the leading role in communicating risk. Some participants felt it was not appropriate to encourage behaviour change e.g. in non-blood relatives or their peers or elders.	

			Participants assessed family members' individual risk (skin tone, risk behaviours) before communicating with them about risks. Some family members were felt not to be receptive, e.g. because they did not care about their health. Some were felt to be "too smart" to need encouragement: ". . . Because she's a highly educated girl, I mean, she should be able to put one and one together and, I don't think she'd use it anymore, let me put it to you that way. I don't think it needs to be discussed, that she would use [tanning] salons."	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
*** Authors:** **Lupton D, Gaffney D** **Year:** **1996** **Citation:** **Discourses and practices related to suntanning and solar protection among young Australians. Health Education Research 11 (2) 147-159** **Quality score:** **++**	**What was/were the research questions:** Study aimed to 'identify some of the discourses and practices around solar protection, skin cancer and tanning among Australian young people, with a particular focus on gender differences' (p147) **What theoretical approach (e.g. Grounded Theory, IPA) does the study take (if specified):** None explicitly stated, but discourse considered key, as the analysis aimed to throw light upon the 'patterned ways of understanding, representing and talking about phenomena that participants drew upon when articulating their responses to tanning, body image and solar protection' (p150) **How were the data collected:**	**What population were the sample recruited from:** Children at 6 New South Wales secondary schools **How were they recruited:** Not stated **How many participants were recruited:** 98 (50 females, 48 males) (50 aged 11-13, 48 aged 14-16) 94% were from English-speaking backgrounds **Were there specific exclusion criteria:** None stated **Were there specific inclusion criteria:** None stated	**Brief description of method and process of analysis:** Transcripts were analysed for discourses, focusing upon 'the structure of the participants' explanations, the words, phrases, concepts and belief systems they used and the other texts they drew upon in their explanation (e.g. campaign material, other mass media)' (p150) **Key themes (with illustrative quotes if available) relevant to this review:** <u>Tanning</u> Tanned skin perceived as more attractive than pale/white skin and also indicative of an outdoors lifestyle – a tanned person was perceived as being likely to be a "fun, beachy person" rather than a pale person who "spends a lot of time inside" (p150) "I have got a friend and she is really pale, and it really describes the way she lives. Because I mean, she doesn't go bike riding or to the beach or anything, that's why she is not tanned, and you can tell who's sport and who goes out a lot and who just stays in." (female) (p150) Tanned skin was considered to be the norm, with untanned or pale skin as abnormal and socially inappropriate: "I hate being white, you feel really self-conscious" (female) (p151) Other words used to describe untanned people: "unhealthy", "sterile", "death warmed up" (p151)	**Limitations identified by author:** None **Limitations identified by review team**: Insufficient details provided regarding analytic process **Evidence gaps and/or recommendations for future research:** Design and evaluation of campaigns that foster 'positive meanings' around pale skin rather than trying to challenge the positive conception of tanned skin **Source of funding:** Health Promotion Unit, New South Wales Health Department

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
	- **What method (s):** Focus groups (n=12), approximately 45 minutes duration with 8-9 participants in each (some mixed-sex, some single-sex) Semi-structured question schedule was utilised (details provided); in addition, visual materials (magazine images of individuals with tanned/non-tanned skin and the 'Me No Fry' television adverts Focus groups were audio-taped and transcribed; field notes were completed at the end of each group by the facilitator - **By whom:** Not stated - **What setting(s):** Secondary schools in New South Wales, Australia (all were conducted during school hours) - **When:**		"If you look too white, it looks like you've got white paint and you have just painted yourself white. It looks funny" (p151) Due to the ease with which a tan can be obtained in summer in Australia 'simply by walking around outdoors', remaining untanned is perceived to require particular effort and therefore a sign of 'artificiality': "I think with a tan it is like adding more to your body" (male) (p151) "I hate people who are too white – they look like a ghost or something" (female) (p151) "White skin makes your figure look terrible" (female) (p151) Tanned skin was not automatically considered to be preferable – it needed to 'suit' the person: "If you see a guy who's tall, blond hair, blue eyes – a tan looks good on him, some people it doesn't" (female) (p151) Some considered pale skin to be a sign of strength, e.g. Madonna's pale skin was perceived as demonstrating that "she has her own opinions" (p151) Tanned skin was associated with Australian nationality, with white pale skin being 'considered a sign of foreignness, particularly British nationality': "I'm brown, [my father and brother] are the same, but my mum, she's a Pommy" (female, edit in original) (p151)	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
	1994		Male students 'frequently' stated that they were not concerned about the effects of the sun on their skin (e.g. causing wrinkles), while female students expressed more concern about the possibility of skin damage Male students emphasised that they did not 'try' to get a tan (as they perceived girls to be doing when lying 'passively' in the sun) – 'for a boy to try to get a tan was represented as unmasculine, tending towards female vanity' (p152) <u>Solar protection and sunburn</u> All participants were able to list ways of protection from the sun, e.g. wearing clothing, using sunscreen, wearing a hat/sunglasses All participants were aware of side-effects of too much sun exposure, e.g. dehydration, headache, moles, sunburn, skin cancer, dry/wrinkly/leathery skin Many made negative statements about people who became sunburnt; "they're not responsible", "they don't care about their skin, they just want to get a tan" (p153) Although participants did not want to get sunburnt, the main perception was that burnt skin (unless peeling) 'became brown and provided a deep tan', e.g.: "[After becoming sunburnt] I used to feel, oh cool, I am going to get brown the next day, I can't wait" (female) (p153)	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
			Not following parents' advice regarding skin protection (as participants were obliged to do when younger) was viewed as a way of making one's own decisions. The perceived lack of rationale in advice, as well as changes in how authority is reacted to, was also identified: "Most people today, before when our parents and that, were kids, people would tell you not to do things, and you would just take their word for it. But now people have changed. Unless you have a good reason for not doing it, you won't listen to what people say, like they don't explain to you why you should wear a hat and that" (male) (p153) Views on the wearing of sunglasses and shirts (whilst at the beach or swimming pool) varied according to whether these items were considered fashionable or not, e.g.: Boys frequently wore branded baseball caps, but in order to be fashionable rather than to protect from the sun – "You wear a hat even if there's no sun" (male) (p154) Girls' views on hats varied; some would not consider them as "they wreck your hair", others would wear hats "if they look good with some outfits" (p154) One school had adopted a fashionable baseball cap as part of its uniform – students noted that 'as soon as the cap became part of the school uniform it lost its positive associations' (p154)	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
			Participants with fairer skin were typically more vigilant about applying sunblock, but 'students commonly said that wearing sunblock prevented them from getting a tan, so they often used sunblock with lower SPF factors or deliberately spent some time in the sun before applying sunblock so as to acquire a tan' (p154) <u>Responses to the 'Me No Fry' campaign</u> Nearly all participants said they had seen or heard the 'Me No Fry' advertisements – 'covering up' was the primary message that they understood from the campaign Some older boys were negative about the 'eggs' advertisement – although they stated that they understood the message, "you don't pay attention because you have seen it so many times, you need new stuff all the time" (p155) The 'stars' advertisement (featuring famous actors) was viewed negatively by some participants: "That's all fake anyway, they'd all be baking themselves on the beach too, I bet" (female) "If you were down the beach you wouldn't expect to see them with pink zinc stripes across their faces" (p155) Some boys viewed the 'stars' advertisement positively because of who featured in it, namely the "good looking women – makes you look at it" (male) (p155)	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
			Younger participants reacted more positively to the 'stars' advertisement: "I reckon it's good because it doesn't show them, like, burning, it shows them, like, having fun, covering up" (female) (p155)	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
*** Authors:** **Murray CD, Turner E** **Year:** **2004** **Citation:** **Health, risk and sunbed use: A qualitative study. Health, Risk & Society 6 (1) 67-80** **Quality score:** **+**	**What was/were the research questions:** Why do people use tanning facilities? What do people feel the potential health benefits of artificial tanning are? **What theoretical approach (e.g. Grounded Theory, IPA) does the study take (if specified):** Interpretive Phenomenological Analysis **How were the data collected:** - **What method (s):** Semi-structured interviews, approximately 1 hour duration - **By whom:** Not stated - **What setting(s):** Office at the researchers' institution (participant's choice) (n=3) Office at the participant's	**What population were the sample recruited from:** Tanning salons (n=4) in Merseyside, UK **How were they recruited:** Study information sheets were left at the salons; participants contacted the researchers if they wished to take part **How many participants were recruited:** 18 (male n=9, female n=9), age range 18-32 (all reported using a sunbed at least once a month; duration of use ranged from 3 months to 8 years, average 3 years) **Were there specific exclusion criteria:** None stated **Were there specific inclusion criteria:** Sunbed use	**Brief description of method and process of analysis:** 'Transcripts were read in order to identify themes from a psychological perspective… [then] an idiographic approach in which the transcript of one interview was looked at in detail, with an attempt to be as exhaustive as practical, before other transcripts were examined' – then, initial themes were identified and collated in order to allow for connections to be looked for and 'superordinate concepts' developed. This final list 'presented, in the researcher's opinion, the most parsimonious analysis of these transcripts' (p71) and is used to present the analysis below. **Key themes (with illustrative quotes if available) relevant to this review:** <u>Gaining some colour: Reasons for starting to use a sunbed</u> 4 main reasons were given for starting: i) 'Gaining some colour' before a holiday in order to "give my skin a bit of protection form the sun" (female) ii) To fit in with holiday companions: "I didn't want to turn up looking like a milk bottle, so I started using the sunbeds" (female) iii) To feel better about one's appearance: "It gave me a nice healthy glow and I didn't look as pasty; it made me look healthy" (female) iv) To 'clear up' acne: "[I began using a sunbed] because I had spots… it did definitely help them" (male) (edit in original) (all p71)	**Limitations identified by author:** None stated **Limitations identified by review team**: Unclear whether or not participants' names have been anonymised Despite the extensive description of the analytic process, the analysis itself predominantly draws on individual examples rather than developing the data into a conceptual whole Convenience sample of sunbed users – no attempt made to investigate whether or not the participants were systematically different or not from other sunbed users Over a quarter of the quotes are drawn from an interview with a single respondent – no

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
	place of work (n=5) Participant's home (n=10) - **When:** Not stated		<u>Feeling better with a tan</u> Participants reported feeling better about their appearance and increased self-esteem when they were tanned: "It makes me feel better in myself, and also I find the sessions really relaxing sometimes" (female) (p72) The positive attention that a tan attracts was also mentioned: "You always get a good response from a tan, whereas you always get a bad response from being pale, you get told 'ooh, you look so white'" (male) (p73) A tan was also reported to increase self-confidence: "I feel that I have a lot of bodily imperfections and by having a tan that it makes them seem less obvious… I also think that it makes me more outgoing somehow… that may sound stupid but it does have that effect on me and my personality" (female) (my edit) (p73) <u>Putting it to the back of your mind: A tan as healthy</u> '… the concept of tan as healthy, or helping someone to appear healthy, emerged consistently in interviews' (p73): "… having a tan isn't necessarily healthy although it gives the appearance that it is" (female)	rationale given for this focus Analysis focuses upon the female participants' responses (18 quotations given from female respondents vs. 7 from male) - no rationale given for this focus **Evidence gaps and/or recommendations for future research:** Evaluation of the effectiveness of health campaigns that are based upon people's motivations for sunbed use, e.g. as the 'healthy' appearance of skin is valued, an emphasis upon the risk of premature aging could be emphasised **Source of funding:** Not stated

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
			"I'd rather go on [a sunbed] than look ill" (male) (p74) All participants were aware of the risks of using a sunbed, but this was not prominent in their rationale for continuing sunbed use: "Well I mean, the obvious risk is skin cancer but I tend not to think about it, you just seem to put it to the back of your mind and hope that you won't get it" (female) (p74) "… if I've done any damage [through using sunbeds] I've probably done it by now so I may as well carry on… [Sometimes I worry about the risks and stop using sunbeds] but then when my tan fades and I start to get pale again I find myself thinking 'oh what the hell, I'm only young once so I might as well feel good about the way I look whilst I can'" (female) (p74) (my edit) For some participants, the aging effects on skin of sunbed use were of greater concern than the risk of skin cancer Some participants had an 'optimistic bias' regarding the risks they were exposing themselves to: "I've read of people getting skin cancer, in magazines, and blaming it on their use of sunbeds, but they seem to use the sunbeds a lot more than I do" (female) (p75) <u>I wish I'd never started: Sunbed use as an addiction</u> 8/18 of the interviewees discussed their sunbed	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
			use in terms of addiction: “If I haven’t been on a sunbed for a while, like when I’m trying to save money, then I just don’t feel as well, as healthy. I get colds and stuff. I start to feel down and get very tense. I just don’t have the willpower to stop for long” (female) (p76) <u>That can’t be good for you: Risks of sunbed use</u> Participants expressed a range of views about whether sunbed use or exposure of the skin to the sun was more risky	

Study Details	Research Parameters	Populations and sample selection	Outcomes and methods of analysis/Results	Notes
Authors: **Parrott R, Steiner C, Goldenhar L** **Year:** **1996** **Citation:** **Georgia's harvesting health habits: a formative evaluation. Journal of Rural Health. 12: S4: 291-300** **Quality Score:** **+**	**What was/were the research questions:** This study conducts a formative evaluation of the GHHH (Georgia's Harvesting Healthy Habits) project. The primary objective of the evaluation was to systematically refine the general campaign plan using information collected about Georgia's famers. The secondary objective was to assess the personal determinants of farmers' behaviour and environmental efforts to support famer's behaviours. **What theoretical approach (e.g. grounded theory, IPA) does the study take (if specified):** Social Cognitive Theory (the project under evaluation is based on SCT) **How were the data**	**What population were the sample recruited from:** Farmers, service providers (public health nurses) and other stakeholders in Georgia (USA) **How were they recruited:** NS **How many participants were recruited:** 14 **Were there specific exclusion criteria:** No **Were there specific inclusion criteria:** No	**Brief description of method and process of analysis:** Three groups selected for open-ended questions to provide descriptive insights about community, group and individual resources to support farmers' skin cancer prevention/detection behaviours. Methods of data analysis NS **Key themes (with illustrative quotes if available) relevant to this review:** Farmer's skin cancer prevention and detection behaviours: little use of sun barriers used, such as wearing wide-brimmed hat, protective clothing, tractor or other farm equipment with/without umbrella/cover. All but the farmer with melanoma said they do not protect against the sun because clothing is too hot and sunscreen too inconvenient. Availability of skin cancer prevention/ detection resources for farmers: most respondents get information from physicians (but a very small number indicated their doctors recommend sun protection measures). For field observations there was a lack of cancer prevention and detection information, services, and products at sites observed. Legislators' perceptions are that farmers resist legislative assistance to avoid increased regulation. Nurses get information primarily from American	**Limitations identified by author:** None stated. **Limitations identified by review team:** No original data are presented to support the findings. No information on data analysis for any phase of the study. Little information about sampling and recruitment. **Evidence gaps and/or recommendations for future research:** GHHH formative evaluation activities may be expanded beyond the target population, providing a model of how to identify the organizations and institutions that should be involved in health promotion efforts to increase the likelihood of success. **Source of funding:**

	collected: - **What methods:** Pilot survey instrument; field observation; in-depth interviews. Only information on interviews is extracted here - **By whom:** Not stated - **What setting(s)**: Legislators' offices, restaurants near public health nurses' place of employment, famers' homes, feed and seed stores. - **When:** Not stated		Cancer Society. Affordability of Skin Cancer prevention and detection resources for farmers: cost was not viewed as a barrier to protective behaviour. Rather, all farmers interviewed emphasized the time aspect over the financial aspect in limiting use of health services. Social support for farmers' skin cancer prevention and detection behaviours: little observable social support for sun protective practices and no one modelled the desired behaviour. Factual knowledge: one respondent stated that sunscreen is for the beach; another said farmers do not need sunscreen because they "get toughened to the sun pretty fast, so they don't need it". Outcome expectations: interview results reveal that farmers do not believe that having skin cancer will affect their ability to work, but agreed (in the survey) that it is a serious disease. Most don't use sun protection because it's too messy, uncomfortable, too busy, not practical (hat falls off one's head) or just not liked.	National Institute for Occupational Safety and Health; fellowship from the Institute of Behavioural Research at the University of Georgia.

Study Details	Research Parameters	Populations and sample selection	Outcomes and methods of analysis/Results	Notes
Authors: **Paul C, Tzelepis F, Parfitt N et al** **Year:** **2008** **Citation:** **How to improve adolescents' sun protection behaviour? Age and gender issues. American Journal of Health Behaviour. 32:4: 387-98** **Quality Score:** **++**	**What was/were the research questions:** To explore adolescents' (12- to 17-year-olds) self-reported sun protection behaviours and differences by age and gender. **What theoretical approach (e.g. grounded theory, IPA) does the study take (if specified):** Theory of Planned Behaviour **How were the data collected:** - **What methods:** Focus groups n=17 - **By whom:** A market research company (Novena Marketing) was contracted to	**What population were the sample recruited from:** Public high schools in New South Wales, Australia **How were they recruited:** Schools were sampled for diversity in socioeconomic backgrounds. Students were enrolled in class groupings. Teachers distributed information and consent letters - those interested mailed consent. The affinity technique was employed whereby students recruited same-aged friends in order to increase numbers (in the	**Brief description of method and process of analysis:** Focus groups were used and were segregated by gender and age group. The focus group discussions were audio taped and typically lasted 45-60 minutes, during which time one of the authors (FT) was the observer. In each group, participants discussed the outdoor activities they were involved in and their sun protection behaviour. The focus group facilitator (NP) performed a thematic analysis of the discussion, which was checked by the observer (FT) for consistency/accuracy. Subsequently, another author (CT) independently derived codes inductively from the data which were used to draw out themes. The coding was based on participants' reasons for the use of sun protection or not using protection and subsequently grouped using factors from theory of planned behaviour. Note: prior to the focus group discussions, participants filled out an anonymous questionnaire on age, hair colour, skin colour, eye colour and usual sun protection behaviour. **Key themes (with illustrative quotes if available) relevant to this review:** Reasons for using sun protection (common for all age groups and gender): Heat avoidance (personal comfort); Fear of skin cancer (single theme); Prompts from mother/with family or teacher (parent/family action or authority figure) *"When I'm packing she'll make sure I've got the sunscreen in the bag and then when I'm ready to go, she'll make me put it on again and put zinc on my lips."*; Media messages (single theme); Intended length of exposure (context); Absence of cloud/high temperature (context); Occasional peer prompts (peer actions). Reasons for not using sun protection (common for all age groups and	**Limitations identified by author:** None stated **Limitations identified by review team:** Limited analysis of the themes (much of the data in tables is not discussed in the text). Cannot tell relative importance of different themes to individuals. **Evidence gaps and/or recommendations for future research:** A quantitative study to evaluate the relative importance of factors among subgroups in an adolescent population would be useful to inform sun protection campaigns.

<table>
<tr>
<td></td>
<td>facilitate the focus groups (author Parfitt) and provide verbatim transcripts. Another researcher observed the focus groups (author Tzelepis).

- What setting(s): For 12-16 year olds, at school; for 16-17 year olds, at the market research company premises

- When: unknown</td>
<td>16- to 17-year age-group). The participants in the 16- to 17-year-old focus groups were reimbursed (AU$30).

How many participants were recruited: 95

Were there specific exclusion criteria: NS

Were there specific inclusion criteria: Age 12-16 (years 7-10) and 16-17 (year 11-12)</td>
<td>gender): Desire for a tan (fashion/image); Media focus on young (sun protection for younger children); Lack of prompting from parent or authority (lack of prompting); Forgetting (single theme) Policy: "B: At my primary school… if you didn't have a hat you couldn't play. I've never seen that at high school..." Attitudes: "I won't die of cancer"; Peer actions: "A:…when you're at the beach with friends, you're playing and you don't really notice."; Image: "You don't see anyone wearing wide brimmed hats. Except as a joke." On different levels, most subgroups mentioned personal contact with skin cancer/sunburn as motivating factor; Differences among groups: All of the female groups mentioned appearances in some way: some to avoid the appearance of sunburn, girls aged 14-16 and16-17 years mentioned avoiding moles and wrinkles and that they wore sun protection in general when it "suited" their appearance; M:12-14 and 16-17 mentioned better sporting performance; F: 16-17 least regard for parent influence.

Table 2
Reasons for Using Sun Protection That Differed by Age or Gender
<table>
<tr><th></th><th>M 12-14</th><th>M 14-16</th><th>M 16-17</th><th>F 12-14</th><th>F 14-16</th><th>F 16-17</th></tr>
<tr><td>ATTITUDES</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Personal Comfort</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Avoid pain of sunburn</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td></tr>
<tr><td>Avoid glare/headache</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td>√</td></tr>
<tr><td>Appearance</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Avoid peeling</td><td>√</td><td>√</td><td></td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>Avoid moles/freckles</td><td>√</td><td></td><td></td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>Avoid facial burn</td><td></td><td></td><td></td><td>√</td><td>√</td><td>√</td></tr>
</table>
</td>
<td>Source of funding: Cancer Council NSW, the University of Newcastle and Hunter Medical Research Institute.</td>
</tr>
</table>

			Avoid wrinkles					√	√	
			Wear what “suits”					√	√	
			Wear what is “cool”/others wear		√	√	√			
			Experience							
			Personal contact with skin cancer case (self or close other)	√	√	√	√		√	
			Previous severe sunburn		√	√		√	√	
			Improved Performance							
			Protective gear preventing heat or glare impeding sporting	√		√				
			performance							
			Own Skin							
			Type	√	√	√	√			
			Current sunburn		√	√				
			SUBJECTIVE NORMS							
			Parental/Family Action							
			Prompts on departure	√	√	√			√	
			Punishment/ restrictions for non compliance	√	√	√	√		√	
			Provision (in bag) of appropriate protective clothing or sunscreen	√	√	√	√			
			(Re)application of	√						

			sunscreen							
			History, frequency, consistency and multiple person prompts	√	√	√	√	√		
			Presence of family results in choosing /bringing shade, less activity, bag for protective gear	√	√	√	√	√		
			Prompts from other family			√			√	
			Mother not tanning						√	
			Context							
			At beach or soccer/cricket	√	√		√	√		
			Actions of others nearby		√	√				
			Policy							
			Sporting uniform	√	√	√				
			Provided sunscreen		√	√				
			Peers							
			Female friends encouraged use	√						
			Closer friends encouraged use	√						
			Sharing of sunscreen by peers	√	√	√	√		√	
			Sight of sunburn on peers		√	√	√	√	√	
			Follow actions of peers		√	√	√	√		
			Use more likely without peers			√	√			
			PERCEIVED							

BEHAVIORAL CONTROL									
Habit/Preparation	√		√	√	√				
Presence of Shade	√	√	√						
Financial Provision			√						

Table 3
Reasons for Not Protecting Self Against Sun That Differed by
Age or Gender

	M 12-14	**M 14-16**	**M 16-17**	**F 12-14**	**F 14-16**	**F 16-17**
ATTTUDES						
Temporary Nature of Burn	√	√	√	√		
Inconvenience						
Reapplication of sunscreen or change of clothing	√	√		√		√
Discomfort (protective fabrics, sunglasses)	√		√	√		√
Heat of clothing/ protection		√		√		√
Carrying of protective gear	√	√	√			√
Feel of sunscreen	√	√				
Sting of sunscreen (in eyes)	√					
Perceived Risk						
No need for protection in some places		√				
Long-term risk not salient		√	√			
Perception of cancer						√

			as easily treated							
			Use of protection only if visibly burnt				√		√	
			SUBJECTIVE NORMS							
			Peer Actions							
			Wearing of what team wears		√	√				
			Timing based on peer availability		√	√	√			
			Wearing of what peers wear			√				
			Focus on fun/social interaction				√	√	√	
			Desire to remain at beach for whole day				√		√	
			Fear of ridicule/embarrassment			√	√	√	√	
			Policy/Uniform							
			Uniform with short sleeves & shorts		√	√				
			Uniform with no hat		√	√				
			Fashion/Image							
			Desire to wear only what is fashionable		√	√	√	√	√	
			Images of famous people (tan no burn)		√					
			Items only fashionable in some places			√				
			Hats spoiling hairdo					√	√	
			Desire for even tan					√	√	
			Sun Protection for Younger Children							
			Parental focus on younger siblings	√			√			
			Coaches' focus on		√					

			younger peers							
			Absence of Prompting							
			Absence of parent to enforce	√						
			Lack of school policy				√	√	√	
			PERCEIVED BEHAVIORAL CONTROL							
			Impracticality							
			Not practical in water	√	√	√				
			Theft of unattended items	√	√	√				
			Timing of best waves			√				
			Lack of shade at beach/sport	√	√	√			√	
			Sunglasses awkward			√				
			Timing of public transport			√				
			Effort Required							
			Effort of reapplication/dressing		√		√	√	√	
			Planning & preparation required		√	√	√			
			Laziness			√	√	√		
			Scheduling							
			Preference for visiting beach near midday	√		√	√			
			Financial Cost of Sunscreen						√	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
*** Authors:** **Reeder A, McAllister S, Bulliard J-L** **Year:** **2000** **Citation:** **Child sun protection in New Zealand: Parental views and societal responsibilities. Health Promotion Journal of Australia 10 (3) 217-223** **Quality score:** **+**	**What was/were the research questions:** 'To gain insight into parental opinions and practices related to the protection of young children from excessive sun exposure' **What theoretical approach (e.g. Grounded Theory, IPA) does the study take (if specified):** None stated **How were the data collected:** - **What method (s):** Focus groups (n=2) - **By whom:** Not stated - **What setting(s):** Not stated - **When:** 1999	**What population were the sample recruited from:** Users of childcare centres and kindergartens in Dunedin, New Zealand **How were they recruited:** 24 childcare centres and 22 kindergartens were identified from the local telephone directory and asked to display a recruitment notice and advise potential participants to leave their name and phone number. Potential participants were phoned to arrange a suitable meeting time and provided with an information sheet and consent form **How many participants were recruited:** 12 (female, n=11; male, n=1), aged 25-40 years **Were there specific exclusion criteria:** None stated	**Brief description of method and process of analysis:** Focus group sessions were audio-taped and 'separately reviewed by two researchers'. A 'draft summary was sent to participants [who were] asked to return their comments in a reply-paid envelope' **Key themes (with illustrative quotes if available) relevant to this review:** <u>Attitudes and knowledge of risk</u> Whilst participants agreed that it was unacceptable for a child to get sunburnt, they still viewed a tan as a sign of health: "If you're fit, healthy and white it's just not quite the same" (p219) People with a naturally dark complexion and a reduced tendency to burn found it more difficult to pay attention to sun protection messages: "It's hard to get your head around it if you're not personally at risk" (p219) <u>Media messages</u> Although generally understood, there existed some confusion over reports of 'burn time' on TV and local radio, e.g. regarding the time of day and skin types that it referred to Some participants did not trust media	**Limitations identified by author:** None **Limitations identified by review team**: Small sample size not compensated for by depth of analysis No rationale provided for convenience sample **Evidence gaps and/or recommendations for future research:** None **Source of funding:** Partly funded by a grant from the Bequest Fund (administered by the Deans' Advisory Committee, University of Otago). Research group also receives funding from Cancer Society of New Zealand, Inc., Health Sponsorship Council and University of Otago

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
		Were there specific inclusion criteria: None stated	reports: "They can't get the weather right so how could they get the burn time right?" (p219) Some viewed 'constant preparedness' as important in preventing sunburn (due to the changeable nature of the weather), whilst others used reports of burn time as a reminder to be careful, but one which "you need to be reminded about while you're actually out" (p219) <u>Ultra Violet Index (UVI)</u> Participants were not clear about the meaning of UVI – 'a burn time expressed in minutes was thought to give a clearer indication of risk than the UVI measures of 'extreme' or 'moderate' risk' (p219) <u>Sunscreens</u> Participants believed there to be a lack of authoritative information on sunscreen use: "There's lots of information out there, but what do you believe?" "What's advertising and what's real?" (p220) Concerns were expressed regarding possible negative effects of long-term sunscreen use Applying (and re-applying) sunscreen to children was viewed as time consuming and sometimes problematic, e.g. getting	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
			children to stand still, pain if the sunscreen gets into a child's eyes, and 'unpleasant' and 'awkward' greasy nature of sunscreen Sunscreen application was viewed as dependent upon its availability, storage in convenient places and availability in a form that was 'economical' and easy to apply from the containers Some participants expressed the view that 'the spontaneity of some activities can be hindered by the need for sun protection' (p220) Cost of sunscreen was a disincentive for use, and in particular for re-application <u>Hats and other clothing</u> Participants thought that making hats part of school uniforms would reduce both the need for parents to remind children to wear a hat to school and of peer pressure on children who wore 'fancy caps' (p220) An 'ideal hat' was described as; made from the same material as sun tops, easy to wear and keep on the head, possible to wear in water, and quick-drying (p220) Participants noted that they themselves did not like wearing a hat as it was a 'hassle', but they noted that children would notice if adults were not wearing a hat (p220)	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
			Rash suits and wet suits were favoured for children (but not toddlers) as they were quick-drying and removed the need to apply sunscreen	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
*** Authors: Shoveller JA, Lovato CY, Young RA, Moffat B** **Year: 2003** **Citation: Exploring the development of sun-tanning behaviour: A Grounded Theory study of adolescents' decision-making experiences with becoming a sun tanner. International Journal of Behavioral Medicine 10 (4) 299-314** **Quality score:** **++** **Note: Uses data**	**What was/were the research questions:** How do adolescents make a decision about getting a suntan? **What theoretical approach (e.g. Grounded Theory, IPA) does the study take (if specified):** Grounded Theory **How were the data collected:** - **What method (s):** 2 stage semi-structured interviews conducted (separately) with adolescents and a parent, duration c.2 hours: Stage 1 – video-taped exploratory interview, drawing on the participant's pre-prepared 'summertime memories chronicle' Stage 2 – audio-taped reflective interview (to reflect on cognitions and emotions) in which the recording of Stage 1 of the interview was reviewed with a different researcher Interviews were structured to explore factors relating to decision-making about sun tanning, the role of peers and	**What population were the sample recruited from:** 3 communities (Vernon, Kelowna, Penticton) in Southern Interior of British Columbia, Canada (a region widely promoted as a 'sunbather's paradise') **How were they recruited:** 5 waves of purposeful sampling using referrals from key community contacts, local newspaper and radio advertisements, notices in local community centres and outdoor recreation events aimed at adolescents **How many participants were recruited:** 40 (adolescents n=20 (age range 12-16), one parent of each of the adolescents (age range 34-50) n=20) **Annual household income of participants:** >CDN$70000 – 40% CDN$30000-69000 – 50% <CDN$30000 – 10%	**Brief description of method and process of analysis:** Interviews were transcribed and analysed using the constant comparative method. Initially, a code was assigned to each new idea expressed in the transcript, then 'as new codes were identified, deductive processes guided the description of how these codes were interrelated… [key concepts were developed] and compared with raw data until no new ideas emerged and all the transcripts had been coded. This process involved circulating the coded transcripts to all 4 coders (the study authors), who met regularly to discuss emergent codes and to 'contextualise individual pieces of data into a more abstract and conceptual perspective'. The 4 coders also 'discussed how their own values and assumptions related to sun tanning may have affected their interpretations of the data' (p303) **Key themes (with illustrative quotes if available) relevant to this review:** The following analytic structure was developed based upon the initial 5 interviews (diagrammatically expressed in Figure 1, extracted below) 1) Becoming motivated – 'corresponded to the emergence of feelings of physical attraction toward others as well as a growing desire to be physically attractive	**Limitations identified by author:** Male adolescents had greater difficulty in articulating their experiences regarding sun tanning than females (analysis therefore focused upon data obtained from females) **Limitations identified by review team:** None **Evidence gaps and/or recommendations for future research:** As findings were 'not intended to be generalised' additional research is required to determine transferability of findings **Source of funding:** National Cancer Institute of Canada

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
from the same research project as Young et al. (2005)	the fashion industry, family health patterns, perceived parental control, and the strategies implemented to address health issues (this structure evolved 'to reflect the emergent theoretical needs of the model building and hypothesis generating exercise inherent in a grounded theory study' (p303) as analysis of interviews progressed) - **By whom:** Two members of the research team - **What setting(s):** Not stated - **When:** 2000-2001	**Were there specific exclusion criteria:** None stated **Were there specific inclusion criteria:** Participants in each subsequent wave were recruited 'on the basis that they had the potential to further inform the emerging theory' (p302)	for others' 2) Experimenting – 'began when adolescents became more influenced by their peers… than by their parents' influences regarding sun protection' 3) Establishing self – becoming an intentional or incidental tanner was 'individually determined' (i.e. no clear pattern) (p306) (an 'intentional tanner' deliberately exposes their skin to the sun for the purposes of tanning, whilst an 'incidental tanner' saw skin tanning as a desirable side-effect of taking part in outdoor activities) Some participants expressed a view that incidental tanning is less damaging: "I don't really see that sun tanning can really damage you … [if] you get it from an outdoor activity" Becoming motivated Adolescents' motivations were influenced by observing others (e.g. older siblings, friends, older teens at the beach) and also by 'receiving compliments or derision regarding their appearance': "They [peers] compliment you on how dark your skin is and say 'Oh yeah, I like that colour'" (female, age 14) (p307) Some adolescents shared erroneous beliefs about suntanning, e.g. that a tan protected the skin from burning, that sunburn at the beginning of the summer	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
			was a necessary 'jump start' to prepare the skin for exposure to the sun, and that incidental tanning was not as dangerous as intentional tanning The environment was identified as fostering 'getting a tan'; the Southern Interior is a resort area that promotes (through the media) 'fun in the sun', especially on beaches. The local built environment (many backyard and public swimming pools, outdoor recreation venues, and tanning salons) also provided the context in which tanning was 'inevitable' (p307) 'As adolescents began to assert their independence [from their parents' sun protection strategies], their experimentation with intentional tanning began: "[When younger] I wasn't like really trying to get a tan… I'd wear my bathing suit, I'd go swimming and just play volleyball or something like that, which I still do, but now I spend more time actually laying there and like actually wanting to really get one [a tan]" (female, age 15) (p307) Experimenting 'Experimenting' defined as: 'judiciously using sunscreen [and/or] learning how to avoid tanlines… to better "fit the picture" [i.e. to fit with the expectations of peers and media images]' (my edit) (p308)	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
			The transition to experimenting can be explained by two processes: i) 'Fitting the picture' – recognising and attempting to achieve a particular image as a desirable goal (being tanned was strongly associated with being active and 'healthy'): "I think they [the media] send out that… you should go sunbathing because you look a whole lot better and in all the ads in magazines you see bronze, athletic people and they look so much better… I don't know… I think they are encouraging us to go sun tanning" (female, age 12) (edit in original) (p308) Having an appropriate tan was part of a wider aspect of appearance; clothes and hair also needed to 'fit the picture', but the desire to tan was motivated by: a) 'the need to be noticed by others, and in so doing, achieve positive recognition and gain popularity' b) 'the desire to blend in with others, thereby avoiding negative recognition and being shunned by peers' (p308) Having a tan that was neither too dark nor too light was considered important by adolescents: 'Sometimes it can look really dumb because… if you see a comparison that's super dark in the summer, but in the winter they just kind of go normal again… sometimes it looks kind of weird, like in the	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
			summer they are so dark and in the winter they are so light' (female, age 12) (edit in original) (p309) Adolescents compared suntans with one another as a means of learning what constituted an appropriate tan ii) 'Shifting sphere of control' – 'the process by which adolescents began to engage more frequently in decision making beyond the boundaries of the family' (p309) Some adolescents reported acquiescing to their parents decisions about sun protection, whilst others 'manoeuvred to negotiate new boundaries and ultimately take primary responsibility for their own decisions': "I'll put on sunscreen, so she [mother] can see it and I have it all on before I'm going to the beach. And then I just wash it off… like I don't try to wash it off, but I go swimming and the it eventually comes off" (female, age 15) (p309) Some adolescents perceived their parents as 'ruining the fun and spontaneity of adolescence' by their attempts to enforce sun protection behaviour (e.g. parents were "always nagging" or "always on my case") (p309) Establishing Self Adolescents who did identify as a 'sun	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
			tanner' associated certain 'traits and behaviour patterns with particular identities and used labels to categorise different types of people as desirable or otherwise' (p310): "Like, if you don't have a tan, most people think, 'Well gee, this person must not go outside because if they went outside more often, they'd have a tan'. So, they [think you] stay inside, just watch TV or do nothing… [they] think you're a couch potato" (male, age 15) (p310) Adolescents described the 'primary goal of avoiding sunburn being to enhance the likelihood of getting the right tan, rather than to reduce the risk of skin cancer' (p310) – for this reason, sunscreen was preferred (over protective clothing and broad-rimmed hats) as it allowed them to continue to 'fit the picture' and get a tan	

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
*** Authors: Young RA, Logan C, Lovato CY, Moffat B, Shoveller JA** **Year: 2005** **Citation: Sun protection as a family health project in families with adolescents. Journal of Health Psychology 10 (3) 333-344** **Quality score:** **++** **Note: Uses data from the same**	**What was/were the research questions:** What are the characteristics of family sun-protection projects (defined as: 'intentional actions and goals that are socially-embedded and occur over the mid- or long-term' (p335)) as they occur in families with adolescents? What differences exist across families among these projects? **What theoretical approach (e.g. Grounded Theory, IPA) does the study take (if specified):** Action Theory ('emphasises intentional, socially-embedded joint actions and projects; provides a language to describe socially-meaningful, goal-directed behaviours that take place in the day-to-day lives of individuals and groups' (p335)) **How were the data collected:** - **What method (s):** 2 stage semi-structured interviews conducted (separately) with adolescents and a parent, duration c.2 hours: Stage 1 – video-taped	**What population were the sample recruited from:** 3 communities (Vernon, Kelowna, Penticton) in Southern Interior of British Columbia, Canada (a region widely promoted as a 'sunbather's paradise') **How were they recruited:** 5 waves of purposeful sampling using referrals from key community contacts, local newspaper and radio advertisements, notices in local community centres and outdoor recreation events aimed at adolescents **How many participants were recruited:** 20 (adolescents n=10, one parent of each of the adolescents n=10) For this study, the 20 participants had been randomly sampled from the original purposive sample of 40 **Were there specific**	**Brief description of method and process of analysis:** Interview transcripts were 'reviewed and coded following the principles of qualitative analysis within an action theory framework (Valach et al., 2002)' (p336) which focused on the parent-adolescent dyad and aimed to identify, describe and 'type' family projects related to sun protection. 2 of the study authors collaborated in order to code the transcripts using the action theory framework: a) identifying goals and the functional steps taken to reach those goals (which may or may not be joint actions between parents and adolescents) b) identifying the characteristics of joint actions (the communication, control and regulation of the project) Family sun protection projects were classified as focused (explicit goals and functional steps) or diffused (few common strategies, or 'embedded' within other family projects) The interview transcripts from the other 20 participants (from the dataset upon which this study drew) were then analysed to 'determine the adequacy of the classification of families' (p337). This classification was then presented and	**Limitations identified by author:** Interviews 'did not capture the actual parent-adolescent conversations and other actions that constitute sun-protection projects' (p343) **Limitations identified by review team**: Few quotations provided from the interviews The participants' views and experiences are not used to develop a framework for analysis; the analysis reads more like a re-statement of the Action Theory framework rather than a close analysis of the participants' responses The analysis is not as in-depth or rich as would be expected given the extensive methodological details No rationale is given for focusing on the 2 case studies presented at the end of the analysis, which largely just repeat what is

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis Findings	Notes
research project as Shoveller et al (2003)	exploratory interview, drawing on the participant's pre-prepared 'summertime memories chronicle' Stage 2 – audio-taped reflective interview (to reflect on cognitions and emotions) in which the recording of Stage 1 of the interview was reviewed with a different researcher Interviews were structured to explore factors relating to decision-making about sun tanning, the role of peers and the fashion industry, family health patterns, perceived parental control, and the strategies implemented to address health issues (this structure evolved 'to reflect the emergent theoretical needs of the model building and hypothesis generating exercise inherent in a grounded theory study' (p303) as analysis of interviews progressed) - **By whom:** Two members of the research team - **What setting(s):** Not stated - **When:**	**exclusion criteria:** None stated **Were there specific inclusion criteria:** Participants in each subsequent wave were recruited 'on the basis that they had the potential to further inform the emerging theory' (p302 of Shoveller et al (2003))	discussed with the study's other 2 co-authors in order to reach a consensus upon this classification **Key themes (with illustrative quotes if available) relevant to this review:** <u>Characteristics of family sun-protection projects</u> Goals: Sun protection goals were both short-term (e.g. discomfort of sunburn and heatstroke) and long-term (e.g. preventing wrinkles, skin problems, skin cancer) – e.g. one participant wore sunscreen "because my cheeks get really burned", and her mother supported her by reminding her to apply sunscreen and discussing the negative effects of sunburn Functional steps: 'Many families' took steps such as applying sunscreen, sitting in the shade, using an umbrella, avoiding the sun at certain times of the day, and wearing hats/t-shirts/sunglasses Parents endeavoured to promote sun-protective behaviour in their children by setting rules, providing advice and supporting efforts made by schools to provide information about sun-protection Projects are dynamic:	already contained in the earlier analysis **Evidence gaps and/or recommendations for future research:** The analysis of 'actual parent-adolescent conversations along with their accompanying internal cognitions… [may allow the description of] how sun protection and related projects are constructed in families' (my edit) (p343) **Source of funding:** National Cancer Institute of Canada

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	2000-2001		In many families, changes took place in projects 'after a critical incident involving a family member [e.g.] the experience of sunburn or the development of skin cancer' (p338) (these typically led to 'increased concern about sun protection and intensified efforts of protective measures' (p338)) The transition from childhood to adolescence was associated with the adolescents assuming more responsibility for their own sun-protective behaviour, although often still regulated in conjunction with their parents, e.g.: "I don't normally go out to suntan because I know like you get cancer" (female, age 13) (this participant's sun-protection goals had 'evolved over time within her family, which she now pursued on her own volition' (p338)) 'Parents continued to exercise some control over their children's behaviours in the sun, as well as educate and remind them of the importance of sun safety [whilst at the same time giving their children greater freedom to make their own decisions]' (p338) Embeddedness in other projects: e.g. the sun-protection project was part of the larger health-promotion project This could lead to conflicting goals with	

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			sun-protection behaviour, e.g. participation in outdoor sports and the desire for a suntan. Ambivalence was expressed regarding suntanning: "… for some reason brown fat looks nicer than white fat… I've probably really bought into that whole thing and I buy the products that give me a tan, it's a liquid tan. And I'm not sure why that is, but probably that whole image of young, healthy and active… I like having a tan, it's funny… And of course, we know that it's damaging your skin while you are getting that wonderful tan" (mother) (edit in original) (p339) Sun-protection could also have complementary goals with other projects, e.g. the 'relationship project' between parent and adolescent (where the goal was to maintain and develop the parent-child relationship). This could take a number of forms: children acquiescing to their parents' demands regarding sun-protective behaviour, children negotiating more independence and responsibility, and/or parents relinquishing control whilst continuing to provide education and guidance <u>Differences in sun-protection projects between families</u> *Focused* sun-protection projects: Parents 'demonstrated a strong	

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			commitment to pursuing their goals [regarding sun protection]' and their children 'tended to trust the knowledge passed on by their parents, were motivated to pursue sun-protective goals and willing to forgo some of the perceived short-term benefits of sun tanning, such as feeling attractive and fitting in with a peer group' (p340) *Diffused* sun-protection projects: Families were less committed to sun-protection; there was less congruence between goals and functional steps. Although both parents and adolescents expressed some concerns regarding harmful effects of sun exposure, 'a lack of information or motivation, preoccupation with competing goals such as appearance or fitting in or the relative unimportance of sun protection as a family issue', e.g., for one mother who 'expressed concern about excessive skin exposure and took steps to educate her daughters about skin cancer… [but also] discussed the inconvenience of applying sunscreen': "I should know better, but… I'm out in the garden and not paying attention, get wrapped up and sort of forget that the sun rays are going to be burning… I get a little burn. And it's almost an annual thing and it's silly, 'cause burns are really bad for your skin" (mother) (edit in	

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			original) (p340)	

12.0 Appendix E. Studies excluded at full text stage

Study	Abstract	Reason for exclusion
Barankin et al. (2001)	Excessive sun exposure in childhood is considered a risk factor for later development of skin cancer, so sun awareness programs targeting children have been developed. Objective was to assess the benefits of involving parents at home in the sun protection program received by their children at school. The existing "Sun and the Skin" program was enhanced in two ways. Parents were educated both about their child's program and with supplemental information. Also, sunscreen was distributed to each child. Certain methods of sun protection, particularly the use of sunscreen, are being practiced by the majority of children, while others, such as protective clothing, have not been readily adopted. The enhanced group of students showed improvement over control and standard groups in their attitude toward tanning. There is a need for teachers to remind their students to practice protective measures. While a sun-awareness curriculum has been shown to be beneficial for elementary school children, the adjunct of parental and school involvement in this process can improve the results and ultimately decrease the risk of skin cancer in the children.	EX 5. Not qualitative research
Bergenmar, Hanson and Brandberg (2009)	The aim was to prospectively explore experiences related to genetic testing for malignant melanoma among unaffected previously untested members of melanoma-prone families in which germline CDKN2A mutations had been identified. Method Consecutive members of families with CDKN2A mutation attending a pigmented lesion clinic (n = 11) were interviewed and completed questionnaires at four occasions: before genetic testing, at disclosure of genetic test result and six months and one year after disclosure. The following areas were measured: anxiety and depression, risk perception, and sun-related habits. Disclosure of the test result did not seem to change family members' perception of their risk of developing melanoma. Few members reported anxiety of clinical significance and no one were depressed. All family members with biological children expressed concerns regarding their children and emphasized the importance of sun protection and surveillance. Sun burns and blisters were rather commonly reported by the family members. Routines regarding the procedure for conveying test result were requested. Genetic testing of the members of melanoma families with CDKN2A mutations attending a pigmented lesion clinic did not appear to induce behavioral changes related to sun habits or emotional problems. Concerns about the future of their children were commonly expressed by participants.	EX 4. Not relevant to intervention

Berret et al. (2002)	The hazards due to sun exposure are well known. Many recent studies have emphasized the protection against the harmful effects of the sun by the use of sunscreens and, moreover, by staying in the shade and wearing long-sleeved shirts, hats and sunglasses. Switzerland has one of the highest rates of skin cancer induction in Europe and the incidence of melanoma in Switzerland is constantly increasing with an incidence of 10-12/100,000 inhabitants/year. Interestingly, some studies have evoked the possibility that sunscreen use can increase the risk of melanoma by increasing overall sun exposure. In this context, the aim of our study was to estimate the amount of sun exposure of children, and their parents, living in Switzerland and to give a description of how they protect themselves against sun irradiation. Questionnaires were provided to pediatricians in every state (canton) in Switzerland and were given to families coming for consultation. A total of 328 forms including 1,285 individuals were returned from most of the cantons in Switzerland. The majority of the Swiss families had 2 children under 16 years of age with middle-aged parents (30-45 years) and a central European skin type (light skin of type II-III, brown or blue eyes, and brown to blond hair). An important sun exposure was noted even though the population seems to be conscious of the associated dangers. Sunscreens were the first-line defense against sun exposure with clothing and shielding oneself from the sun not being highly used. Moreover, sunscreens tended to be misused with most people applying them at the beach or swimming pool (instead of 15 min before exposure) and few applications throughout the day. Prevention should imperatively be emphasized for lower overall sun exposure as sunscreens are primarily used at the beach and not in routine daily exposure. In addition, it is agreed that prevention campaigns would be better directed towards children because up to 80% of detrimental sun exposure occurs during childhood.	EX 5. Not qualitative research
Brodkin and Altman (1993)	There is evidence that the mortality rate associated with malignant melanoma can be decreased by early identification of the risk factors for melanoma and precursor lesions and by reducing sun exposure in young patients at higher risk. Many of the risk factors for malignant melanoma are seen in the pediatric age group. To determine pediatricians' awareness of risk factors for melanoma and their ability to recognize the precursors of melanoma, we studied three departments of pediatrics--at an urban and a suburban medical center and a medical college. Ninety-six members of the audience, which included full-time faculty, practicing pediatricians, and pediatrics residents, responded to questionnaires before and after a presentation on the risk factors for melanoma. Based on the results of the questionnaires, this group of pediatricians believed that they were not sufficiently knowledgeable about the risk factors for melanoma and did not routinely examine their patients for these risk factors or counsel them on proper	EX 4. Not relevant to intervention

	sunlight protection. These findings indicate a need for making pediatricians aware of the risk factors for melanoma and of the critical role they play in decreasing the incidence and mortality rate associated with this disease.	
Buendia-Eisman, Feriche and Ortega (1999)	Most campaigns for the prevention of skin cancer have detected more new cases and decreased the number of advanced cancers. Since the incidence of skin cancer continues to increase, however, we believe that primary prevention is the best way to control it. It must be kept in mind that sunlight exposure is the main changeable risk factor for skin cancer and that this exposure is most significant in childhood and adolescence. The aim of this study was to evaluate the need for a campaign and design one if necessary. We therefore proposed to determine the level of awareness and the behaviour of students with respect to sunlight exposure. We surveyed 628 teenage students from 9 high schools in the city of Granada (Spain). The questions were grouped into four sections: 1. Relationship Sun and Skin, 2. Relationship Sun and Environment, 3. Relationship Sun and Health, 4. Evaluation of Attitudes and Behaviour. More than 60% of the students gave satisfactory answers with regard to awareness, in contrast to the responses for attitudes and behaviour. Prevention campaigns for students are definitely necessary, keeping in mind in their design that a high level of awareness does not translate into healthy habits with regard to sunlight. Intervention to change behaviour patterns should be the main goal of primary prevention campaigns	EX 5. Not qualitative research
Buller et al. (2002)	The objective was to assess current sun protection policies and the receptiveness to new policies at elementary schools in the United States. In 1998, a random sample of 1000 public elementary schools in the United States was selected (proportional to population size) from 27 metropolitan areas chosen from the 58 US cities regularly reporting the UV index in 1997. A final sample of principals from 412 elementary schools completed the survey. Only 3.4% of schools had a sun protection policy. The most common reasons for not having a policy included the principal's lack of awareness (n = 113) or organizational barriers in the school districts (n = 77). Most principals (84.2%) said that students were outdoors during midday hours. Many principals (48.3%) were willing to adopt a sun protection policy. Most schools (72.8%) had shade structures but the majority (67.3%) reportedly covered less than one fifth of the grounds. Most principals (76.4%) were willing to increase the amount of shade structures. The low frequency of sun protection policies and shade structures calls for national efforts to change policies and environments to increase sun protection at US schools. Research is needed to demonstrate the efficacy of these changes	EX 5. Not qualitative research

Buller, Goldberg and Buller (1997)	Excessive exposure to the sun's ultraviolet radiation (UVR) contributes to the etiology of melanoma and nonmelanoma skin cancers. Many behaviors that increase lifetime risk of skin cancer--sun exposure, sunburn, and lack of sun protection--occur early in childhood. A 1-day school-based skin cancer prevention effort--Sun Smart Day--was implemented and evaluated in three elementary schools to improve fourth-graders' knowledge, attitudes, and behaviors related to skin cancer prevention. A classroom-based skin cancer prevention lesson was compared to an interactive sun safety fair was vehicles for promoting comprehensive photoprotection. Sun Smart Day interventions had their greatest impact on fourth-graders' awareness and knowledge of skin cancer and children's increased knowledge persisted through the summer break. While both the classroom curriculum and the health fair boosted awareness and knowledge of sun safety among fourth graders, the classroom curriculum demonstrated a slight immediate advantage over the health fair on these outcomes. Also the curriculum was less difficult to implement, but the health fair was more engaging. A Sun Smart Day program may be an important first step in increasing public awareness and understanding of skin cancer and its prevention.	EX 4. Not relevant to intervention
Campbell et al. (1999)	This was an extensive review of identified literature, using a broadly-defined study question.	EX 5. Not qualitative research
Correia et al. (2006)	The incidence of skin cancer has been increasing steadily, and a direct correlation with sun exposure has long been recognised. Primary prevention actions, mainly directed at children, are important to promote behavioural changes regarding sun exposure. A questionnaire-based enquiry, followed by a sensitisation action, with distribution of didactic material, was carried out in several private and public schools, in June 2003. A significant number of children reported the existence of only a few trees at their schools' playground and the practice of outdoor gymnastics during risky hours. Although they admitted to usually applying sunscreens when going to the beach, this was not a normal practice when going to school on sunny days. A history of sunburn was reported by 53% of the children. We found some changes in behaviour after the summer holidays following the sensitisation action, which emphasizes the importance of this type of campaigns.	EX 5. Not qualitative research
Crane et al. (1999)	This paper describes the evaluation of a skin cancer prevention program for preschools and daycare centers. The intervention was targeted primarily at staff of child care centers, with the aim of increasing use of sun protection practices for young children while attending these centers. Secondary target groups included parents and the children themselves. The intervention, which adopted the slogan, 'Block the Sun, Not the Fun,' included workshops for child care center staff, and information/activity packets for	EX 5. Not qualitative research

	parents. Twenty-seven preschools and daycare centers were randomly assigned to an intervention or wait-list control group. The intervention group received the intervention during the spring of 1994; the wait-list control group received the intervention during the spring of 1995. Evaluation consisted of interviews with center directors, observations of practices, and review of written policies before the intervention (in summer, 1993) and after the intervention (in summer, 1994). A survey of 201 parents was conducted during late summer 1994. While the intervention did not appear to change the sun protection attitudes or practices of parents, or use of clothing and shade at child care centers, results suggested significant changes in the sun protection knowledge/attitudes of center directors and the use of sunscreen at child care centers. Additionally, parents with children attending centers in the intervention group were more likely to be satisfied with sun protection practices at their centers. Conclusion: This low-intensity intervention appears to be effective at changing sun protection attitudes and sunscreen use at child care centers, and can be easily replicated. However, high staff turnover at child care centers would suggest that 'boosters' will be necessary to sustain the impact. More intensive efforts directed at social norms are likely to be necessary to change clothing and outdoor play practices.	
Dietrich et al. (1998)	Evaluated the impact of an intervention promoting sun protection behavior among children 2 to 11 years of age through schools and day care centers, primary care practices, and recreation areas. Ten towns in New Hampshire were paired, then assigned randomly to intervention or control status. The multicomponent SunSafe intervention was provided to children and caregivers through primary care practices, day care centers, schools, and beach recreation areas. Training support and materials were provided by the SunSafe project, but project staff had no direct contact with children or parents in providing the intervention. All intervention components promoted the same message: avoid the sun between 11 AM and 3 PM, cover up using hats and protective clothing, use sun block with a sun protection factor >/=15, and encourage sun protection among family and friends. The impact of the intervention was determined by observing children's sun protection behavior at the beach during baseline compared with 1 year later. The primary outcomes of interest were changes in the proportion of children per town using at least some sun protection and changes in the proportion of children fully protected. Children were clustered by town, with the town thus being the unit of analysis. We observed 1930 children. Use of some sunscreen on at least one body area increased in all 5 intervention towns compared with paired control towns. In intervention towns, this mean proportion increased from 0.56 of those observed at baseline to 0.76 of those observed postintervention, with a minimal increase among	EX 5. Not qualitative research

	control town children.	
Dixon (2007)	Case study: Mrs LF, 71 years of age, presents with numerous squamous cell carcinomas (SCCs) on her hands (Figure 1). She comments that she had 'perfect' hands until recent years and had never been an 'outdoors person'. On questioning her about trauma or exposure to her hands she commented that she had frequently experienced 'sunburn' on her hands after assisting her son with his welding business	EX 4. Not relevant to intervention
Dunn, Lynch and Dip (2001)	Two hundred thirty-one spectators at a Cricket match in Brisbane, Australia, were interviewed and observed to determine their sun protective behaviors, and these behaviors were compared to the temperature and amount of cloud cover at the time of the study.	EX 5. Not qualitative research
Escoffery et al. (2009)	This article describes process evaluation methods for the Pool Cool diffusion trial across 4 years. Pool Cool is a skin cancer prevention program that was found to improve behaviors and environments for sun protection at swimming pools in a randomized efficacy trial, which was followed by a national diffusion trial. The process evaluation focus shifted from measuring program satisfaction to assessing widespread program implementation, barriers and facilitators to implementation, and program maintenance and sustainability. Data collection methods include training surveys, database tracking, field coordinator activity logs, e-mails, surveys of parents, lifeguards and pool managers, and process evaluation interviews and site visits. The data revealed high levels of implementation of major program components when disseminated in the diffusion trial, including sun safety lessons, sun safety signs, and sunscreen use. This article describes program features and participant factors that facilitated local implementation, maintenance and sustainability across dispersed pools such as linkage agents, a packaged program, and adaptations of program elements.	EX 4. Not relevant to intervention
French and Hevey (2008)	There is little information concerning what people think about when completing questionnaires that assess perceptions of risk, and even less for questionnaires assessing unrealistic optimism. The thoughts of 40 participants who displayed unrealistic optimism about risks of skin cancer were elicited using think aloud methods, when completing both direct and indirect ratings of unrealistic optimism. The most common thoughts overall concerned exposure to the sun, and features such as skin colouring. Thoughts concerning prevalence, reasons for risky behaviour and admissions of ignorance were more common for indirect measures of unrealistic optimism than for direct measures. The direct unrealistic optimism measures yielded more optimistic ratings for those participants who did not mention symptoms or signs of skin damage, and those who mentioned thoughts about prevalence. Participants seem to be drawing upon different sources of information when completing superficially similar direct and indirect measures of	EX 4. Not relevant to intervention

	unrealistic optimism, which may explain why these measures are usually only modestly associated. People do not seem to think about numerical probabilities when estimating risk, but instead appear to focus on issues such as exposure to risk, and concrete bodily symptoms and signs. This may at least partially explain why attempts to influence behaviour by providing probabilistic information are generally unsuccessful.	
Garvin and Eyles (2001)	This paper employs the policy analytic approaches of framing and narrative to examine national differences in public health policies using a case study of Sun Safety programs in Australia, Canada and England. The study shows how a single public health issue identified at the global scale (rising skin cancer rates) is framed differently based upon specific social, cultural and political situations. The result is a different story, or narrative, embedded in each national policy. This study provides an example of how health policy is defined, constrained and limited through the process of problem identification and policy resolution. The paper concludes that framing and narrative analysis are powerful tools for understanding the place-specific implementation of public health policies and initiatives.	EX 4. Not relevant to intervention
Glanz, Buller and Saraiya (2007)	Outdoor workers have high levels of exposure to ultraviolet radiation and the associated increased risk of skin cancer. This paper describes a review of: 1) descriptive data about outdoor workers' sun exposure and protection and related knowledge, attitudes, and policies and 2) evidence about the effectiveness of skin cancer prevention interventions in outdoor workplaces. Systematic evidence-based review. We found variable preventive practices, with men more likely to wear hats and protective clothing and women more likely to use sunscreen. Few data document education and prevention policies. Reports of interventions to promote sun-safe practices and environments provide encouraging results, but yield insufficient evidence to recommend current strategies as effective. Additional efforts should focus on increasing sun protection policies and education programs in workplaces and evaluating whether they improve the health behavior of outdoor workers.	EX review. Literature review
Glanz et al. (2002)	Skin cancer is the most common type of cancer in the United States. Since 1973, new cases of the most serious form of skin cancer, melanoma, have increased approximately 150%. During the same period, deaths from melanoma have increased approximately 44%. Approximately 65%-90% of melanomas are caused by ultraviolet (UV) radiation. More than one half of a persons lifetime UV exposure occurs during childhood and adolescence because of more opportunities and time for exposure. Exposure to UV radiation during childhood plays a role in the future development of skin cancer. Persons with a history of > or = 1 blistering sunburns during childhood or adolescence are two times as likely to develop	EX 5. Not qualitative research

	melanoma than those who did not have such exposures. Studies indicate that protection from UV exposure during childhood and adolescence reduces the risk for skin cancer. These studies support the need to protect young persons from the sun beginning at an early age. School staff can play a major role in protecting children and adolescents from UV exposure and the future development of skin cancer by instituting policies, environmental changes, and educational programs that can reduce skin cancer risks among young persons. This report reviews scientific literature regarding the rates, trends, causes, and prevention of skin cancer and presents guidelines for schools to implement a comprehensive approach to preventing skin cancer. Based on a review of research, theory, and current practice, these guidelines were developed by CDC in collaboration with specialists in dermatology, pediatrics, public health, and education; national, federal, state, and voluntary agencies; schools; and other organizations. Recommendations are included for schools to reduce skin cancer risks through policies; creation of physical, social, and organizational environments that facilitate protection from UV rays; education of young persons; professional development of staff involvement of families; health services; and program evaluation	
Glanz et al. (2008)	Objective: To develop, in a collaborative project, core measures of sun exposure and sun protection habits, since the lack of standard outcome measures hampers comparison of population surveys and interventions used in skin cancer prevention research. Design: A work group of investigators evaluated available questionnaire measures of sun exposure and protection. Their deliberations led to a proposed set of core questionnaire items for adults, adolescents aged 11 to 17 years, and children 10 years or younger. These core items were used in cognitive testing by the investigators. Cross-site summaries of methods, response samples, and descriptive data were prepared. Setting: Nine locations across the United States. Participants: The study population comprised 81 individuals. Results: No unusual response patterns were detected in any of the respondent groups or for any specific question. Some revisions to the survey items resulted from the need for clarification or emphasis of frames of reference such as adding or underlining key phrases in a question. Conclusions: The combination of expert review followed by cognitive interviewing yielded standardized core survey items with good clarity and applicability for measuring sun exposure and sun protection behaviors across a broad range of populations. They are appropriate for studies tracking morbidity and/or mortality and evaluating prevention program effects.	EX 4. Not relevant to intervention
Godkin (1991)	The use of consumer advertising and marketing techniques to increase skin cancer protective behaviour	EX 5.

	was tested amongst outdoor workers employed by Telecom Australia. The program was based upon a set of communication principles that had previously been shown to be effective in the medical profession. The program's impact was evaluated and it was found to have been an effective tool in encouraging outdoor workers to increase their sun protection. The principles used in developing and implementing the program may also have application in other areas of occupational health and safety.	Not qualitative research
Grant-Petersson et al. (1999)	Elementary schools and child care settings in rural New Hampshire participated in a sun protection program that reached more than 4,200 children. The program was part of a successful multifaceted community intervention targeting children ages 2-9. Program components included curricular materials, training and support for school/child care staff, and parent outreach. Evaluation showed good uptake of the curriculum by teachers and child care providers, improvements in sun protection policy in participating schools and child care settings, and significant knowledge and attitude improvements in fourth grade children tested, as well as actual behavior change. The study highlighted the importance of flexible, developmentally appropriate curricular materials and active engagement of principals and directors in policy review. In addition, for parent outreach programs to be successful, children needed to participate.	EX 5. Not qualitative research
Grin et al. (1994)	Sun exposure in childhood has been implicated as a risk factor for the development of melanoma and nonmelanoma skin cancers. As an increasing number of young children are cared for in day-care centers, we were interested in examining the sun-protection practices in this setting. In our study of day-care centers, we found that while most day-care center staff were aware of the adverse effect of excess sun exposure and the need for sun protection, the use of sunscreen and protective clothing and avoidance of midday sun were limited. We conclude that intensive education of day-care center staff and parents regarding sun exposure and sun protection is necessary if we are to attempt to reduce the frequency of melanoma and nonmelanoma skin cancer.	EX 5. Not qualitative research
Grob et al. (1993)	Excessive sun exposure in the first 15 years of life has been shown to be a determinant risk factor for melanoma. This study was conducted on a randomly selected sample of 200 adolescents (13-14 years old) and 150 children (3 years old) in Marseille (South of France). Children and adolescents were examined and interviewed (mothers answered for young children). Our results show that a large number of highly sensitive children were not identified as such by their parents and most adolescents do not realize or at least admit being highly sun sensitive. Adequate sun protection measures were used in only 63% of 3-year-olds and 38% of adolescents. With reference to their constitutional skin sensitivity and taking into account their possible use of effective sun protection measures, 33% of the children and 62%	EX 5. Not qualitative research

	of the adolescents were highly overexposed. Only good sun protection habits of the mother were predictive of acceptable sun exposure in children. In the adolescents the predictive variables were sun protection habits of the father and sunbathing only to obtain a tan. The main reason why adolescents sunbathed was embellishment. Conversely, most mothers said that they exposed their young children to the sun for health. Many adolescents and mothers were reasonably well informed but considered the risk of sun exposure to be exaggerated by the media. These results may be important to determine the targets of future melanoma prevention campaigns	
Hancock et al. (1996)	This paper describes the rationale, aims, design and methods of a large-scale community action cancer prevention project, Cancer Action in Rural Towns (CART). The primary aim of the CART project is to evaluate the effectiveness of a community action program in increasing community rates of preventive and screening behaviours relating to breast, cervical, smoking-related and skin cancer. Twenty towns in rural New South Wales, Australia (population 5001-15,000) were selected for inclusion in the CART project. A matched-pairs design was used, with one town from each pair randomly allocated to either experimental or control condition. In experimental towns, community action is being promoted through established community networks and within key access-points (schools, workplaces, community organisations, health care providers, retailers and the media), to encourage uptake of cancer-related preventive and screening behaviours. Outcome evaluation includes self-report measures of adult smoking quit rates, Health Insurance Commission provider presentations data, surveys of adolescent smoking and solar protection practices, and direct observation of solar protection practices at schools and community venues. Economic evaluation includes cost-effectiveness, travel cost, and contingent valuation methods of cost analysis. Process measures for the project include media monitoring, measures of change in institutional policies, and records of CART intervention activities. The evaluation of CART will be completed by the end of 1997.	EX 5. Not qualitative research
Harrison, Buttner and Nowak (2005)	Women reported a high prevalence of beliefs that may result in their infant being intentionally exposed to sunlight, and which could increase their child's future risk of skin cancer.	EX 5. Not qualitative research
Hill and Boulter (1996)	In principle, the sun-related behaviour of individuals can moderate the effects of stratospheric ozone depletion in increasing potential exposure of populations to UVR. In this paper, we present key results from a program of research on an Australian population's sun related behaviour together with a comprehensive review of the literature published to date in this subject. Males and young people are	EX 5. Not qualitative research

	most likely to be out in the sun and least likely to engage in protective behaviour. However, females are most likely to deliberately sunbathe, yet they make greater use of sunscreens than males. Knowledge about skin cancer is now generally high, particularly among females, but there are specific deficiencies such as in knowledge of times of day and season when UVR is greatest. Most people accept they are at some risk of skin cancer but a worrying minority persist in denying the risk. Favourable attitudes to suntans are prevalent, though declining, and there is some evidence that people believe suntans are more attractive than others actually see them to be. Factors that predispose towards sunprotective behaviour include health knowledge (weakly), social norms and negative beliefs about suntans (more strongly). People with sensitive skin take more precautions yet suffer more sunburn and certain activities (particularly water sports) are associated with a high probability of sunburn. A number of efficacy and evaluation studies have shown: (a) mixed effects of school-based sun protection programs, and positive effects of (b) work place programs for outdoor workers, (c) positive effects of programs for mothers of newborns, (d) skin cancer patients, (e) hospital outpatients, and (f) samples drawn from populations exposed to mass campaigns. A comprehensive and long running evaluation of a solar protection campaign has been conducted in Victoria, where significant changes in dispositional and behavioural factors have occurred over time in association with reduced sunburn. As well, survey data indicate high levels of public concern about ozone depletion and many people claiming to take extra precautions because of it.	
Hughes (1994)	Reports results from an evaluation of "Living with Sunshine," a resource to help teachers encourage positive sun-related conduct by children ages 6-8. Results indicate that children who used the materials were knowledgeable about the sun's effects and aware of sun protection methods. Both teachers and students responded enthusiastically to the resource.	EX 4. Not relevant to intervention
Hughes et al. (1996)	Excessive sunlight in early childhood is thought to be a risk factor for skin cancer. We report the use of the 'draw and write' technique for determining changing perceptions, attitudes and knowledge of young children (aged 4-12 years) to the sun and skin cancer. Children were asked to draw pictures and label them in response to a series of carefully worded invitations and questions. The captions were then analysed to assess changing views and perceptions about particular issues in relation to behaviour in the sun. Four hundred and sixty children completed the exercise. An increasing spiral of knowledge with age about effects of the sun and appropriate behaviour was demonstrated. The study revealed a relatively high level of knowledge. Misconceptions and stereotypes were demonstrated. This technique is a simple	EX 5. Not qualitative research

	and effective way of eliciting information from children about health issues. It provides baseline data for producing material for health education for children in relation to sun and skin. It is also a method of assessing the effectiveness in young children of health promotion initiatives.	
Ing et al. (2002)	Farmers are at higher risk for skin cancer; US studies indicate that they do not use adequate sun protection. Little data on Canadian farmers' sun exposure are available, and a literature review suggests a strong need to develop a comprehensive, easy to complete farmers' sun safety survey in order to identify sun safety issues in the farming community. A literature review contributed to the development of a draft farmers' sun safety survey. Preliminary testing of the survey with 207 Ontario farmers supported the usefulness of the questionnaire, but weaknesses remained in phrasing and missed concepts. To augment the questionnaire's development, focus groups were held with farmers in four Ontario communities to clarify the phrasing of survey questions concerning the amount of sun exposure, the use of sun protection practices, family/personal history of skin cancer, and skin cancer attitudes and knowledge. This paper reports on what was learned substantively from these focus groups.	EX 5. Not qualitative research
Johnson et al. (2001)	Objective was to examine the frequency with which sun protection is used by parents for their children. Descriptive survey conducted at a university medical clinic in Florida. Parents of children aged 1 to 16 years were approached in the waiting area, and 77 of 100 were successfully interviewed. Parents' self-reported use of sun protection measures for their children and their attitudes and beliefs about sun protection. Fewer than half of respondents (43%) reported regularly using sun protection for their child. Regular use of sun protection was reported more frequently by female caretakers and those with more favorable attitudes regarding sun protection use. Sunscreen was the most frequently used measure, and preventing sunburn was the primary reason for using sun protection. Respondents held several unfavorable sun protection attitudes, including the belief that sun exposure was healthy, that children looked better with a tan, and that it was okay to stay out in the sun longer if the child wore sunscreen. Regular use of sun protection for children is infrequent and consists primarily of applying sunscreen rather than methods that reduce sun exposure. Parents primarily use sunscreen to prevent sunburn and may increase their children's overall sun exposure as a result.	EX 5. Not qualitative research
Jones, Harrison and Chrispin (2000)	This study, conducted at the end of a UK heat wave, used qualitative and quantitative questionnaire measures to investigate sun protection in the context of the potentially conflicting attractions of sun exposure. It examined attitudes to the good weather, beliefs about the benefits and harmful effects of the sun and perceptions of risk amongst a sample of 80 college students (aged 18-52 yrs) in the UK.	EX 5. Not qualitative research

	Participants could think of more benefits than harmful effects of the sun for both their health and appearance. Most enjoyed sunbathing, protected themselves inadequately and did not intend to change this behavior. Those who knew someone who had suffered skin cancer, who perceived higher risk and who wrote more about the harmful effects of skin cancer on their appearance (but not their health) were more likely to engage in skin protective behaviors.	
Kamin, O'Neill and Ahearn (1994)	The authors describe the development, field testing, and initial evaluation of a skin cancer prevention program targeted for high school students. They developed a curriculum based on input from focus groups conducted with biology teachers and student representatives from high schools throughout Texas. The module contained a teacher's guide, video, posters, slides, handouts, and hands-on activities; an achievement test and attitude survey measured student outcomes. During 1991, more than 1,000 students from private and public schools completed the module. Results indicated a significant improvement in the pre- to posttest achievement scores. Evaluation of attitudes after the module indicated that only 2.5% of the students did not believe that a change in sun behaviors was necessary; 72% of the students were contemplating or ready to change their sun behaviors.	EX 5. Not qualitative research
LaBat, DeJong and Gahring (2005)	The goal of this research was to determine the long-term viability of a sun health message. A multi-part educational intervention on hazards of sun exposure and methods of protection was delivered to fifth- and sixth-grade students, followed by a questionnaire to assess learning of the message. Four years later, participants were tracked and a questionnaire administered to assess retention of the sun health message. No formal sun health educational programs were delivered over the 4-year period. Participants retained the knowledge that sun can cause cancer and skin damage; however, the importance of appearance to these teens seems to have affected decisions about sun protection methods. Four years later, as teens, the students preferred a sun-tanned appearance and rejected methods of sun protection, especially the use of sun-protective clothing.	EX 4. Not relevant to intervention
Lamanna (2004)	Skin cancer is the most commonly occurring cancer in the United States. Primary prevention practices for skin cancer are fully documented in the literature for reducing the damaging effects of ultraviolet radiation on skin. Late adolescents, inherent to their young age and risk-taking behaviors, are more likely to sunbathe. The cancer attitudes and suntanning knowledge, attitudes, perceptions, beliefs, and behaviors among college students were examined. Gender-specific interventions for educating this age group are recommended.	EX 5. Not qualitative research
McWhirter et al.	Eleven schools in the south of England took part in a trial of 'Safe in the Sun', a curriculum programme for	EX 4.

(2000)	primary school aged pupils. Case study methodology and the 'draw and write' technique were combined to evaluate changes in pupils' perceptions of the effects of the sun on their skin.	Not relevant to intervention
Michielutte et al. (1996)	The incidence of skin cancer in the United States is rapidly increasing, and current estimates suggest that about one in five persons will be diagnosed with skin cancer in their lifetime. However, comparatively little is still known about the prevention and early detection behaviors of healthy individuals. This study presents information on prevention and early detection practices for a sample of non-Hispanic rural white women. Interviews were conducted with 1,295 women age 20 or older who were patients in six public health departments and one primary-care clinic serving a low-income population, all located in rural western North Carolina. Both prevention and early detection behaviors were found to be infrequent in this population. Low knowledge of skin cancer, younger and older ages, and low education characterized women least likely to practice prevention. Low knowledge, younger age, and low education characterized women least likely to practice early detection. Perceived barriers to cancer screening including cost, lack of symptoms, and denial also were predictive of a low likelihood of both prevention and early detection behavior. Fatalism and fear of the stigma associated with cancer also were predictive of lower participation in selected early detection behaviors. A summary general barriers score was significantly associated with all prevention and early detection behaviors examined in the study. The results indicate a need for skin cancer education among this population.	EX 5. Not qualitative research
Milne et al. (1995)	"Kidskin" is an intervention study involving children at 33 primary schools in Perth, Western Australia. This study includes measurement of changes in implementation of schools' sun protection policies. This paper reports on measurement of observable aspects of sun protection. Hat use was assessed from videos of children in the playground. Shade use was measured using UVR-sensitive polysulfone badges worn by a random sample of children. Shade provision was measured from aerial photographs of the schools. Principals were surveyed about school policies and practices. Eighty-seven percent of children wore a hat during lunch time at school, although only 14% wore the most protective styles of hats. The mean proportion of ambient UVR exposure received by Year 1 children was 15.5%; children spent less time in the sun on sunnier days. On average, 14.5% of the playground was shaded; this was not associated with children's sun exposure. Correlations between these results and the principals' estimates were poor. Children should be encouraged to wear more protective styles of hats and to avoid sun exposure, even on less sunny days during spring and summer. Principals' estimates of shade provision and children's sun protection behavior at school are of little value.	EX 5. Not qualitative research

Morris, Bandaranayake and McGee (1998)	To investigate awareness of sun protection behaviours in a sample of primary school children in New Zealand. Information was collected from 824 primary school children in New Zealand using a drawing and writing technique. The data revealed a bias towards sunscreen as a method of sun protection compared with other methods such as clothing and the use of shade. Comparisons between results obtained from children resident in Australia and England indicated a greater awareness of sun protection methods amongst the children from Australia and New Zealand compared with those children living in England. Children as young as 5 and 6 can describe the consequences of overexposure to the sun, and can illustrate methods of sun protection. Sunscreen is seen as the main method of sun protection	EX 5. Not qualitative research
Morris et al. (2005)	Recent evidence indicates that there are significant numbers of cases of malignant melanoma in the UK. In order to assess the current position with regard to sun awareness in Cornwall, a questionnaire survey of all state primary school heads (n = 123) and a survey of a random sample of GP practices (n = 9) was carried out. The data obtained were supported by visits to libraries and Tourist Information Centres at urban and rural centres--this enabled the identification of sun awareness literature. Key health professionals who worked within the field of health promotion were also contacted. The findings showed that in Cornwall public campaigns organized around the issue of sun protection took place only sporadically, although GP surgeries usually organize a display at the appropriate time of the year. None of the public places (e.g. Tourist Information Centres, libraries) surveyed had sun protection messages on display. It is concluded that insufficient sun awareness initiatives were being undertaken in Cornwall. Although most primary schools included sun awareness education in their curriculum in a form based on the Sun Awareness Guidelines produced by the Department of Health in 1995, few schools considered further measures to protect pupils on hot and sunny days. In particular the provision of shade, the scheduling of outdoor activities and the use of sunscreen and protective clothing were not standard.	EX 5. Not qualitative research
Morrison (1996)	To mark Sun Awareness Week next week, this article highlights the fact that the major contributory factor in the development of skin cancer is exposure to ultraviolet radiation, and nurses are ideally placed to promote care in the sun and raise awareness of moles. The aim of this study was to determine whether there are any gaps in nurses' knowledge about the prevention and early detection of skin cancer. A total of 142 nurses were questioned about their own attitudes towards sun exposure, sun protection and mole awareness. The study showed that the nurses surveyed have a responsible attitude towards avoiding sunburn and the need for adequate sun protection, particularly when abroad. However, the study also revealed that they do not fully appreciate the extent to which the sun can cause skin cancer and they lack	EX 5. Not qualitative research

	understanding about the need to protect the skin from sunburn and avoid long term sun exposure in the UK.	
Nelson and Luczon-Peterman (2001)	A descriptive study was conducted to examine the knowledge of and behaviors related to sun-protection among parents of youth soccer players. A convenience sample of 56 parents at community soccer events completed an 18-item instrument designed by the researchers. Results indicated that female respondents were more responsive to skin protection than males. In addition, advice from health care providers was shown to make an impact on the behavior of parents related to skin self-examinations and the use of sunscreen. Family history of skin cancer significantly promoted the use of protective clothing in the sun. Nurse practitioners can make a difference by educating clients about sun protection and practices that can lower the risk of skin cancer and by teaching parents how to perform skin self-examinations.	EX 5. Not qualitative research
Newton et al. (1997)	The objective of this study was to determine the perceptions of primary school children about sun exposure and skin cancer, and the language they use about these issues, as a basis for the design of health promotional materials. In all, 2857 children in five European countries took part in the study and were compared with 641 Australian children participating in a similar study, since the latter have been exposed to more intensive health education about the sun. The 'draw and write' technique was used. In Europe the level of awareness about the risks of excessive sun exposure and the need to protect the skin was considerably lower than in Australia, although there was some variation within northern Europe. Amongst the European children acknowledging a need to protect the skin, the principal means of protection quoted was the use of suncreams, with inadequate awareness of the value of clothing, hats and shade. European children expressed greater approval of suntans than did the Australian children. Some methodological problems were encountered as a result of nuances in the languages involved, emphasizing difficulties in international research of this type.	EX 5. Not qualitative research
Parrott et al. (1999)	Efforts to increase the sun-protective behaviors of children were extended to outdoor recreational sports and youth soccer settings in this study. The pretest results of a pilot survey of coaches (n = 12), parents (n = 50), and youths (n = 61) on eight soccer teams in south Georgia were used to guide the development of a health education program for coaches. In the pilot programs, half the coaches were trained to be involved in soccer-playing youths' sun protection by acting as positive role models and promoting sun protection to youths and their parents. The pilot demonstrated coaches' willingness to participate in sun protection promotion to youth: Youths indicated that coaches and parents were more likely to tell youths to wear sunscreen after the training than before, and coaches perceived getting	EX 4. Not relevant to intervention

	youths to wear sunscreen to be less difficult than before.	
Parrot et al. (1998)	Although health campaigns promote avoidance of behaviors that pat an individual's health at risk, often these behaviors cannot be avoided, and campaign messages designed to encourage behavior adaptation afford greater likelihood of success. With that in mind, a model of health risk behavior adaptation was proposed and tested using four different behaviors in a communication campaign aimed or reducing farmers' risk for skin cancer. Farmers and farm wives answered a series of questions about their skin cancer prevention and detection behaviors and attitudes. Interpersonal expectancies, social resources, and actual procedural knowledge predicted perceived procedural knowledge and public commitment, which, in turn, predicted behavior adaptation.	EX 5. Not qualitative research
Paul et al. (2003)	Conclusions: The strong mnemonic value and remembered appeal of previous campaigns provides a foundation that future campaigns might build on, while taking into consideration adolescents' desire to distance themselves from the childlike associations of such messages.	EX 4. Not relevant to intervention
Pion et al. (1997)	Childhood exposure to sunlight is a risk factor for melanoma. To formulate a meaningful program to educate children about the ill effects of the sun, their extant knowledge base must be determined. We have used the "draw-and-write" technique to assess children's perceptions about the sun, suntans, and skin cancer. A total of 693 school children aged 4 to 13 years were asked to draw pictures and label them in response to a series of carefully worded questions. Awareness of the need to apply sunscreen increased from 44% in children aged 4 to 6 years to 95% in children aged 9 to 10 years. Ten percent of children aged 4 to 6 years already perceived a suntan as attractive. While almost all children were aware of the negative immediate effects of sun exposure, namely sunburn, just 30% of American children aged 11 to 13 were aware that sun exposure is a risk for skin cancer. No differences between boys and girls were seen. The "draw-and-write" technique allows assessment of the attitudes and perceptions of children regarding the sun and skin cancer. It also provides valuable information on which to base health education and evaluate its cost-effectiveness.	EX 5. Not qualitative research
Pratt and Borland (1995)	Interviewed 92 adolescents on a surf beach in Victoria to find predictors of sun-protection (SP) behavior. 46 females and 46 males (aged 15-20 yrs) were interviewed during the Australian summer of 1990 to 1991. Shade use, cloth cover, observed sunburn, and tan level were recorded. Interview questions included sunscreen usage, tan preferences (from a series of 4 photographs of a model with different tan levels), and days planned at the beach during the summer. Results demonstrated that a majority of the Ss were not taking adequate SP measures. The level of tan and the intention to sunbathe were seen as	EX 5. Not qualitative research

	the best determinants of how well the Ss would protect themselves against the sun. Indirect predictors for SP behavior were tan preferences and social norms. A need is noted for education about the long-term and short-term risks of sun exposure.	
Rademaker et al. (1996)	To assess whether young children understand the dangers and results of sun exposure, a novel Draw and Write technique was used to survey a group of 5-8 year old primary school children. One hundred and ninety-four children were invited to draw and write comments to six scenarios involving sun exposure. Of the children surveyed, 84% gave a negative sentiment to sunburn, with only 6% displaying positive sentiments towards sunbathing. Sixty-five per cent of children suggested the use of sun blocks, 69% the use of protective clothing, 45% the wearing of hats and 43% the use of shade as a mechanism for protecting the skin from sun damage. Only 2% of children made any reference to skin cancer. The primary school children surveyed had a good level of awareness of the dangers of sunburn and the need to take appropriate actions to avoid sun damage.	EX 5. Not qualitative research
Reynolds (2007)	Lifetime exposure to ultraviolet radiation is a major risk factor for all types of skin cancer. The purpose of this manuscript is to examine theory-guided empirical studies examining adolescent tanning practices.	EX 5. Not qualitative research
Richtig et al. (2009)	Understanding the public's perception of nevi and sunburn is crucial to melanoma prevention efforts. Methods: We investigated the knowledge and perception of melanocytic nevi and sunburns in 77 children 6 to 10 years old (mean 8.2) in two elementary schools in Styria, Austria. The children were interviewed by specially trained psychologists about the number of their moles and how they felt having them. Additionally questions about sunburn history and sunburn perception were asked. The spontaneous answers of the children were recorded, there were no pregiven answers. Afterwards the children were examined by dermatologists clinically and with dermatoscopes. The 96% of the children could describe a nevus (the term "mole" was translated to "nevus") and 91% did not feel bothered about theirs. Only 26% had noted the appearance of new nevi within the last year. The 67% of all children had at least one sunburn and remembered the clinical features. The 20% of the children knew that sunburns could provoke skin cancer. All children felt comfortable during the clinical and dermatoscopic examination. Conclusion: Children aged from 6 to 10 years know exactly why they had suffered from sunburn, can describe the sunburn and how to avoid it. They do not feel bothered by their nevi and are alert to the appearance of new nevi.	EX 5. Not qualitative research
Schofield, Edwards and	With rising rates of skin cancer in Australia, there is a need to examine strategies to reduce sun exposure among children. This study aimed to determine the effectiveness of a multifaceted dissemination strategy	EX 5. Not qualitative research

Pearce (1997)	compared with a simple mail-out strategy in promoting the adoption of comprehensive SunSmart skin protection policies and practices in primary and secondary schools in New South Wales. It also aimed to examine characteristics of the primary and secondary schools that adopted a comprehensive SunSmart policy before and after the intervention. Four hundred randomly selected primary schools and all 381 high schools in New South Wales were randomised to one of two intervention groups. Pretest and post-test surveys of principals were undertaken in 1991 and 1992. Intervention 1 was a simple mail-out of a sample sun-protection policy kit. Intervention 2 comprised the mail-out of the policy kit and a follow-up mail-out of a staff development module. There was a strong intervention effect on adoption of a comprehensive sun-protection policy in primary schools (21 per cent for the 'mail' group compared with 44 per cent for 'mail and staff support' group) but not in high schools (6 per cent and 11 per cent). There was little relationship between adoption of a comprehensive sun-protection policy and sun-protection practices in primary or secondary schools. Further research is needed to determine the most effective ways of ensuring that adoption of a comprehensive sun-protection policy results in effective implementation of sun-protection practices in schools.	
Schofield et al. (1991)	This study presents findings on solar protection policies and practices in primary and secondary schools in New South Wales, Australia. The findings suggest that policies have been more fully articulated in primary schools than in secondary schools and that there is wide scope for further public health initiatives to protect children from the risk of skin cancer. Little attention has been given to the potential benefits of timetable changes and provision of shade in school environments, although school principals considered the latter would be a successful means of increasing protection. The level of solar education provided in the schools surveyed in our study was minimal, suggesting that urgent attention should be given to incorporating these issues in the school curriculum. Observations of school children's solar protection behaviours suggest that the majority of children used some form of protection in the middle of the day, but the form of protection changed with age. Consideration of more structural and environmental changes is needed to maximise the opportunities for solar protection in schools.	EX 5. Not qualitative research
Scott et al. (2008)	This is the story of Go Sun Smart, a worksite wellness program endorsed by the North American Ski Area Association and funded by the National Cancer Institute. Between 2000 and 2002 we designed and implemented a large-scale worksite intervention at over 300 ski resorts in North America with the objective of reducing ski area employees and guests risk for skin cancer by adopting sun safe practices. The following narrative describes the intervention in toto from its design and implementation through	EX 5. Not qualitative research

	assessment. Our theory driven, experimentally tested intervention was successful in reducing employees' risks for skin cancer during and after the' ski season. We also succeeded in making ski area guests more aware of the need to take sun safe precautions with both themselves and their children	
Stanton et al. (2004)	The incidence of skin cancer is increasing worldwide. Protecting the skin from the sun by wearing protective clothing, using a sunscreen with appropriate sun protection factor, wearing a hat, and avoiding the sun are recommended as primary preventive activities by cancer agencies. In this paper the recent data relating to skin cancer primary preventive behaviour in Australia and other countries is reviewed. Comparison of the studies in a table format summarizing the methods, objectives, participants, findings and implications may be obtained from the corresponding author. The sun protection knowledge, attitudes and behaviour patterns observed in Australia are similar in other countries, although Australian studies generally report higher knowledge levels about skin cancer and higher levels of sun protection. The findings suggest that sunscreen is the most frequent method of sun protection used across all age groups, despite recommendations that it should be an adjunct to other forms of protection. While young children's sun protective behaviour is largely influenced by their parents' behaviours, they are still under protected, and sun protective measures such as seeking shade, avoiding the sun and protective clothing need to be emphasized. Adolescents have the lowest skin protection rates of all age groups. Within the adult age range, women and people with sensitive skin were most likely to be using skin protection. However, women were also more likely than men to sunbath deliberately and to use sun-tanning booths. The relationship between skin protection knowledge and attitudes, attitudes towards tanning and skin protection behaviour needs further investigation. Further studies need to include detailed assessments of sunscreen use and application patterns, and future health promotion activities need to focus on sun protection by wearing clothing and seeking shade to avoid increases in the sunburn rates observed to date.	EX 5. Not qualitative research
Wetton (1996)	Describes the evolution of a draw and write research project to investigate children's perceptions of sun exposure and skin cancer in five northern European countries. Findings showed that primary school children acknowledged a need to protect themselves, but thought the main way to do this was to use sun creams. There was little mention of protective clothing or the value of shade. A comparison with children in Australia and New Zealand showed much less approval of sun tans and greater awareness of prevention strategies. Concludes that European countries need to mount coherent sun protection programmes in schools.	EX 5. Not qualitative research