Sun Protection in New Zealand Teacher-led Early Childhood Centres

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Abstract

Background
This research is about sun protection policies and practices in the New Zealand early childhood care setting. Skin cancer is the most frequently occurring cancer in New Zealand, causing over 250 deaths, around 1800 new melanoma cases, and an estimated 67,000 cases of non-melanoma skin cancer annually. Associated health care costs were estimated to be NZ $57 million in 2006. Excessive Ultraviolet Radiation (UVR) exposure, particularly during childhood, increases the risk of skin cancer later in life. It has been estimated that in areas with high UVR, over 90% of skin cancer is the result of excessive UVR exposure. Fortunately, UVR exposure can be modified through appropriate use of sun protection measures.

In New Zealand over 180,000 infants and preschool children are cared for by early childhood care services, where they are potentially at risk of excessive UVR exposure. UVR from sun exposure is the main source of Vitamin D which is essential for health. Therefore, it is important to balance the risks and benefits of sun exposure. Vitamin D production is influenced by skin colour, with darker skinned people requiring more UVR exposure to produce sufficient Vitamin D than those with lighter skin. Therefore some aspects of sun protection recommendations vary according to skin colour. There is a lack of research on the sun protection practices and policies in early childhood care services in New Zealand.

Aims
The aims of this research were to: i) briefly explore sun protection policies and practices in New Zealand teacher-led early childhood centres; ii) develop an understanding of the key underlying factors influencing sun protection practices in this setting, and iii) identify steps that could support effective sun protection in this setting.

Method
This study used a qualitative methodology. The focus was limited to teacher-led early childhood centres. Semi-structured telephone interviews were conducted with ten key informants. The key informants were involved in providing professional development advice, or support and information to early childhood centres. The key informants came from several large nationwide organisations providing care in early childhood centres; small and large
kindergarten associations; and a District Health Board early childhood health promoter. This was complemented by documentary analysis of sun protection policies supplied by the key informants, and review of the sun protection content of the Ministry of Education early childhood “Lead” website. An expert Advisory Committee reviewed and advised on the research methodology and findings.

**Results**

The results showed that the respondents considered that the early childhood staff, in the centres they were in contact with, took sun protection seriously, and were motivated to protect children. However, while some effective sun protection practices were being implemented, there were also practices and policies which fell significantly short of best practice recommendations of the Cancer Society of New Zealand, and the World Health Organization. The research showed that of the sun protection policies that were reviewed, many lacked detail and did not cover the full range of recommended sun protection practices. There was an emphasis by many respondents on all children being treated the same irrespective of their skin colour.

The study identified key factors influencing sun protection policies and practices. These were: that the *Education (Early Childhood Services) Regulations 2008* did not include a specific clause in regard to sun protection; staff lacked access to appropriate information to support their practice; in some cases role modeling was inconsistent due to resistance from staff; and an important factor facilitating effective sun protection was a positive relationship with, and involvement of, parents. There was strong support for a sun protection accreditation programme which would provide an accreditation to centres that meet recommended sun protection criteria. This was seen to have the potential to support sun protection and also provide a marketing advantage to centres that gained accreditation.

**Discussion**

Excessive sun exposure in New Zealand is a serious hazard. Infants and preschoolers are particularly vulnerable to excessive sun exposure and are therefore reliant on the adults caring for them to provide sun protection, based on best practice. A positive finding in this research was the respondents’ view that the early childhood staff they were in contact with were very aware that sun protection was important and were actively motivated to protect children. This awareness and motivation is crucially important as it is a fundamental requirement for the implementation of consistent, effective, sun protection practices.
The regulations governing early childhood services do not have a specific reference to sun protection, whereas they do include specific criteria about other safety issues such as food hygiene, and hot water temperature. This may result in the hazard of sun exposure not receiving the focus it requires. The lack of access to information to support sun protection practices was a key influence, because it limited the ability of staff to reflect on and improve their practices. The emphasis on all children being treated the same irrespective of their skin colour could potentially have implications for the Vitamin D levels of very dark skinned children. Children having sunscreen applied before arriving at centres at 7am illustrates that some early childhood staff and parents lack knowledge of appropriate sun protection.

The results suggest there may be a degree of complacency about current sun protection policies and practices in the early childhood care setting, as the current regulating and monitoring process does not appear to ensure sun protection policies are comprehensive and practices are based on up-to-date evidence. The research findings suggest that sun protection in early childhood care needs to be improved in order to be maximally effective, as children in early childhood care have the right to effective, evidence-based sun protection.

Recommendations are given to address the findings and include: inclusion of sun protection in the early childhood regulations; encouragement for centres to consistently implement recommended sun protection policies and practices; provision of easily accessible, concise sun protection information for staff and parents; consideration be given by the Ministry of Education, Ministry of Health, and the Cancer Society of New Zealand to developing a sun protection accreditation programme for early childhood centres; and additional research be undertaken into sun protection in the early childhood care setting.

There is a lack of evidence on sun protection in the New Zealand early childhood care setting. This research identifies that it is important to examine what is actually happening in regard to sun protection in early childhood care, rather than assuming children are adequately protected. This research indicates the key stakeholders: the Ministry of Education, Ministry of Health, and the Cancer Society of New Zealand need to take more action to support effective sun protection in early childhood care. Given the burden of skin cancer in New Zealand, and the evidence indicating the cost effectiveness of investment in sun protection, this is an essential way to support the future health of New Zealand children. This research suggest that to overlook this opportunity, by not taking effective action to promote health, would be very shortsighted.
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# Table of Contents

Abstract ................................................................................................................................. ii

Background ............................................................................................................................. ii

Aims ........................................................................................................................................ ii

Method .................................................................................................................................... ii

Results .................................................................................................................................... iii

Discussion .............................................................................................................................. iii

Acknowledgements .............................................................................................................. v

Table of Contents .................................................................................................................... vi

List of Figures ........................................................................................................................ x

List of Tables .......................................................................................................................... x

List of Abbreviations ............................................................................................................. xi

Chapter 1 : Introduction and Background ............................................................................. 1

1.1 Skin cancer and ultraviolet radiation ............................................................................ 1

1.2 Early childhood services ............................................................................................... 2

1.3 Background to sun protection in early childhood services ......................................... 3

1.4 Organisations involved in skin cancer prevention ......................................................... 3

1.5 Sun protection research ............................................................................................... 4

1.6 Research aims ............................................................................................................... 5

1.7 Outline of research ..................................................................................................... 5

Chapter 2 : Literature Review ............................................................................................... 6

2.1 Literature search strategy ............................................................................................ 6

2.2 Skin cancer .................................................................................................................. 7

  2.2.1 The burden of skin cancer in New Zealand ............................................................... 8

  2.2.2 Skin cancer and ethnicity ...................................................................................... 8

  2.2.3 Skin cancer and socio-economic status ................................................................. 9

2.3 Skin cancer prevention .............................................................................................. 10

  2.3.1 Recommended sun protection measures ............................................................... 10

  2.3.2 Amount of skin cancer prevented by decreasing UVR exposure ......................... 13

  2.3.3 Importance of childhood exposure ..................................................................... 14

  2.3.4 UVR and development of melanocytic nevi ......................................................... 15

  2.3.5 Sun exposure of New Zealand children ............................................................... 16

  2.3.6 Health effects of sun protection ......................................................................... 18

2.4 Importance of sun protection in the early childhood care setting ............................. 22

vi
4.1.2 Regulations ........................................................................................................... 61
4.1.3 Licensing criteria ............................................................................................... 62
4.1.4 MoE website management information on establishing a new centre ........... 63
4.1.5 Summary of MoE website information ............................................................... 64
4.1.6 Respondents’ knowledge of current regulations ............................................. 64
4.1.7 Respondents’ attitude to current regulations .................................................. 64
4.1.8 Ministry of Education information ................................................................. 65
4.1.9 Licensing of early childhood centres ............................................................... 65
4.1.10 Education Review Office reviews of early childhood centres .................... 66
4.2 Sun protection policies ......................................................................................... 67
  4.2.1 Documentary analysis of sun protection policies ......................................... 67
4.3 Attitudes to sun protection .................................................................................. 68
4.4 Sun protective measures ..................................................................................... 70
  4.4.1 Hats/Clothing ................................................................................................... 70
  4.4.2 Shade ............................................................................................................... 72
  4.4.3 Scheduling of time outdoors ......................................................................... 74
  4.4.4 Sun protection and physical activity ............................................................... 74
  4.4.5 Sunscreen ........................................................................................................ 74
  4.4.6 Sun protection and skin colour/ethnicity ....................................................... 76
  4.4.7 Role modeling .................................................................................................. 76
  4.4.8 Information for Parents .................................................................................. 77
  4.4.9 Emphasis on different sun protection measures ......................................... 78
4.5 Staff knowledge and confidence ........................................................................ 78
  4.5.1 Availability of information .......................................................................... 78
  4.5.2 Staff knowledge .............................................................................................. 79
  4.5.3 Teacher confidence ......................................................................................... 79
  4.5.4 Vitamin D ........................................................................................................ 80
  4.5.5 Teaching children about sun protection ....................................................... 81
4.6 Sun protection educational resources .................................................................. 81
  4.6.1 Useful resources for children ...................................................................... 81
  4.6.2 Resources for teachers ................................................................................. 82
4.7 Key actions to improve sun protection ............................................................... 82
4.8 Outsider’s view of sun protection issues ............................................................. 83
4.9 Conclusion ............................................................................................................ 83
Chapter 5 : Discussion and Recommendations ...................................................... 85
viii
List of Figures

Figure 1: Structure of early childhood services in New Zealand ........................................49

Figure 2: Location of key informants ................................................................................50

List of Tables

Table 1: Sun protection measures included in sun protection policies ............................. 68
## List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCC</td>
<td>Basal Cell Carcinoma</td>
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<td>CSNZ</td>
<td>Cancer Society of New Zealand</td>
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<td>DHB</td>
<td>District Health Board</td>
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<td>ERO</td>
<td>Education Review Office</td>
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<tr>
<td>HSC</td>
<td>Health Sponsorship Council</td>
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<tr>
<td>IARC</td>
<td>International Agency for Research on Cancer</td>
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<td>MoE</td>
<td>Ministry of Education</td>
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<td>MoH</td>
<td>Ministry of Health</td>
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<tr>
<td>NMSC</td>
<td>Non Melanoma Skin Cancer</td>
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<td>NSW</td>
<td>New South Wales</td>
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<tr>
<td>PHU</td>
<td>Public Health Unit</td>
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<tr>
<td>SCT</td>
<td>Social Cognitive Theory</td>
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<tr>
<td>SECP</td>
<td>SunSmart Early Childhood Programme</td>
</tr>
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<td>SSAP</td>
<td>SunSmart Schools Accreditation Programme</td>
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<td>SSC</td>
<td>Squamous Cell Carcinoma</td>
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<tr>
<td>TPB</td>
<td>Theory of Planned Behaviour</td>
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<tr>
<td>UVR</td>
<td>Ultraviolet Radiation</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Chapter 1: Introduction and Background

1.1 Skin cancer and ultraviolet radiation

Skin cancer is an important public health issue in New Zealand, identified as being, “by far the most common cancer affecting New Zealanders” (O’Dea, 2009, p.6). O’Dea has estimated the “health-care costs of skin cancer and related neoplasms to New Zealand…at NZ$57 mn [million] for the year 2006 measured in 2007/8 dollars, excluding GST” (p.6). In 2006, there were 1998 new melanoma registrations, 287 deaths from melanoma, and 102 non-melanoma skin cancer (NMSC) deaths (Ministry of Health, 2010a, p. 6). Melanoma “was the fourth most commonly registered cancer… and the ninth most common cause of cancer death in 2006” (Ministry of Health, 2010a).

Ultraviolet radiation (UVR) is a known carcinogen (International Agency for Research on Cancer, 1992). UVR exposure to the skin results in, “damage to cells and DNA manifested as erythema [reddenning of the skin, known as sunburn]” (Webb & Engelsen, 2008, p. 72). The amount of UVR required to cause erythema varies with the individual’s skin colour and is also influenced by other factors such as medications. The term, “excessive UVR exposure” is frequently used in regard to skin cancer prevention (Cancer Society of New Zealand, 2008a). Exposure that is sufficient to cause erythema in an individual has been shown to increase the risk of skin cancer, and is therefore considered to be excessive. Cumulative exposure, even at levels that do not cause erythema is also implicated in some types of skin cancer (Webb & Engelsen, 2008).

UVR is measured using the Global Solar UV index (UVI) which is the, “international scientific measure of the amount UVR reaching the Earth’s surface” (Cancer Society of New Zealand, 2010g). The higher the number the higher the UVR level and the greater the risk of skin damage (World Health Organization, 2009). In New Zealand the UVI is very low in winter with levels of 1-2 and very high from September to April with levels up to 12-13 (Cancer Society of New Zealand, 2010g). WHO recommends that sun protection is required when the UVR is “3 and above” (World Health Organization, 2009).

Excessive UVR exposure, especially during childhood, increases the risk of skin cancer later in life (World Health Organization, 2003). Therefore, decreasing exposure to excessive UVR
in early childhood through effective sun protection is potentially a very important strategy in the prevention of skin cancer (Armstrong & Kricker, 2001; Autier & Dore, 1998). UVR exposure is also beneficial. The main source of Vitamin D is UVR exposure to the skin which stimulates the body to produce Vitamin D. This vitamin is essential for bone health, and recent evidence suggests that low Vitamin D levels may also contribute to a range of diseases (International Agency for Research on Cancer, 2008). Therefore, it is important that both the risks and benefits of UVR are considered. The relationship between sun exposure and Vitamin D is discussed in more detail in section 2.3.6.

1.2 Early childhood services

Early childhood services in New Zealand provide care and education for infants and children up to age five years in centre-based and home-based settings. Children are eligible to start school on their 5th birthday (Ministry of Education, 2010i). However, as school attendance is not compulsory until age six, some early childhood services cater for 5 year old children, although this is not usual. There are different types of centre-based early childhood care including: childcare centres, playcentres, kindergartens, and Kohanga Reo (Māori language immersion centres) (Ministry of Education, 2010b). This dissertation is focusing on centre-based care, (the reason for this choice is discussed in Section 3.2.2).

In New Zealand many preschool children and a significant number of infants are in early childhood care on a regular basis. New Zealand Ministry of Education (MoE) statistics for 2009 show there were over 180,000 enrolments in early childhood care services, with children being in care for an average of 19.5 hours per week (excluding Kohanga Reo and casual care, where data is not available) (Ministry of Education, 2010f). Numbers of enrolments are used rather than numbers of children, as some children may be enrolled in more than one service. Of the total enrolments, 140,770 were in centre-based rather than home-based care. Children often attend these services when UVR levels are high, placing them at potential risk of excessive UVR exposure in this setting. While those providing early childhood care are responsible for the health and safety of the children in their care they frequently rely on the co-operation of parents to provide appropriate clothing and hats. Effective sun protection for children when attending early childhood care is a fundamental strategy in the prevention of skin cancer.

Early childhood centres are staffed by both qualified and unqualified early childhood staff. The percentage of staff who must be qualified is detailed in the early childhood regulations.
(Ministry of Education, 2008b). There are a range of titles for early childhood staff including: early childhood teacher, early childhood educator, and early childhood staff member. In this research the term, “early childhood staff” will be used to include all staff employed to work in a care giving/teaching role in early childhood centres.

1.3 Background to sun protection in early childhood services

New Zealand is a signatory to the 1990 Convention on the Rights of the Child. The Convention includes Article 24 which states, “the right of the child to the enjoyment of the highest attainable standard of health” (United Nations General Assembly, 1990, Article 24). This would include the right of the child to protection from excessive UVR exposure and the consequent increased risk of skin cancer. As New Zealand has made a commitment to this Convention, it can be argued that the New Zealand government has a responsibility to ensure children are protected from the sun when they attend government regulated early childhood services.

Early childhood centres are subject to government regulation, require a licence to operate and are reviewed 2-3 yearly. The MoE is responsible for governing early childhood centres under the Education (Early Childhood Services) Regulations, 2008 (Ministry of Education, 2010a). Regulation 46, requires services to, “take all reasonable steps to promote the good health and safety of children enrolled in the service”. Regulation 45 requires services to provide, “suitable and sufficient space for a range of activities…to support safe and healthy practices by the service provider” (Ministry of Education, 2008a). However, the regulations do not include a specific reference to, or requirement in regard to, sun protection. The licensing process, under the regulations, requires early childhood centres to have a health and safety report completed by their Regional Public Health Unit (PHU), prior to being granted their initial licence to operate (Ministry of Education, 2010h).

1.4 Organisations involved in skin cancer prevention

There are two main organisations working in skin cancer prevention in New Zealand: the Cancer Society of New Zealand (CSNZ); and the Health Sponsorship Council (HSC). The CSNZ is a non government, not-for-profit organisation, which works to reduce the incidence of cancer and promote cancer care. Since 1980 the CSNZ has been involved in promoting skin cancer prevention messages to the New Zealand public (Cancer Society of New Zealand, 2010a). The CSNZ also provides leadership in skin cancer prevention, working with experts to develop evidence-based sun protection information and advice, disseminating research
results, as well as supporting New Zealand sun protection research.

The CSNZ runs a SunSmart Schools Accreditation Programme (SSAP), in which primary schools which meet key sun protection criteria are granted accreditation status (Cancer Society of New Zealand, 2010f), in line with World Health Organization (WHO) recommendations (World Health Organization, 2003). The CSNZ promotes the sun protection message in the early childhood care setting and has a model sun protection policy on the website (Cancer Society of New Zealand, 2008b). The CSNZ works closely with their Australian counterparts in the area of sun protection (Cancer Society of New Zealand, 2009). To encourage early childhood care services to provide effective sun protection, Australian State Cancer Councils have implemented a SunSmart Early Childhood Programme (SECP), which grants “SunSmart status” to services meeting specific sun protection criteria (Ettridge, Bowden, Rayner, & Wilson, 2010, p. 5).

The HSC is a New Zealand government agency funded to promote health through provision of social marketing of health messages, including sun protection, to the New Zealand public (Health Sponsorship Council, 2010a). The HSC has been running social marketing campaigns about sun protection under the “SunSmart” brand since 1993. The HSC uses mass media advertising campaigns; as well as supporting sun protection for communities, recreational settings, sports events, and local authorities (Health Sponsorship Council, 2010c). The current HSC campaign has a particular focus on the parents and caregivers of 8-12 year olds (Health Sponsorship Council, 2010b). The HSC does not have a specific involvement in early childhood care services.

1.5 Sun protection research

There is a lack of research about sun protection practices in the New Zealand early childhood care setting. A U.S. Task Force on reducing UVR exposure reviewed the effectiveness of interventions to reduce UVR exposure. The Task Force concluded there was evidence to support skin cancer prevention programmes in the primary school setting, but a lack of evidence internationally as to interventions that effectively promote sun protection in the early childhood setting (Saraiya et al., 2003).

Interventions to promote sun protection in this setting need to be based on sound information. At this stage it is important to develop an understanding of the current situation and the underlying issues influencing sun protection in the New Zealand early childhood care setting.
This needs to be done before developing initiatives such as an accreditation programme, which may or may not be the most effective action. A baseline survey would also be appropriate in the future, and this dissertation seeks to provide background information on the key influencing factors which could be used to inform a baseline survey.

1.6 Research aims

Aims:

1. To briefly explore sun protection policies and practices in New Zealand teacher-led early childhood centres.
2. To develop an in-depth understanding of the underlying issues influencing sun protection in New Zealand teacher-led early childhood centres.
3. To identify what steps could be taken to support the development of effective sun protection in teacher-led early childhood centres in New Zealand, including consideration of whether there is support for an accreditation programme.

1.7 Outline of research

This dissertation reports on the qualitative research study that was undertaken to address the aims outlined above. Chapter two provides a literature review examining: the burden of skin cancer in New Zealand; the role of sun exposure in the development of skin cancer; the effectiveness of sun protection; sun exposure in early childhood care settings; and successful sun protection programmes in early childhood care. Chapter three outlines the methodology used in this research, including the theoretical perspective that underpins the research and a description of the research method. Consideration is then given to how the research addresses the issues of credibility, fittingness and auditability (Beck, 1993). Chapter four provides a detailed account of the research results. Chapter five summarises the results, and discusses the strengths and weaknesses of the study. This is followed by a discussion of the significance of the results, integrated with recommendations for actions for supporting sun protection in the early childhood care setting. The dissertation finishes with a conclusion regarding the overall research study and a suggested way forward in promotion of sun protection in New Zealand teacher-led early childhood centres.
Chapter 2 : Literature Review

This chapter reviews key literature relevant to sun protection in the early childhood care setting. Firstly, the cause of skin cancer, and the extent of skin cancer morbidity and mortality in New Zealand are discussed (s.2.2). This is followed by an examination of the international research on skin cancer prevention; particularly focusing on why preventing excess UVR exposure in children is essential (s.2.3). The importance of sun protection in the early childhood care setting is discussed (s.2.4). The chapter then considers the research evidence on sun exposure levels, and sun protection practices in this setting and provides a critical review of several evaluated studies of interventions to promote sun protection in the early childhood care setting (s.2.5). This is followed by a brief discussion of the economics of skin cancer prevention (s.2.6), and how the theoretical framework for health promotion intervention provided by the Ottawa Charter (World Health Organization, 1986), can be applied to sun protection in the early childhood setting (s.2.7). The chapter concludes with a summary of what the literature review has shown.

2.1 Literature search strategy

The Medline Database (1950 to present) was searched in April 2009 and January 2010. MeSH headings were used to search individually for the following concepts: sun screening agents; protective clothing; sunburn (prevention and control); melanoma (prevention and control); and sun protection (key word search). These searches were combined using OR to give combined results for these concepts. A search was then done using the concepts: child day care centres; preschool (key word search); early childhood centres (key word search), and these three searches were then combined using OR to give combined results for these concepts. The results of these combined searches were then both combined using AND to find articles that had both a sun protection focus and an early childhood care focus. The search was limited to English language papers. In October 2010 the Medline Database (1950 to present) was additionally searched for the following extra terms using MeSH headings: basal cell carcinoma (BCC); squamous cell carcinoma (SCC); infants and preschool children. Because the research was focusing on the early childhood setting, research about specific primary school intervention programmes was not included. However, research on the general approach that has been shown to be effective in primary school based programmes was included. Articles on the following topics were rejected because they were outside the scope of this research: skin cancer treatment; screening; general skin cancer prevention studies, and youth/adult orientated research, unless relevant. An in-depth literature review on skin cancer
was not considered to be appropriate, as the focus of the research was sun protection, not skin
cancer. Therefore, the major sources of the general skin cancer information were review
articles, New Zealand-relevant articles, and articles from experts in this field. Relevant
articles were also identified from bibliographies of published articles. In February 2010 the
PsycInfo database (1967 to February Week 1, 2010) was also searched using the same search
terms as the January 2010 Medline search.

2.2 Skin cancer

Skin cancer is generally classified into two categories: melanoma skin cancer and non-
melanoma (NMSC). Melanoma, the most dangerous form of skin cancer has an 85% 10-year
survival rate if diagnosed before it has spread, and a 30% 10-year survival rate for melanoma
that has spread to the lymph nodes or has metastasized to a distant site (Elwood, 2004).
Ninety-five percent of NMSC is either BCC or SCC. While BCC is usually curable, SCC
grows slowly, but if not treated can spread and be fatal. SCC and BCC combined have a
mortality rate of around 0.1% (Elwood, 2004). Exact incidence rates for NMSC are not
available but it is estimated that the NMSC incidence rate is 18-20 times higher that the
melanoma incidence rate (Lieter & Garbe, 2008).

The 1992 Review of Solar and Ultraviolet Radiation by the International Agency for Research
on Cancer (IARC) confirmed that sun exposure causes melanoma and NMSC (International
Agency for Research on Cancer, 1992). In 2008, an IARC report on Vitamin D and Cancer
confirmed the main environmental cause of melanoma and NMSC is solar radiation
(International Agency for Research on Cancer, 2008). While sunlight includes both visible
light and UVR, English, Armstrong, Kricker, and Fleming et al.’s. (1997) review of the
evidence of the relationship between sunlight and cancer identifies the primary role of UVR,
“UV radiation is probably responsible for all the carcinogenic effect of sun light” (p.271).
Excessive exposure to UVR also causes eye damage and may cause altered immune function
(Lucas, McMichael, Armstrong, & Smith, 2008). It has been estimated that 50-90% of skin
cancers are attributable to solar radiation (Lucas, et al., 2008) (see section 2.3.2).

The health effects of UVR are particularly relevant to New Zealand for two reasons. Firstly,
New Zealand has exceptionally high levels of UVR from September to April; “the peak UVI
in NZ is approximately 40% greater than at comparable latitudes in the Northern Hemispheren”
(National Institute of Water and Atmospheric Research, 2010). Secondly, this climatic factor,
coupled with a large percentage of the population being of European descent, (67.6% at 2006
census) (Statistics New Zealand, 2010), and consequently fair skinned, gives rise to skin cancer being a major health problem.

### 2.2.1 The burden of skin cancer in New Zealand

The melanoma incidence rates in New Zealand are amongst the highest worldwide (International Agency for Research on Cancer, 2002), with particularly high rates reported in Auckland (W. O. Jones, Harman, Ng, & Shaw, 1999), and Northland (Martin & Robinson, 2004). In 2006 (latest figures available), there were 1998 new melanoma registrations, and 287 deaths from melanoma. In 2006 New Zealand had a melanoma incidence rate per 100,000 (age standardised to the WHO world standard population model), of 41.2 for men, and 33.4 for women (Ministry of Health, 2010a).

The New Zealand incidence rate for NMSC is not available as these cancers are not required to be registered. However, O’Dea (2009) has estimated New Zealand has 67,000 new cases of NMSC annually, and “skin cancers account for just over 80 percent of all new cancers each year” (p.6). While the BCC and SCC mortality rate is low, the incidence rate is so high that the number of people who die from NMSC is significant. Deaths from NMSC are required to be registered and in 2006, there were 102 NMSC deaths in New Zealand (Ministry of Health, 2009b). NMSC accounted for 26% of the total skin cancer deaths.

O’Dea (2009) has estimated there were 4,741 years of life lost in 2006 due to premature death from skin cancer and that, “these persons if alive would have made an economic contribution through employment of an estimated additional $66.0 million in 2006 (estimated in 2007/08 dollars)” (O’Dea, p. 6). Together with the estimated NZ$57.1 million in health-care costs O’Dea estimates, “the annual costs to New Zealand of skin cancer amount therefore in 2006 to NZ$123.1million, in 2007/08 prices” (O'Dea, 2009, p. 8). Additional to this are the social costs of ill health such as lowered participation in society.

### 2.2.2 Skin cancer and ethnicity

Ethnicity has an influence on skin cancer rates in New Zealand. Overall cancer incidence and mortality occur disproportionately more in Māori (Ministry of Health, 2010a). By contrast, melanoma incidence is disproportionately lower in Māori, Pacific and Asian people (Sneyd & Cox, 2009). Melanoma risk is higher in those of “European origin” which is related to skin colour, with lighter skin colour increasing melanoma risk, (English, et al., 1997, p. 272; Lieter & Garbe, 2008). NMSC risk is also related to skin colour, with a review paper indicating
NMSC, “is rare in non-white populations” (English, et al., 1997, p. 274). Skin colour is determined by the amount of the pigment melanin which is present in the skin, with darker skin having more melanin. Melanin has a protective effect against UVR; therefore lighter skinned individuals have increased skin cancer risk (Cancer Society of New Zealand, 2008a). The CSNZ information sheet on UVR and Vitamin D for people with dark skin indicates that people with very dark skin need less protection from UVR, and therefore, “do not normally need to apply sunscreen” (Cancer Society of New Zealand, 2010h).

A study by Reeder (2001), identified that, “those who defined themselves as Māori included a full range of skin types, from very fair to very dark and a sizable proportion reported the tendency to ‘just burn and not tan afterwards’” (p.7). As Galtry (2004) highlights, where children have a Māori or Pacific parent as well as a parent of European descent, with lighter skin, they may potentially have an increased risk of skin cancer compared to children with little or no European origin. These children, who may identify as Māori or Pacific, will potentially have a lighter skin colour than Māori or Pacific children with no European ancestry, and they will therefore have a higher risk of skin cancer. While melanoma incidence rates are lower for Māori, Pacific and Asian people, “minority ethnicities in New Zealand have a higher than expected risk of thick and more advanced melanoma, with poorer prognosis” (Sneyd & Cox, 2009, p. 1706). Skin colour does not influence the other negative effects of excessive UVR, such as eye damage and immunosuppression (World Health Organization, 2003).

2.2.3 Skin cancer and socio-economic status

Pearce Barnett, and Kingham (2006) analysed melanoma incidence and socio-economic status (SES) in New Zealand over the period 1995-2000. To prevent confounding this study controlled for ethnicity, because Māori and Pacific people have lower levels of melanoma, and there are a higher proportion of people of Māori and Pacific ethnicity in low SES groups. The study showed a very small increase in melanoma incidence with increasing SES. This is in contrast to most other cancers which have a higher incidence and mortality in lower SES groups (Minister of Health, 2003). Pearce et al. point out that, “underreporting of melanoma incidence” (p.239) in low SES groups may have previously caused the figures to indicate that melanoma incidence was lower in low SES groups. They suggest that underreporting will have decreased because of the changes in cancer registration and better health care for lower SES groups. Pearce et al. note that the increased incidence of melanoma in higher SES groups is reducing. They caution that if this trend continues, melanoma incidence could come to the
point were low SES groups have a higher melanoma incidence than higher SES groups, which is the situation with many other cancers.

In addition, there is international evidence that diagnoses and outcomes are worse for melanoma patients from lower SES groups. A Scottish study (MacKie & Hole, 1996) showed that those from lower SES groups were less likely to survive melanoma, compared with those from higher SES groups. A study in the U.S. also concluded that, “males, unmarried patients, smokers and those who resided in communities with low median educational attainment were more likely to be diagnosed as having melanoma at a late stage” (Van Durme et al., 2000, p. 610).

This outline of the burden of skin cancer in New Zealand shows it is a significant cause of mortality and morbidity, incurring substantial treatment costs and loss of potential years of life. Clearly, skin cancer is a serious public health issue in New Zealand.

2.3 Skin cancer prevention

Given the extent of skin cancer in New Zealand, it is fortunate that because skin cancer is largely due to excessive UVR exposure, it is potentially preventable (unlike many other cancers).

2.3.1 Recommended sun protection measures

Sun protection measures recommended by expert agencies such as the WHO and the CSNZ cover both personal protection (hats, sun protective clothing and sunscreen) and environmental protection (shade and limiting time outdoors during high UVR times) (Cancer Society of New Zealand, 2010c; World Health Organization, 2010a). These sun protection measures which aim to reduce UVR exposure are recommended by the CSNZ when the UVR levels are above 3. This is between September and April, (especially between 11am and 4pm), over most parts of New Zealand (Cancer Society of New Zealand, 2010c).

2.3.1.1 Hats and Clothing

Hats and clothing are a means of preventing skin cancer by reducing UVR exposure and sunburn. Clothing has been found to provide good UVR protection, with research showing that 80-90% of summer clothing provides a high level of sun protection (Diffey, 2004). Research has also shown that hats can effectively reduce the amount of UVR exposure to facial sites when compared with the level of ambient UVR available. The research by Gies, Javorniczky, Roy, and Henderson (2006) on a range of hats found, “the hats reduced the facial
exposures to 2.5% of ambient UVR for the ears and 20% of ambient of UVR for the chin” (p.753). The degree of sun protection varies according to the style of the hat, and baseball caps “only provided protection against solar UVR to the nose and front of the face”, with the ears, neck and remainder of the face not being adequately protected (p.752). The type of hats found to provide a high level of sun protection were: broad brimmed hats; deep crown, bucket hats (with a large downward sloping brim); and legionnaire hats (with a flap to cover the back of the neck). These styles of hats are recommended by the CSNZ (Cancer Society of New Zealand, 2007). The importance of sun protective hats is reinforced by Armstrong and Kicker’s (2001) finding that the distribution of melanoma, BCC and SCC was, “high on the face and neck, which are more-or-less continually exposed when outdoors” (p.12).

2.3.1.2 Sunscreen

A 2007 review by Lautenschlager, Wulf, and Pittelkow of the effectiveness of sunscreens in preventing skin cancer concluded that sunscreen can protect against sunburn and skin damage from UVR exposure. In “careful and regular sunscreen users”, sunscreen reduced the number of SCC but not BCC (Lautenschlager, et al., 2007, p. 3). The evidence for protection against melanoma is not conclusive. A study in Vancouver randomized children to sunscreen use for a three year period, with a control group who did not use sunscreen (Gallagher et al., 2000). Modeling of the research results suggests that for children with freckles, sunscreen use could potentially reduce nevi (mole) development by 30-40%. (Nevi development is discussed in section 2.3.4). A review of the research on sunscreen use and risk of melanoma (Dennis, Beane Freeman, & VanBeek, 2003), found that that many studies did not control for the potentially confounding effect of how sun sensitive the study participants were. This can confound the results because people with more sun sensitive skin are not only more likely to use sunscreen; they also have a pre-existing increased risk of melanoma. A further issue is the variation over time in sunscreen sun protective factor rating (SPF) which measures the degree of protection from UVR provided by the sunscreen. Before 1990, the usual SPF level of sunscreen was around SPF4-10, this increased to around SPF15 by 1997 (Lautenschlager, et al., 2007). The reliability of the protective effect of sunscreen is also a concern as there is substantial evidence that sunscreen is frequently not applied correctly, resulting in a lower level of protection than indicated on the product label (Lautenschlager, et al., 2007). Because of the relatively recent advent of higher SPF sunscreens, Dennis et al. concluded that, “it may take decades to detect a protective association between melanoma and use of the newer formulations of sunscreens” (p.966).
Concerns regarding the health effects of sunscreens are an important factor to address when considering sun protection for young children. A recent case study showed sunscreens with a high concentration of micro pigments, (which gave a high sun protection factor), can induce perioral dermatitis in young children with dry skin (Abeck, Geisenfelder, & Brandt, 2009). Lautenschlager et al. (2007) discuss the safety concerns about sunscreens in regard to whether the ingredients may cause endocrine effects and/or DNA damage. They conclude that studies have not shown clear evidence and more research is needed. The authors also reported that sunscreens may cause a reaction due to the irritant effect of the ingredients, but allergic reactions to sunscreen are not common. The CSNZ recommendation to protect most skin with clothing minimizes exposure to sunscreen.

2.3.1.3 Shade

Effective shade can reduce the levels of direct UVR by up to 94% (Greenwood, Soulos, & Thomas, 1998) therefore, shade is a recommended sun protection measure, particularly in areas where people congregate and spend a large amount of time. Effectiveness of shade is influenced by factors including UVR protection provided by the shade materials, the amount of reflection of UVR from surrounding surfaces such as concrete, (which is not prevented by shade), and appropriate positioning of shade in areas where it will be used. Decreasing time outdoors around the hours of highest UVR is also a recommended sun protection practice (World Health Organization, 2009). The WHO also advises that infants should be kept in the shade (World Health Organization, 2009). However, the MoH recommends, “all infants require appropriate daily sun exposure to ensure adequate vitamin D levels”, with recommended sun exposure times, between October and March outside of 11am-4pm, of five minutes for infants with “light coloured skin” and up to 20 minutes for infants with “dark coloured skin” (Ministry of Health, 2009). As more research becomes available the WHO approach of advising that infants should be kept in the shade may have to be refined, as this may potentially have a negative impact on the Vitamin D levels of darker skinned infants.

2.3.1.4 Sunglasses

Exposure to UVR is known to be a causative factor in the development of; cataracts, SCC of the cornea and conjunctiva, and pterygium (a benign growth over the conjunctiva) (Lucas, et al., 2008). Sunglasses limit the damage by blocking UVR from being transmitted to the eye. Sunglasses which provide a high level of UVR protection are a recommended sun protection measure for the eyes. Wearing a sunhat also reduces UVR exposure to the eyes.
2.3.2 Amount of skin cancer prevented by decreasing UVR exposure

For diseases such as skin cancer which have a long latency period, of 20 years plus, from exposure to disease occurrence (Situm et al., 2008; Urbach, 1997), it can be very difficult to establish the success of prevention efforts. Skin cancer prevention research frequently measures self reports of sun protection as an outcome, rather than reduced skin cancer rates, as the latter would take many years to show any significant results. Measurement of individual sun exposure, particularly historical exposure which relies on recall over many years, is another major challenge when researching UVR and skin cancer. This is highlighted by Oliveria, Saraiya, Geller, Heneghan, and Jørgensen (2006), in their summary of the epidemiological evidence on melanoma and sun exposure in adolescence and childhood.

There are estimates of the amount of skin cancer that is caused by excessive UVR exposure. Lucas et al. (2008), in an extension of the WHO estimate of the global burden of disease due to ultraviolet radiation, systematically reviewed the relevant epidemiological literature. Lucas et al. estimated the, “population attributable fraction (PAF) [the fraction of disease attributable to the exposure to that risk factor, (and thus the fraction that could be reduced by elimination of exposure to that risk factor)]” (p. 655). However, the elimination of exposure to UVR is neither possible nor desirable, therefore prevention aims to reduce rather than eliminate excessive UVR exposure. The authors note that case control studies indicated a lower PAF probably due to the difficulty of assessing individual exposure levels, and the absence of a comparison group who are truly non-exposed to UVR. Ecological studies on the other hand, were found to indicate higher PAFs. They consider this is possibly due to the risk of confounding by exposure to other risk factors such as skin type. To address this Lucas et al. estimated the, “upper and lower levels of disease-specific PAF” (from studies of fair-skinned populations) (p.655). They estimated the following lower and upper PAF for skin cancers: melanoma 0.5-0.9; SCC 0.5 -0.7; and BCC 0.5 -0.9. Even the estimated lowest level of PAF for all three skin cancers is 0.5, which indicates that a large amount of the burden of skin cancer is related to UVR exposure. While UVR exposure can not be eliminated, it can be reduced. Armstrong (2004) has estimated that in areas with high UVR (such as New Zealand), over 90% of skin cancer may be caused by excessive UVR exposure. This indicates that efforts to prevent skin cancer are potentially very important.

Sneyd and Cox (2006) specifically looked at prevention of melanoma in New Zealand based on 2002 figures. They have calculated the population attributable risk percent (PAR%) for severe sunburn (sunburn with blisters) at 17.8% of melanoma cases in New Zealand. They
suggest:

*It is possible that 328 of the 1842 new cases of melanoma in 2002 were directly attributable to severe sunburn.*... Thus a reduction of 10% in the prevalence of severe sunburn could result in 28 fewer cases of melanoma per year... this could result in a reduction of about 4 deaths from melanoma each year (Sneyd & Cox, 2006, pp. 4-6).

While 328 cases may not seem very high, there are two aspects to note about this estimate: 1) it only applies to preventing melanoma, and; 2) it is only focusing on a 10% reduction in cases of *severe sunburn*. Prevention efforts need to aim for a greater reduction in severe sunburn as well as decreasing less extreme exposure. Also, reducing UVR potentially may reduce the very high NMSC rates, which result in high costs to the health system.

Dunbar, Findlay and Stevens (2006) take a more critical perspective, pointing to the lack of evidence that skin cancer prevention programmes reduce melanoma. They suggest this may partially be because of the long time required for people to adopt sun protective behaviour, plus the long latency period for melanoma. However, despite this concern they still consider it “prudent” to promote sun protection, suggesting more research is needed to understand, “the relationship between sun exposure and melanoma” (Dunbar, et al., 2006, p. 2).

While prevention efforts may take many years to show an effect, a study of melanoma rates in Queensland from 1982-2002 by Coory et al. (2006), indicates skin cancer prevention may possibly be having a positive effect:

*There is some suggestive, but not definitive, evidence that progress is being made. Incidence rates are stabilising in those younger than 35 years and the proportionate increase for both in situ and invasive lesions appears to be lower for the most recent period compared with previous periods* (Coory, et al., 2006, p. 21).

### 2.3.3 Importance of childhood exposure

While excessive UVR is a known skin cancer risk factor, variation in the pattern of sun exposure (e.g. intermittent versus cumulative exposure), appears to influence the type of skin cancer that develops. Cumulative sun exposure is related to SCC development, whereas melanoma, and to a lesser extent BCC, are thought to be more closely associated with, “high levels of recreational or intermittent exposure” (Armstrong & Kricker, 2001, p. 14).
Studies have shown that, excessive UVR exposure during childhood particularly increases the risk of developing skin cancer later in life. Oliveria et al. (2006) discuss Australian migration studies which have shown increased incidence of melanoma in those who migrated to a high UVR environment at a young age, compared to those who migrated after the age of 10 years. Whiteman, Whiteman and Green’s (2001) systematic review of the epidemiological evidence on the role of childhood sun exposure in the development of melanoma, supports the importance of sun exposure during childhood. A summary of the evidence on sun exposure and melanoma (Oliveria, et al., 2006) supports the role of childhood sunburn in the development of melanoma.

While these studies indicate the importance of childhood sun exposure, Pfahlberg, Kolmel, and Gefeller (2001) challenge this, suggesting that childhood is not a particularly crucial time. This is based on their case control study of 607 melanoma cases and 627 controls. However, Pfahlberg et al. do not suggest that childhood exposure is not important, rather they suggest that, “the hazardous impact of sunburns seems to persist lifelong” (p.471), and prevention should target the whole population, not just children and adolescents.

In contrast, WHO particularly emphasises the need for sun protection during childhood. WHO estimates that, “four out of five cases of skin cancer are preventable by sensible behaviour especially during childhood” (World Health Organization, 2003, p. 2). Autier and Dore (1998) concluded from their case control study of melanoma that, “sun protection during childhood would have a greater impact on melanoma risk than sun protection during adulthood” (p.536). Prevention efforts aimed at the entire population as suggested by Pfahlberg et al. (2001) are important. However, the role and development of melanocytic nevi during childhood (discussed below), and the importance of children learning sun protection habits early in life (detailed in section 2.4.4), indicates the need for a special emphasis on sun protection of young children.

2.3.4 UVR and development of melanocytic nevi

Melanomas frequently develop from existing melanocytic nevi (moles), which are benign concentrations of melanin-producing cells. Studies have shown that melanoma risk increases as numbers of nevi increase (Elwood, 2004). Lieter & Garb (2008) identify the presence of melanocytic nevi as the primary risk factor for the development of melanoma. A study of nevi development highlights that early childhood is a particularly critical time, because nevi development begins from as early as 6 months to 2 years of age (Harrison, MacKie, &
MacLennan, 2000). While there appears to be an inherited component to the number of nevi a child develops, with children’s nevi count related to parental nevi count, research has also shown that childhood sun exposure influences nevi development (Wiecker, Luther, Buettner, Bauer, & Garbe, 2003). In their study of 1812 children, Wiecker et al. concluded that, “moderate sun exposure such as outdoor activities during a German summer without sunburns seemed sufficient for induction of melanocytic nevi” (Wiecker, et al., 2003, p. 628).

Research in Townsville, Australia in 1991 and 1992 examined a cohort of 479 preschoolers for number of melanocytic nevi and re-examined them after a year (Harrison, MacLennan, & Buettner, 2008). UVR exposure was assessed by a sun exposure questionnaire completed by parents, and calculations from “local UVR biometry” to estimate the solar radiation dose the children had received during the year (p. 2318). The research showed that the development of new nevi was related to total UVR exposure and having sun sensitive skin. The number of sunburns and severity of sunburn was particularly associated with large nevi (Harrison, et al., 2008). A limitation of the research was a low response rate.

Further evidence was shown in a European study by Autier et al. (2003) who interviewed parents of 628 Caucasian 6-7 year olds to assess retrospective sun exposure history, plus skin examination to count nevi. This study suggests that small nevi develop in response to UVR exposure, but that high sun exposure levels are not required to stimulate this development. However, high levels of UVR exposure tended to be related to presence of large nevi, similar to the study by Harrison et al. (2008).

The studies discussed in Section 2.3.3 (Autier & Dore, 1998; Oliveria, et al., 2006; Whiteman, et al., 2001), indicated that childhood UVR exposure is an important factor in development of skin cancer. The studies discussed above indicate that childhood nevi development is related to UVR exposure and that sun exposure even without sunburn is implicated in development of nevi. Given that nevi are a key melanoma risk factor; these studies further highlight the importance of effective sun protection for children as a key skin cancer prevention strategy.

### 2.3.5 Sun exposure of New Zealand children

The literature review did not identify any recent studies of sun protection of infants and preschoolers in New Zealand. The studies that are reviewed here were carried out prior to 2001. It is important to consider that the sun protection parents provide for their young children may have changed since these studies were conducted, due to the ongoing sun
protection campaigns. It is also important to be aware that these study findings could also be influenced by under-reporting, as mothers may not have wanted to admit their children had been sunburnt. In regard to children’s sun exposure, the literature review found a lack of New Zealand research specifically on infants and preschool children, as studies tend to include the wider age range from infants up to age ten or twelve years.

The studies reviewed here indicate that a significant number of young children may be experiencing sunburn. A study of children’s sun exposure by McGee et al. (1997) was undertaken as part of a larger telephone survey of sun exposure of 15-65 year olds. The 1243 respondents were asked about their own exposure and then asked about the age of the youngest child in the household. In 325 cases there was a child under 10 years living in the household. In 40 cases the adult did not know about the child’s sun exposure. The research reported on the survey of the sun exposure of the remaining 285 children (from infants to 10 years), 68% of these children were aged 1-5 years. The study found that 90% of the children were outside in the sun during the weekend survey period. The duration of time the children were in the sun was not specified but McGee et al. found that, “7% of those outside had experienced some degree of sunburn” (p.234). The authors extrapolate that if this rate of sunburn was occurring throughout New Zealand, “this would translate into 42,000 children experiencing some degree of sun burn on at least one weekend over the summer months” (McGee, et al., 1997, p. 236).

A study by Morris, McGee and Bandaranayake (1998) used a postal questionnaire to analyse 887 parental reports of sun protection for children aged 2-12 years in Otago and Canterbury. The study involved a baseline questionnaire in December and follow up questionnaires in January and February. Of the initial baseline sample, 94% completed the January follow up questionnaire and 92% completed the February questionnaire. Morris et al. found that, “29% of the children were reported as being sunburned” (p.557), but preschoolers were less likely to be sunburned than older children. The reasons for this are unclear, with the authors suggesting this may be because younger children are more easily accessible to parents who are providing sun protection. Of particular concern is Morris et al.’s finding that, “nearly one-third of the parents reported that if their child was in the sun for three or more hours they would apply sunscreen only once” (p.561). On a more positive note, a study of New Zealand children aged 10 years and under at beaches and playgrounds, over the summers of 1998-2000 found a relatively high level of sun protection, with preschoolers being more likely to be protected than older children (McGee, Reeder, Williams, Bandaranayake, & Tan, 2002). However, the
authors reported that the head and neck were less well protected, highlighting the lack of appropriate hat wearing.

In the absence of New Zealand research specifically on sun exposure in the 0-5 year age group, it is useful to consider research from Australia. New Zealand and Australia both have: a high UVR environment; a large population of European descent (Charles, 1999); high rates of skin cancer (The Cancer Council Victoria, 2010); and active sun protection campaigns, which will influence parental knowledge regarding the need for sun protection. Therefore, it is reasonable to examine what Australian research has shown regarding sun exposure of infants and preschool children.

High rates of excessive sun exposure for 0-4 year olds have been reported in Australia. A Queensland study by Stanton, Chakma, O'Riordan, and Eyeson-Annan (2000), used interviews to look at sun exposure and sun protection behaviours of 133 mothers towards their children aged 0-4 years old. Alarmingly, the study showed that:

\[
even \text{ by six months of age, a third had been sunburnt and 15\% had experienced painful sunburn. By three years of age 82\% had been sunburnt and one-third had experienced painful sunburn, though mother’s knowledge levels of sun safety issues were high (Stanton, et al., 2000, p. 178).}
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It is important to note the study location was Queensland where UVR levels are high year round; therefore these children would have had a greater potential opportunity for excess sun exposure compared to children in New Zealand.

2.3.6 Health effects of sun protection

2.3.6.1 Vitamin D

An emerging issue in skin cancer prevention is the relationship between sun exposure, Vitamin D levels and health. Vitamin D is produced in the body in response to UVR exposure. This is the main source of Vitamin D, as well as a smaller contribution from food (Munns et al., 2006). There is clear evidence that Vitamin D is essential for bone health and that Vitamin D deficiency leads to negative health consequences such as rickets in children (Munns, et al., 2006). However, recent research also suggests a link between low Vitamin D levels and other diseases such as cancer (Giovannucci et al., 2006), and evidence also suggests that Vitamin D is important for brain development (McCann & Ames, 2008). There is currently a debate as to what levels of Vitamin D are required for optimal health, due to research suggesting negative
health effects at Vitamin D levels that were previously considered to be sufficient. Some research suggesting that previously accepted levels of 50nmol/L are insufficient and that levels of at least 80nmol/l are required for bone health and for prevention of other diseases (Scragg & Bartley, 2007).

An International Agency for Research on Cancer (IARC) working group that examined the evidence for a link between Vitamin D levels and cancer, acknowledged an association between low Vitamin D levels and some cancers in its report (International Agency for Research on Cancer, 2008). However, the report questions whether low Vitamin D causes illness or whether low Vitamin D is an indicator of ill health, and consequent increased susceptibility to disease, which could explain the association between low Vitamin D levels and some diseases. In regard to sun exposure and Vitamin D levels, the report does not recommend changes to current sun protection recommendations, because increased sun exposure has the potential to increase skin cancer risk. While this report indicates that recommended sun protection behaviours should not be putting people at risk of Vitamin D deficiency, the authors acknowledge the need for further research into the role of Vitamin D. The report suggests that if future research shows that increasing Vitamin D levels reduces the risk of some diseases, then oral supplements rather than increased sun exposure would, “probably represent the safest way for increasing Vitamin D status” (International Agency for Research on Cancer, 2008, p. 144).

This concern about low Vitamin D levels could be seen to conflict with the sun protection message, and potentially some people could decide to increase their sun exposure in order to ensure they have sufficient Vitamin D. Evidence from Australia indicates that some people are increasing their sun exposure at times of high UVR radiation, (potentially increasing their risk of skin cancer), because they are concerned about getting sufficient Vitamin D (J. Makin. SunSmart Research and Evaluation Manager, Cancer Council Victoria, Australia, personal communication, 29 July 2009).

Clearly, it is important that inappropriate sun protection does not contribute to low Vitamin D levels. Research suggesting the potential for harm due to low Vitamin D, and positive health effects of higher Vitamin D levels, needs to be taken seriously. The CSNZ, recognizing the importance of this issue in 2005, and again in 2007, convened an Expert Advisory Group to review the evidence about Vitamin D and sun exposure (Cancer Society of New Zealand, 2008a). The resulting CSNZ Position Statement addresses the issue, stating that, “a balance is
required between avoiding an increase in the risk of skin cancer by excessive sun exposure and achieving enough sun exposure to maintain adequate Vitamin D levels” (Cancer Society of New Zealand, 2008a, p. 1). The position statement recommends sun protection when UVR levels are high and advises that those with fair skin can obtain Vitamin D levels above 50nmol/ L in the following way:

*in summer by exposing the face, arms and hands or the equivalent area of skin to a few minutes of sunlight on either side of the peak UVR periods on most days of the week, whereas people who tan more easily or have darker skin... will need a longer exposure time to achieve the same effect* (Cancer Society of New Zealand, 2008a, p. 3).

In contrast, during the cooler months of May to August when UVR levels are low, sun protection is not recommended as UVR exposure is required for Vitamin D production.

The CSNZ identifies that there are some groups of people who will be at increased risk of Vitamin D deficiency, (e.g. babies of Vitamin D deficient mothers), and may need oral supplements. The CSNZ information sheet on a balanced approach to sun exposure states that people with naturally very dark skin, “require 3-6 times the exposure level of fair to olive skin [and during the high UVR months]… It is not really necessary for people of this skin type to wear sunscreen but they should still wear a hat and sunglasses” (Cancer Society of New Zealand, 2010b). The CSNZ recommends that more research about Vitamin D is needed, as Vitamin D production has been shown to vary with factors such as weight, skin colour, age etc. As the CSNZ suggests, in the future as more information becomes available, sun exposure recommendations may need to be more individualised (Cancer Society of New Zealand, 2008a).

There is evidence that many New Zealanders have low Vitamin D levels (Livesey et al., 2007) which is not surprising given the low UVR levels and lack of sun during the winter months. Research has shown that New Zealand children have particularly low levels in winter, and that Pacific and Māori children tend to have lower levels than children of European descent, largely due to skin colour (Rockell et al., 2005).

Out of concern about Vitamin D levels, the CSNZ sun protection advice emphasises the importance of using sun protection when required (during the high UVR times), and not using sun protection when it is not required. The issue of Vitamin D highlights the importance of
early childhood staff having the knowledge and expertise to be competent to implement appropriate sun protection, which both protects children, while at the same time does not unnecessarily increase their risk of Vitamin D deficiency. If, as the CSNZ suggest, sun protection advice becomes more individualised in the future, it will be even more important to have an early childhood workforce who are informed and competent in this area.

2.3.6.2 Sun protection and physical activity

Promoting sun protection in children could potentially impact on physical activity levels as recommendations to avoid excess sun exposure could be interpreted as meaning people should avoid being outside. This potential impact on children’s physical activity levels could indirectly work against measures to combat obesity. It is important for children to be outdoors playing and exploring their environment, while maintaining protection from the sun. Therefore the emphasis of sun protection strategies needs to be on using protective clothing and shade to prevent excess sun exposure, and timetabling outdoor activity for times when sun exposure is less harmful, rather than limiting overall time outdoors.

Shade provision is a critical issue when promoting physical activity while ensuring effective sun protection. Boldeman et al., (2006) studied the impact of the environment on the physical activity and sun exposure of 4-6 year old children in eleven pre-schools in Stockholm over a minimum of five days. A strength of this study was the objectivity of the measurements of both sun exposure and activity. Sun exposure was measured by dosimeters (which record the level of UVR exposure), and activity was measured by pedometers (which record step count). The study showed that environments with trees and shrubs provided greater UVR protection and children’s UVR exposures in these environments were significantly lower, while at the same time their activity levels were higher, in comparison to environments which did not have trees and shrubs. It is important to provide a physical environment which supports sun protection and this study demonstrates that environments in the early childhood care setting can provide effective shade while at the same time fostering physical activity.

The discussion above has shown there is strong evidence that excessive sun exposure is a major risk factor for skin cancer. As sun exposure is a potentially modifiable behaviour, it is logical that prevention efforts should focus on reducing excessive sun exposure in the hope that this may significantly reduce the skin cancer burden. This approach is supported by WHO, CSNZ and many leading researchers (Armstrong, 2004; Harrison, et al., 2008).
It may take many years to establish whether sun protection effectively prevents skin cancer, because of the long latency period from exposure to development of the disease. However, it is not ethical to postpone prevention efforts until there is clear evidence of their effectiveness in preventing disease. There is substantial evidence suggesting that childhood sun exposure is particularly important, both in terms of nevi development, and the increased skin cancer risk posed by sunburn. Therefore, prevention of excessive sun exposure in childhood is a high priority. The benefits of sun exposure also need to be considered, and those involved in skin cancer prevention efforts need to tailor recommendations to take account of the beneficial role of sun exposure in regard to Vitamin D production.

2.4 Importance of sun protection in the early childhood care setting

The studies discussed above suggest that while in parental care many 0-5 year olds may not be as well protected from the sun as they could be. While parents are very influential in determining sun exposure in the 0-5 year age group, many of these children also receive sun exposure in the early childhood care setting.

2.4.1 Health promotion in the early childhood care setting

Implementing health promotion intervention in settings has advantages over health promotion aimed at the wider population. Poland, Green, and Rootman (2000) identify that, “settings come equipped with readily definable structures, routines, pathways of entrée and of change, [and] are relatively stable over time” (p.12). These aspects can be utilised to define the scope of a health promotion intervention and support its implementation. Because many children spend a significant amount of time during the peak UVR months in early childhood care, this is a very appropriate setting for sun protection promotion.

An ecological perspective on health promotion provides a useful approach when considering the factors influencing sun protection in early childhood care settings. McLeroy Bibeau, Steckler, and Glanz (1988) define the purpose of an ecological model as being to, “focus attention on the environmental causes of behaviour and to identify environmental interventions” (p. 366). This approach emphasises the influence of the social environment on health and the need to target, “both individual and social environmental factors” in health promotion (McLeroy, et al., 1988, p. 351). The ecological perspective incorporates five levels of influence (i) intrapersonal, (ii) interpersonal, (iii) institutional or organisational, (iv) community and (v) public policy (McLeroy, et al., 1988). “Reciprocal causation”, a key concept of the ecological approach, emphasises the reciprocal relationship between
individuals and their environment, including the social and psychological environment (McLeroy, et al., 1988, p. 366). Reciprocal causation encompasses the influence of people on the environment and the impact of the environment on people. In the early childhood care setting, the concept that people influence and are influenced by the environment highlights environmental factors such as quality of shade, and social factors such as the relationships between parents and staff, which may contribute to the effectiveness of sun protection interventions. As this approach allows for interventions at multiple levels rather than restricting the focus of health promotion to the individual, it is a particularly fitting perspective to use when examining sun protection in the early childhood care setting.

2.4.2 Enrolments in early childhood care

Enrolments in the New Zealand early childhood care setting are increasing. There was a 10% increase in enrolments in licensed and/or chartered early childhood services from over 164,000 enrolments in 2005, to over 180,000 in 2009 (Ministry of Education, 2010f).

2.4.3 Vulnerability of young children

Early childhood staff have a responsibility to protect children in their care because 0-5 year old children are very vulnerable. This is particularly important because young children do not have any political power to ensure their needs are met, and are consequently largely reliant on parents and staff to ensure they receive appropriate care. Sun protection knowledge and behaviour of preschoolers is briefly considered in Section 2.4.4. This is supported by the WHO, which specifically refers to the 1990 Convention on the Rights of the Child (United Nations General Assembly, 1990), emphasising that children have a particular need for sun protection because of their vulnerability to the harmful effects of excessive UVR (World Health Organization, 2001).

2.4.4 Importance of developing health behaviour in early childhood

As sun protection is a behaviour that needs to be continued throughout life, it is important to develop good habits early so children will be able to continue these habits throughout their lives. A review of skin cancer prevention in Australia and internationally suggests that, “inducing sun protective behaviour in children may additionally foster healthy sun protection practices throughout their lives” (Stanton, Janda, Baade, & Anderson, 2004, p. 370).

Education of preschoolers about sun protection has been studied by Loescher, Emerson, Taylor, Christensen, and McKinney (1995). Their Arizona–based study focused on educating 4 to 5 year old preschoolers about sun safety, with a curriculum based on their developmental
level according to Piaget’s theory of cognitive development. Piaget identified four distinct stages of cognitive development that children progress through from birth to 16 years, developing an increasing ability to understand and interact with the world (Loescher, et al., 1995). In this study, six classes in 12 preschools were randomly assigned to receive the Be Sun Safe curriculum with the remaining six classes acting as controls. Children’s sun protection knowledge, comprehension and application were tested pre- and post-intervention. The results showed knowledge and comprehension of sun safety significantly increased in the intervention group who were taught the sun protection curriculum, compared to the control group. However, there was no change in the application component defined as; “the ability to transfer concepts -not behaviours- learned in one situation to another situation or setting” (Loescher, et al., 1995, p. 939). The authors suggest this is because at the pre-school age children are generally not developmentally capable of applying knowledge. While pre-school children may not be able to apply sun protection knowledge, development of positive attitudes towards sun protection will support the continuance of this behavior as the child develops. A New Zealand study (Morris, Bandaranayake, & McGee, 1998), showed that 5-6 year old children were able to, “understand that sunburn is a consequence of overexposure to the sun, and that the use of sunscreen, hats, and clothing are methods of sun protection” (p. 258).

This discussion indicates that sun protection is particularly important in the early childhood care setting because of the participation of large numbers of young children who are susceptible to the harmful effects of excessive UVR. An ecological approach to sun protection enables consideration of the individual factors coupled with the social and environmental factors that influence sun protection. Development of sun protective habits at an early age is also very important as this has the potential to support the continuation of sun protective behaviour later in life.

2.5 Research on sun protection in the early childhood care setting

2.5.1 UVR exposure in the early childhood care setting

This literature review found no authoritative research on UVR exposure levels in the early childhood care setting in New Zealand, and very little research internationally. While there will be differences in some aspects of early childhood care between countries, it is useful to consider what international research there is, especially from Australia, where environmental conditions are most comparable.
UVR exposure has been measured in two ways, originally using Minimal Erythemal Dose (MED), and more recently using Standard Erythema Dose (SED). MED is the amount of UVR required to produce minimal erythema in an individual. Geis, Roy, and Udelhofen (2004) state that, “the MED (in terms of effective UVR) from a number of studies was in the range 200 to 300 J.m² and depended on the susceptibility of the test subject” (p.24). As the MED varied between individuals in order to quantify the amount of UVR and provide a set measurement, the MED was in some circumstances defined according to fair skin as, “the amount of ultraviolet exposure required to induce a barely perceptible erythema (sunburn) in people with a fair complexion, defined as 200 J/m²” (Geis et al., 1995, cited in Stanton, Saleheen, O’Riordan, & Roy, 2003, p. 295). More recently a new measurement has been used, the Standard Erythema Dose (SED) which is, “erythemally weighted radiant UVR equivalent to 100 J·m⁻²” (Lucas, McMichael, Smith, & Armstrong, 2006). The advantage of this latter measurement is that it is a standardised amount of UVR, and therefore is not influenced by skin type. Both these measurements of UVR exposure are important as older studies use MED and more recent studies use SED to assess exposure.

An Australian study looked at UVR exposure levels of 3-5 year olds attending early childhood centers in Queensland (Stanton, et al., 2003). The study involved four early childhood centres and measured sun exposure for one hour between 9am-10am on four days during March and April. In this study, “UVR exposure was studied under four conditions in a repeated measures design; sunny days, cloudy days, teachers instruction to stay in the shade and health professional’s instruction to apply sunscreen” (Stanton, et al., 2003, p. 287). A total of 49, 3-5 year old children were involved in the study. A strength of this study was that rather than only relying on questionnaire data to measure sun exposure, data gathering combined multiple techniques. These were: parent questionnaires of sun exposure and sunburn history; dosimeters to measure children’s UVR exposure; video recording of children’s activities; and researcher recording of children’s sun protective clothing.

This study by Stanton et al., (2003) was conducted in the early morning to avoid peak UVR times and showed that, “on average the levels of UVR exposure” during the one hour observation period would not be high enough to cause sunburn (p.295). The study found little difference in the amount of time children spent in full sun on cloudy days compared with sunny days. The “relative exposure” (measuring UVR exposure relative to the amount [of UVR] available in the same time period) was slightly lower on sunny days than for the other three conditions,… indicating that shade was used more on the sunny day” (Stanton, et al.,
Stanton et al. (2003) compared the children’s level of exposure during the one hour morning session to the findings of a comparable study by Mosie, Harrison, and Gies (1999). Mosie et al. assessed one year old and two and a half year old children, in the home setting in Townsville, Australia, to establish their typical UVR exposure over a whole day. The dosimeters readings showed that while some children received a low level of UVR the maximum doses were high. It is important to note that the study by Stanton et al. measured *UVR exposure over a one hour period*, while Mosie measured *exposure over a full day*. As children in early childhood care would usually be outside for more than one hour/day, Stanton et al. concluded, “this indicated that young children attending child care may receive higher levels of UVR exposure than children at home” (p. 295).

In their study Stanton et al. (2003) indicated their results showed children would not be at risk of excessive exposure if time outside was limited to, “early morning and late afternoon while maintaining adequate sun protection and the children were not outside for a longer period in the afternoon” (p.295). However, this may not always be the case; if children are outside during peak UVR times their UVR exposure levels will be higher, and consequently, sun protection measures will be very important.

Stanton et al. (2003) also found that over 50% of the 3-5 year old children had at some stage experienced sunburn that was “sore or tender” (p.287). They did not indicate whether the sunburn had occurred while in care or under parental supervision. While cumulative exposure levels and opportunities for sunburn in Queensland are probably greater than New Zealand, this study is relevant because there are many similarities in regard to maximum UVR levels over the summer, and recommended sun protection measures.

The study by Boldemann et al. (2006) of the impact of the pre-school environment on physical activity and sun exposure (discussed in section 2.3.6.2), also provided data on UVR exposure levels of the 197 children studied for a minimum period of five days for each child. Boldemann et al. showed that, “daily UV exposures ranged between 74-292 J/m2, i.e. frequently > 200 J/m2 erythemally effective UV radiation, the equivalent of 1 minimal erythemal dose [MED] for sun-sensitive skin” (p.304). This suggests that many of the children may have been receiving in excess of one MED (which could cause erythema in fair skinned children). Boldemann et al. showed the importance of the effectiveness of shade,
finding that high levels of effective shade could, “reduce UVR exposure by 50-100 J/ m²/day in a child staying 7 h at preschool and spending half of the time outdoors” (p. 304).

While there is a lack of information about New Zealand and internationally on children’s UVR exposure in the early childhood care setting, the Australian study suggests that sun exposure levels may be higher than in the home setting (Stanton, et al., 2003). The study by Boldemann et al. of 197 children in 11 pre-schools suggests that UVR exposure levels are quite variable and in some cases could be high enough to cause concern (Boldemann, et al., 2006). This study also highlighted the influence of the effectiveness of shade on UVR exposure levels.

2.5.2 Sun protection practices in the early childhood care setting

This section covers research about sun protection practices in the early childhood care setting, specifically; sun protection policy, the use of clothing, sunscreen, and shade, as well as staff education. This literature review found very little research on sun protection practices in the early childhood care setting in New Zealand. Therefore, it is again useful to look to overseas research to provide information.

The Queensland study discussed above by Stanton et al. (2003), also looked in-depth at sun protection measures used in four early childhood centres. This study was based on direct observation of sun protection practices, rather than reports from teachers, which may increase the reliability of the study results. However, it is possible that the teachers may have been more careful to follow policy when they were being observed. If this occurred, this extra care could have biased the results by showing a greater level of protection compared to usual practice.

The study found that while sunscreen was applied to all children, there was a lack of appropriate sun protective clothing worn, “most wore short sleeve shirts, short skirts or shorts and cap, that do not provide optimal levels of sun protection” (Stanton, et al., 2003, p. 285). On the sunny day over 70% wore sandals without socks, or no footwear. These findings suggest sun protective clothing and footwear was not the norm and there was a reliance on sunscreen over protective clothing. This is concerning, as sunscreen is not recommended as the main form of protection from excess sun exposure (Cancer Society of New Zealand, 2010e).

A further key finding by Stanton et al. (2003) was that despite shade being available, the
children were in the full sun for over a third of the one hour study period. This study was limited to four centres, and the amount of shade will differ from centre to centre. However, as the authors state “preventive measures need to be maximized” (Stanton, et al., 2003, p. 296). Practical approaches such as ensuring all play activities are shaded, as recommended by the researchers, are an important way to provide effective sun protection.

Despite all centres having written sun protection policies, Stanton et al. (2003) found the use of sun protective hats and clothing was not high. This illustrates that having a written policy does not necessarily guarantee the most appropriate sun protection measures are in fact implemented. This finding highlights the need to not solely focus on ensuring centres have written policies. There needs to be a further emphasis on ensuring that the policy is carried out. The link between policy and practice will be discussed further below.

In 2002, Harrison, Saunders, and Nowak (2007) used a postal questionnaire, sent to directors or senior teachers of all identified early childhood services in Queensland, to establish baseline levels of sun protection knowledge, practices and policies. Limitations included the research being based on self report, with no direct observation of sun protection practices. The study had 1,383 respondents, giving a response rate of 56.5%. In regard to the potential for bias, as to why services did or did not participate, Harrison et al. indicate that there were no known demographic difference between the responders and non-responders, apart from a lower response rate from family day care services. However, it is not possible to establish from the results if the non-responders and responders were similar in regard to sun protection practices. It is possible that services where sun protection was not at a high level would not have a strong interest in the issue, and may therefore have been less likely to respond. If this is so, any non-response bias would be in the direction of overestimating, rather than underestimating, the levels of sun protection.

Harrison et al. (2007) found sun protection practices were reportedly superior in centers with written policies. The authors identified a concerning lack of knowledge among senior staff of key sun protection information, such as the meaning of sunscreen SPF rating. Usually, where senior staff had greater knowledge, higher levels of sun protection practices were implemented. The authors suggest sun protection could be improved by inclusion of written policies, and better sun protection knowledge among senior staff.

An American study in Massachusetts in 2002 looked at sun protection at 327 childcare centres
(Kenfield et al., 2005). The telephone survey of directors and assistant directors compared the centers’ sun protection policies and practices to six sun protection measures recommended by the American Cancer Society (American Cancer Society, 2010), and the American Centre for Disease Control and Prevention (Centers for Disease Control and Prevention, 2000). The study hypothesised that more consistent sun protection practices would be reported in centres with a sun protection policy, compared to centres without a policy. Centres were randomly selected with a response rate of 65% (many of the non-responders were centres that were closed over the summer). This study also relied on self report with no direct observation.

Kenfield et al. (2005) found 73% of centres had a written sun protection policy. Similar to Harrison et al. (2007), Kenfield et al. identified that having a written policy was associated with increased likelihood of sun protection practices being reported by the respondent. Only 10% of policies included all of the six recommended sun protection practices. The main sun protection measure in most centres was sunscreen, and 24% applied sunscreen less than the recommended 20-30 minutes before outside play. Kenfield et al. reported that only 47% of policies included hat wearing, and only, “thirty six percent of centres reported hat use consistent with recommended practices, while 21% reported that the majority of preschoolers never or rarely wore hats outside” (p.495). The authors recommended requiring centers to have comprehensive policies and increased regulation and enforcement; they specifically suggest regulating the amount of shade centres are required to provide.

A further finding by Kenfield et al. (2005) is the variability in the amount of shade provided and the subsequent effect on time spent outside. Centres with a greater percentage of shade were more likely to spend a longer time outside during midday compared to those with less shade, which has implications for physical activity. Kenfield et al. highlight that all shade is not of equal standard, similar to the finding by Boldeman et al. (2006). Kenfield et al. recommended that shade, “should block the line-of-sight path from most of the sky, in addition to that from the sun” (p. 499). This is because a large amount of UVR can be received from the sky, and this emphasises the importance of considering the level of protection shade actually gives. If shade provides high UVR protection, children could be outside over the higher UVR times, which would encourage physical activity. Additionally, Kenfield et al. found centers in low SES areas were less likely to have a policy and had lower levels of reported sun protection practices.
While interesting, this study was conducted in Massachusetts, U.S., which has a different regulatory environment, different teacher training requirements, and a different UVR environment than New Zealand. However, the study highlights a number of points that are relevant to New Zealand: the marked gap between the written policy and the implementation of effective sun protection practices; the over reliance on sunscreen; the importance not only of providing shade, but ensuring that shade provides high level of UVR protection; and the lower reported levels of sun protection policies and practices in lower SES areas.

A study in Connecticut (Grin, Pennoyer, Lehrich, & Grant-Kels, 1994) examined reported sun protection measures and also observed sun protection practices in twenty-five randomly selected day care centres. Researchers interviewed the centre director, viewed the sun protection policy, and directly observed sun protection measures including; availability of shade, use of protective clothing, and sunscreen. A strength of this study was that the directors were unaware the focus was on sun protection, as the questions covered all areas of the center’s operation. Therefore, this decreased the possibility that staff increased their sun protection practices in response to being observed by the researcher. The authors concluded that there was a high level of awareness of the need for sun protection, but a lack of more detailed knowledge resulting in inadequate sun protection practices being carried out. In particular, there was a lack of awareness of the need for sun protection in autumn when temperatures were cooler, but UVR levels were still high. This is particularly relevant as New Zealand has a temperate climate with significant periods of cooler temperatures combined with high UVR levels. This study concluded that education of staff and parents is paramount, if effective sun protection is to be achieved for children in early childhood care.

While there is a lack of research on sun protection practices in the New Zealand early childhood setting, the research from Australia and the U.S. reviewed here indicates consistently that centers with written policies have better sun protection practices. However, even these written sun protection policies are frequently inadequate and ineffective sun protection can occur despite having a written policy. The findings of an over-reliance on sunscreen, lack of in-depth understanding by staff of the risks of excessive sun exposure, and children not consistently wearing sun protective clothing and hats are major areas of concern.

### 2.5.3 Interventions to promote sun protection in the early childhood setting

This literature review found a lack of evidence internationally on effective interventions to promote sun protection in early childhood care and did not identify any published research
about sun protection in the New Zealand early childhood care setting. However, this does not mean there are no effective interventions taking place, rather it points to a lack of research to identify such interventions.

In the course of this research the following two New Zealand interventions were identified.

1) In 2008, a CSNZ division held a workshop on sun protection in early childhood centres, which was attended by over twenty teachers/educators and parents. Evaluation feedback from participants indicated they found the workshop useful, and they felt more confident initiating sun protection within their centres as a result of attending the workshop. Participants indicated they would like to have another workshop in a year (Personal communication with CSNZ health promoter, 23.9.10). 2) The MoH provides a resource for early childhood titled *Nga Kupu Oranga Health Messages. A Health and Safety Resource for Early Childhood*. This resource has a brief section on “Suncare” and is available online (Ministry of Health, 2003), and is listed on the MoE website. However, the literature review did not identify any research which evaluated the effectiveness of this resource in regard to sun protection.

As previously mentioned, a U.S. Task Force on Community Preventive Services, reviewed the effectiveness of interventions to reduce UVR exposure (Saraiya, et al., 2003). The task force systematically reviewed the literature, assessing whether interventions showed changes in short term outcomes (e.g. increases in knowledge) and/or increases in sun protective behaviour. The U.S. Task Force concluded there was evidence of the effectiveness of skin cancer prevention interventions in *schools*, but, “insufficient evidence on which to make recommendations for or against…educational and policy approaches in child care centres” (Saraiya, et al., 2003, p. 6). They pointed out they were not saying interventions were ineffective, rather there was a lack of evidence about effective interventions, which highlights the lack of research internationally on effective sun protection interventions in the early childhood care setting.

The Task Force report (Saraiya, et al., 2003) included research by Glanz, Saraiya, and Briss (2004) who reviewed the impact of strategies to reduce UVR exposure including interventions in the early childhood care setting. Glanz et al. reviewed five studies of interventions including parent education, and training for centre staff. The studies, cited in Glanz et al. were: Loescher, et al., 1995; Boldeman, Jansson, and Holm, 1991; Crane, Schneider, Yohn, Morelli, and Plomer, 1999; Grant-Petersson, Dietrich, Sox, Winchell, and Stevens, 1999; Wolf,

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1 Name withheld to preserve confidentiality of one of the respondents.
Swanson, and Manning, 1999. The review concluded that there were, “improvements in knowledge in two studies, and changes in policy and/or structural factors in three studies, however, none of the studies reported improved sun protection behaviour (SPB) in parents, teachers/staff, or children’ (Glanz, et al., 2004, p. 265). As these studies were systematically reviewed by Glanz et al., and they did not show improvements in sun protection practices, they will not be considered further in this literature review.

Three international studies of interventions to promote sun protection in early childhood care will now be considered in detail. These studies were chosen because they cover a range of interventions and have been clearly evaluated. Therefore, they may potentially provide an understanding of factors relevant to the New Zealand setting. The interventions are: the Australian Cancer Council SunSmart Early Childhood Programme (SECP), the U.S. “Sun Protection is Fun” programme (a comprehensive education based intervention) and the workshops run by New South Wales Cancer Council in the Hunter region. Lessons from the approach taken in the primary school setting will also be briefly considered.

2.5.3.1 Australian Cancer Council SunSmart Early Childhood Programme

To increase sun protection in primary schools the Australian State Cancer Councils developed the SunSmart Schools programme which confers, “SunSmart status” on primary schools that meet their State Cancer Council’s criteria (SunSmart Victoria, 2010). The programme has been running in Victoria since 1994. Evaluation of this programme has shown that schools that had gained SunSmart status had a, “higher standard of policy and practice than non-SunSmart schools” (S. Jones, Beckmann, & Rayner, 2006, p. 31).

Using the schools programme as a model, Australian State Cancer Councils have also developed a SunSmart Early Childhood Programme (SECP). The uptake of the SECP between Australian States is variable because the programme has been available for different lengths of time (between 4 and 14 years), in different States (Ettridge, et al., 2010). The SECP grants SunSmart status to early childhood services that meet their State Cancer Council’s sun protection policy and practice criteria (based on the recommended sun protection measures) (Cancer Council ACT, 2010). State Cancer Councils encourage services to join the programme and provide policy guidelines and information via newsletters etc. Early childhood service staff complete a questionnaire about sun protection practices at their service, and submit a copy of their policy. The State Cancer Council staff assess the policy and practices against the SECP recommended criteria, granting early childhood services SunSmart
status when they meet the criteria.

In 2007, sun protection in Australian early childhood services was evaluated (Ettridge, et al., 2010). The study involved 1017 randomly selected early childhood services across Australia (excluding playgroups and family day care), and had a response rate of 59%. The sample included centres participating in the SECP, as well as services that had not joined the programme. The evaluation involved a postal survey and asked respondents to send a copy of their sun protection policy. Sun protection scores for both policy and practice were developed based on, “10 key areas of sun protection” (Ettridge, et al., 2010, p. 8). The questionnaire and policy data for each service were assessed to provide sun protection scores for each centre. Of the centers surveyed, 49% had gained SunSmart status. While 95% percent of all services had a written policy, only 34% of policies addressed all ten sun protection items. Areas of concern regarding sun protection policies included: one third of policies did not include protective clothing for children and only 70% included shade provision. Data on sun protection practices indicated that: 74% required sun protective hats to be worn, but only 47% reported, “sunscreen is reapplied regularly to children (every 2 hrs if outdoors)” (Ettridge, et al., 2010, p. 24).

In order to assess the effects of the SECP, the survey compared centres that had achieved SunSmart status and those that had not, and found that SunSmart services had, “more comprehensive sun protection practices than non-SunSmart services” (Ettridge, et al., 2010, p. 16). The authors discuss a possible confounder acknowledging that, “services that prioritise sun protection are those more likely to have better policies and practices and are therefore also those more inclined to join the SECP” (Ettridge, et al., 2010, p. 16). It is also possible that the SECP may have raised overall awareness of sun protection in early childhood services, resulting in increased sun protection polices and practices in services that were not actively involved in the SECP. This would tend to lead to the effectiveness of the SECP being underestimated. Ettridge et al. conclude that, “these results suggest SECP may have had a positive impact on services’ sun protection policies and subsequently their practices” (p. 16). The authors indicate that more research is needed to confirm this.

As one aim of this dissertation is to consider ways to support sun protection in New Zealand early childhood centers, the effectiveness of the SECP intervention is particularly relevant. While these results suggest the SECP may be effective, they are not able to substantially confirm this. The survey provides some very useful information, but has the limitation of
being a self-reported, postal survey with no direct observation of sun protection practices. It is possible that the non-responders did not reply to the questionnaire because they were less motivated to provide sun protection. If this occurred, the overall sun protection levels would be an overestimate. Therefore, care must be taken in generalising from the results.

2.5.3.2 Workshops in Hunter region of New South Wales

In order to support child care centers to implement sun protection, in 1999 the New South Wales Cancer Council held workshops in the New South Wales (NSW), Hunter region (Parkinson, Astley, Peterkin, Page, & Hampson, 2003). The workshops, which were attended by staff from 68 centres, focused on sun protection policies and practices, and environmental aspects of sun protection. Subsequently, in August and September 2000, a study of child care center’s sun protection policies and practices was funded by the NSW Cancer Council and the NSW Department of Health. In order to identify if there were any differences as a result of workshop attendance, the research included a comparison of sun protection policies and practices between those who had, and those who had not, attended the workshops (Parkinson, et al., 2003). The study, which had a 95% response rate, involved 177 early childhood centres in the Hunter region, and used a computer-assisted telephone interview. Copies of written policies were also requested from centres.

The results showed that 97% of the centres surveyed had a written policy. Of the 78 policies that were reviewed, only 5% covered all the sun protection practices recommended by the New South Wales Cancer Council. The study did not find a clear difference in policy and practice for those that attended a workshop versus those who did not. Parkinson et al. (2003) found that while most centers had policies, the policies were more comprehensive than the reported sun protection practices. In particular, sun protection was focused on children, with less protective practices being implemented for staff. This is a concern because, as Parkinson et al. point out, role modeling by staff is an important aspect of sun protection. The authors concluded that the workshop intervention was not enough to change practice and more intervention was needed. An important conclusion was that:

... simply having a sun protection policy in place may not translate into sun protection practice at child care centres...policy implementation needs to be followed up with adequate maintenance strategies such as continuing staff education, awards systems and regular policy reviews (Parkinson, et al., 2003, p. 523).

This study highlights the need for an intervention that includes a range of approaches in order
to support effective sun protection in early childhood care, rather than a one-off educational intervention. However, it is important to acknowledge that the lack of demonstrated effectiveness of the workshop could indicate that the workshop was not sufficient to promote improved sun protection, or alternatively that the workshop was not well done.

2.5.3.3 Sun Protection is Fun - Houston U.S.A - Pre-intervention baseline study

In 1996, James et al. (2002) carried out a cross-sectional study in Houston, U.S.A., involving 245 preschool staff. This study used a written, self-report questionnaire to establish a pre-intervention baseline, prior to a sun protection intervention called, “Sun Protection is Fun”. The study aimed to examine the sun protection measures staff used, and to understand the psychosocial factors that influenced staff sun protective behaviour towards the children. The research was based on the Theory of Planned Behaviour (TPB) and Social Cognitive Theory (SCT). TPB predicts that behaviour is determined by “behavioural intention” which is the “perceived likelihood of performing the behaviour” (Glanz, Rimer, & National Cancer Institute, 2005, p. 7). In TPB, behavioural intention is influenced by, “attitude toward behaviour, subjective norm [perceived approval of behaviour by important others] and perceived behavioural control [amount of control individual thinks they have over the behaviour, which is influenced by factors that support or impede the behaviour]” (Glanz, et al., 2005, p. 18). SCT is a similar theory to TPB, but considers behaviour to be a process which is influenced by, and in turn influences, the person and the environment. SCT looks at factors that influence behaviour change proposing the “core determinants” of behaviour change include:

knowledge,...perceived self efficacy that one can exercise control over ones health habits, outcome expectations about the expected costs and benefits for different health habits, the health goals...and the perceived facilitators and social and structural impediments to the changes they seek” (Bandura, 2004, p. 144).

James et al. (2002) used TPB and SCT to identify the following key psychosocial factors they thought would influence sun protective behaviour: expectancies (attitudes to sun tanning and use of sunscreen); perceived norms (beliefs about what other teachers would think is important); impediments to carrying out the behaviour and; self efficacy (confidence in ability to effectively carry out sunscreen and sun avoidance activity). The staff questionnaire included questions to measure these psychosocial factors, and to assess the sun protection practices staff undertook to protect the children.
The results of this study showed *self efficacy* (confidence that a practice was practical and possible) was a key psychosocial factor correlated with staff sun protection practice. Staff self-efficacy reflected confidence they could: access sunscreen and apply it correctly; ensure children wore protective clothing; provide shade on trips; and limit outside activity at peak UVR times. A key finding was:

> even if teachers held a favorable expectancy or attitude towards sun protection, when they did not have high levels of self-efficacy regarding sun-protective practices in the classroom, they were unlikely to use sun-protection practices with their students (James, et al., 2002, p. 313).

This finding suggests that for staff to carry out sun protective behaviour, a positive attitude to sun protection needs to be coupled with self efficacy. This has implications for the promotion of sun protection in New Zealand early childhood care settings, as it suggests that as well as increasing knowledge about sun protection, it is important to promote teacher’s skills and confidence.

2.5.3.4 *Sun Protection is Fun* intervention

Following James et al.’s (2002) pre-assessment baseline survey, a “Sun Protection is Fun” (SPF) programme was implemented in Houston pre-schools. SPF was a comprehensive 2 year long sun protection intervention based on SCT (Gritz et al., 2007). The intervention included components aimed at parents and pre-school staff, however, this discussion is confined to the evaluation of the staff intervention discussed by Gritz et al. The program was implemented in ten preschools, with ten control preschools matched for ethnic mix of children and numbers of children in the centre. The intervention and control status of the centre was randomly assigned after the centres were matched. The staff intervention aimed to change the behavioral and psychosocial factors, identified by James et al. (2002) as being an influence on the sun protection behaviour of preschool staff towards the children. The programme aimed to, “promote sunscreen and sun avoidance (e.g. protective clothing and shade) behaviours among preschool staff” (Gritz et al., 2007, p. 565). The intervention was carried out over a two year period and included: training sessions, demonstration video, role modeling stories, curriculum materials and sunscreen. The control group received a skin cancer prevention leaflet and instructions to maintain their current sun protection practices.

The evaluation of the SPF programme measured both psychosocial and behavioural outcomes
at baseline, 12 months and 24 months (Gritz, et al., 2007). The psychosocial outcomes, included: knowledge level; self-efficacy, perceived norms, and attitudes. Staff receiving the SPF intervention showed: increased self-efficacy regarding sunscreen use and sun avoidance measures; significant increase in knowledge regarding sunscreen and UVR; increased positive norms about sunscreen use; a decrease in positive attitude to tanning; and a decrease in perceived impediments to sunscreen use.

The behavioural outcomes focused on: the use of sunscreen, protective clothing and shade. Staff receiving the SPF intervention showed: increased use of and increased re-application of sunscreen; increased use of shade; and increased use of protective clothing. Gritz et al., (2007) consider that, “these findings suggest that SCT-derived intervention methods are effective in modifying determinants of sun-protection behaviors as well as the behaviors themselves” (p. 573). The strengths of this evaluation of SPF are that: it included a control group, and the intervention was evaluated over a long period of time with a cross sectional survey at 12 and 24 months. Most of the positive effects of the intervention were stronger at 24 months. The authors recommended that identifying and working with, “key opinion leaders”, or “champions”, can be an important way of generating and maintaining interest in sun protection in early childhood centres (Gritz, et al., 2007, p.575).

This discussion of interventions to promote sun protection in early childhood centres indicates there is a lack of evidence as to what interventions are effective. The research on sun protection in Australian early childhood centres suggests the SECP has had a positive effect which is promising, but more detailed research is needed to evaluate the full impact of this intervention (Ettridge, et al., 2010). The evaluation of the Hunter Valley workshop suggests follow up may be necessary to reinforce and support an intervention (Parkinson, et al., 2003). The “Sun Protection is Fun” intervention appears to have been effective, as the evaluation showed a positive change in sun protection behaviour of staff towards children (Gritz, et al., 2007). This intervention is particularly interesting because it was theoretically grounded, and orientated towards changing the psychosocial factors that influence behaviour, leading to a change in the behaviour itself. This is in contrast to the Hunter Valley workshops which only focused on increasing knowledge. Clearly, more research is required in order to establish what interventions are effective in promoting sun protection in early childhood care.

2.5.4 Role of parents in sun protection in early childhood centers

Parents have a vital role in influencing the level of sun protection provided for children at
early childhood centers. While a minority of early childhood centres require children to wear a uniform, usually parents are responsible for choosing and providing children’s clothing and hats. Parents may also be required to provide sunscreen, and/or apply sunscreen to their child before they come to the centre. The literature search identified a considerable amount of research on parent’s influence on sun protection in home and recreational environments, but very little mention of parent’s influence in provision of sun protection in early childhood centers.

A U.S. sun protection intervention, “Block the Sun, not the Fun” which included a three hour workshop for centre staff and information for parents, included a survey of parents in the evaluation (Crane, Schneider, Yohn, Morelli, & Plomer, 1999). The intervention was delivered to 13 centres with 14 controls matched for total number of children and ethnic mix of children. The evaluation included an interview with the centre director, researcher observation of sun protection practices, assessment of policy, and parental telephone survey. Interestingly, Crane et al. (1999) found there was a difference in the parents’ reports of sun protection practices carried out at the centres compared to the reports from the directors. Crane et al. make an important point when suggesting that, “parents may be a more objective source of this information than centre staff” (p.36), as the latter may have a vested interest in reporting a higher degree of sun protection practices.

Parents from both intervention and control centres had a positive attitude to sun protection. The research found that in the intervention centres, during the intervention more parents had noticed increased sun protection practices, especially increased use of sunscreen, and they were, “significantly more likely to be satisfied with the sun protection practices at their centres” (Crane, et al., 1999, p. 36). The evaluation reported an increased use of sunscreen by staff, but no change in the use of protective clothing or shade, (behaviours the intervention was designed to increase). The authors concluded that to achieve changes in use of protective clothing there needed to be concentrated intervention aimed at parents and directors, focusing on changing beliefs about clothing. It is particularly concerning that the authors describe sunscreen as being viewed as a, “magic bullet” by centre staff (Crane, et al., 1999, p. 36).

A pilot study of a programme in one German early childhood centre involved training for staff and parents, and the development of a written sun protection policy (Aulbert et al., 2009). The centre then gained a Certification confirming they were providing effective sun protection practices. This intervention has similarities with the Australian SCEP. The research showed
increases in: staff and parents’ knowledge of sun protection assessed by survey, hat wearing by children assessed by observation, and staff use of sunscreen on children. There was no increase in staff role modeling SunSmart behaviour. At the end of the programme the research indicated that discussions between parents and staff about sun protection had increased, and parents had noticed an improvement in the sun protection practices at the centre. The parents tended to be satisfied with the current practices at the centre. A limitation of this study was the lack of a control group.

These studies indicate that including parents in sun protection promotion in these early childhood centres was positive. The U.S. “Block the Sun, not the Fun” intervention contributed to the parents being more satisfied with the sun protection their children received than the control group parents (Crane, et al., 1999). In both the German and U.S. studies the parents noticed improvements in the centres’ sun protection practices during the intervention. The intervention increased parental knowledge of sun protection in the German study (Aulbert, et al., 2009). The indication that parents may provide a more objective view of sun protection practices (Crane, et al., 1999), also further highlights the value of including parents in the development of sun protection policies and practices.

2.5.5 What can we learn from sun protection in primary schools

In regard to sun protection, early childhood care settings and primary schools have factors in common including: staff responsibility for children’s health and safety; teacher role modeling to encourage compliance; and parental responsibility for providing appropriate clothing and hats (including uniforms). As there is a lack of substantial research on effective interventions in early childhood child care (Saraiya, et al., 2003), it is appropriate to adopt the approach suggested by Masso (2006) who suggests, “it is sensible to model the approach on what works in schools until clearer guidance emerges from ongoing research” (p. 363).

The U.S. Center for Disease Control have issued *Guidelines for schools programs to prevent skin cancer* (Glanz, Saraiya, & Wechsler, 2002), which they specifically state also pertain to childcare facilities. These guidelines were based on a comprehensive review of sun protection literature, and consultation with stakeholders and experts in sun protection and education. The guidelines emphasise that sun protection programmes in schools are more effective if they involve family and community, and if they work towards developing an environment that supports sun protection, coupled with professional development for teachers. The WHO also has specific recommendations for sun protection programmes in schools which also
emphasise family and community involvement, and the importance of an environment that supports sun protection. These important components of school based programmes are also relevant to the early childhood care sector.

2.6 Economics of skin cancer prevention

It is important to consider the costs and benefits of skin cancer prevention to determine whether there is an economic benefit in investing in skin cancer prevention programmes. In their estimate of the global burden of disease from UVR, Lucas et al. (2008) point out that the huge incidence of NMSC means the health care costs of skin cancer are very large. The potential benefits of skin cancer prevention include the health benefit of a lower incidence of skin cancer, and the economic benefit of savings in regard to decreased health care costs, and decreased lost production. The costs of running skin cancer prevention programmes need to be offset against these benefits to assess the overall cost/benefit. The literature search did not identify research on the benefits of the current investment in New Zealand skin cancer prevention programmes or an estimate of the amount of skin cancer that may have been prevented. However, as previously discussed, O’Dea’s (2009) study has provided an estimate of the total costs of skin cancer for 2006 of NZ $123.1million. This comprises health care costs of $57.1m, and “lost production” costs of $66.0million (p. 8). The costs of prevention have been identified as including $2million in prevention programmes by CSNZ and HSC, plus at least $10.6million public expenditure on sunscreen (O'Dea, 2009). This review did not identify research about the amount of skin cancer prevented by skin cancer prevention programmes in New Zealand. However, O’Dea’s research includes a template for a cost/benefit analysis which could be used in the future.

An economic evaluation of the Australian SunSmart skin cancer prevention programme has recently been completed (Shih, Carter, Sinclair, Mihalopoulos, & Vos, 2009). The Australian SunSmart programme includes promoting sun protection in schools, workplaces, and recreational settings, as well as supporting legislative and environmental developments which increase sun protection. The evaluation assessed the cost effectiveness of the SunSmart programme which started in Australia in the 1980s. The programme has been well funded in Victoria with less funding in the other six Australian states. Melanoma rates have been increasing in Australia over many years. The authors examined the rates of increase in melanoma and NMSC in Victoria over the period 1988-2004 compared to the rate of increase over the period 1982-1987 (which was prior to the programme being introduced). They calculated the incidence rate that would have been expected in Victoria if no prevention
programme was operating, and compared this to the actual incidence rate from 1988-2004, to assess the benefits of the programme in regard to preventing melanoma. The study concluded that the SunSmart programme resulted in health benefits in terms of deceased skin cancer rates, and an economic benefit due to savings on health care costs. Shih et al. found that if over the next 20 years the SunSmart programme was funded in all seven states at the rate it was historically funded in Victoria, the savings from preventing skin cancer would, “return AUSS2.30 for every dollar invested” (Shih, et al., 2009, p. 451).

In the U.S., the SunWise School programme developed by the U.S. Environmental Protection Agency provides a 1-2 hour educational intervention for primary school aged children which has been shown to effectively improve knowledge, attitudes and sun protection behaviour (Kyle et al., 2008). An evaluation of the programme modeled the amount of skin cancer that would be prevented based on the deceased UVR exposure of the children due to their increased sun protection behaviour. The evaluation concluded that the programme was cost effective because, “for every dollar invested in SunWise between approximately $2 and $4 in medical care costs and productivity losses are saved” (Kyle, et al., 2008, p. 1074). The authors acknowledge the limitations of this analysis. These include the possibility that influences other than the SunWise programme may have contributed to the changes in behaviour attributed to the programme and that the process of modeling the potential outcomes requires making assumptions and choices which include an element of uncertainty.

These two economic evaluations suggest that these investments in skin cancer prevention are cost effective. While there is a lack of specific information about the costs and benefits of skin cancer prevention in New Zealand, these studies are encouraging. International research showing a positive benefit both in terms of preventing skin cancer, and in achieving savings in health care costs, supports the importance of reducing excessive UVR exposure. This underscores the value of focusing on the prevention of skin cancer because UVR exposure, the major risk factor for skin cancer, is modifiable. In times of limited resources investing in skin cancer prevention may free up resources through health care savings which can than be utilised to treat conditions that are not as preventable.

2.7 Health promotion theory relevant to sun protection

It is appropriate to consider health promotion theory when discussing the promotion of sun
protection in Early Childhood Care. While there is a considerable amount of literature on health promotion theory, the Ottawa Charter of Health Promotion (World Health Organization, 1986), provides a very useful and widely accepted model (Hearn, Martin, Signal, & Wise, 2005). The Ottawa Charter defines health promotion as, “the process of enabling people to increase control over and improve their health” (World Health Organization, 1986, p. 2).

The Ottawa Charter proposes a model of health promotion that is both multilevel and multifaceted. The components of the model, coupled with illustrations of the way they could apply to sun protection in the early childhood care setting are:

i. Promoting healthy public policy – This includes broad level public policy (e.g. childcare regulations) as well as policy interventions which support education of staff about sun protection.

ii. Creating supportive environments – This requires the creation of behavioural and physical environments which support sun protection. This makes sun protection the easy choice, by making it the expected behaviour and not up to the individual child or staff member to make independent decisions about sun protection.

iii. Strengthening community action – This involves supporting the members of a community or organisation to take charge of their health and act in ways that promote a healthy lifestyle. In the early childhood settings this would involve including parents and staff in decisions about sun protection.

iv. Developing personal skills – This entails supporting the development of knowledge and skills of individual staff members, as well as supporting sun protection education for children. Educating children promotes understanding of the need for sun protection; this understanding will support the child to continue sun protection practices as they grow up.

v. Re-orienting health services – Health promotion action at this level often focuses on re-orientating health care agencies towards including health promotion rather than only focusing on treatment. However, a broader interpretation of this level could include re-orientating public health services towards a particular health issue. In this case, re-orientation would involve more intervention by regional PHUs to support sun protection in early childhood care settings by raising awareness and providing guidance. Similarly, funding by the MoH specifically to promote sun protection in early childhood care would also be an appropriate re-orientation of the Ministry’s health promotion focus.
2.8 Literature review conclusion

This literature review has demonstrated that skin cancer is an important public health problem in New Zealand which may potentially be significantly reduced by the prevention of excessive sun exposure. Children have been identified as an important group for the promotion of sun protection, because the evidence indicates that excessive UVR exposure during childhood is particularly associated with development of skin cancer in adulthood. As large numbers of New Zealand children are in early childhood care, this is an important setting where children may be exposed to excessive UVR exposure. UVR exposure is also beneficial because it is a key element in the body’s ability to make Vitamin D, and there is very strong evidence that Vitamin D is essential for health. Therefore, in order that the beneficial effects of sun exposure are considered, effective sun protection requires knowledge of when sun protection is required, as well as when it is not required.

The literature review has identified a lack of research on sun protection policies and practices in New Zealand early childhood care services. The international studies reviewed here on sun protection in early childhood centers generally show that centres that have a written policy have more comprehensive sun protection practices. The studies also indicate that frequently in early childhood centres, the full range of sun protection measures is not implemented. Therefore, children may be at risk of excessive UVR exposure. The literature review also indicates that sun protection policies and practices can be influenced by a variety of factors including: Policy Factors, Economic factors (e.g. cost of shade development), Social factors (e.g. role modeling) and Psycho-social factors (e.g. self-efficacy and norms regarding sunscreen use).

As a signatory to the International Convention on the Rights of the Child (United Nations General Assembly, 1990), New Zealand has the responsibility to ensure children are well protected when in licensed early childhood services. At present there is a lack of information as to what is happening in the New Zealand early childhood care setting. This encompasses three areas; (i) the underlying factors which influence sun protection, (ii) current sun protection policies and practices, and (iii) children’s UVR exposure levels. The review highlights that internationally there is insufficient evidence as to what interventions are effective. Given the importance of this issue, and the lack of available information, this dissertation has focused on providing some much needed information about sun protection in the New Zealand teacher-led early childhood centres. The next chapter discusses the research methodology.
Chapter 3: Methodology

As discussed in chapter one, there is a lack of research regarding sun protection in the New Zealand early childhood care setting. Therefore, it is important to establish the current situation, so that future initiatives in this area are evidence-based. As the literature reviewed in chapter two has shown, the lack of research includes the following three areas; i) current sun protection policies and practices, ii) underlying factors influencing sun protection, and iii) children’s sun exposure levels. This research focused on the first two areas, identifying the underlying factors which influence sun protection in this setting, and current sun protection policies and practices. The research also aimed to develop an understanding of key steps that could support effective sun protection in this setting. To meet these aims this research involved ten key informant interviews, coupled with documentary analysis to study sun protection in teacher-led early childhood centres in New Zealand.

This chapter discusses the methodology used in this study. Firstly, the reasons for the focus of this research are explained. This is followed by an outline of the theory that influenced the research design, including Patton’s (2002) emphasis on the research purpose as a determinant of research design. The discussion includes the way in which the ecological perspective (Glanz, et al., 2005; McLeroy, et al., 1988) contributed to decisions about this research. The theoretical perspective underlying the research is outlined. Consideration is then given to how this research addresses the issues of credibility, fittingness and auditability (Beck, 1993). The chapter provides a description of the research methods including: selection and recruitment of respondents; the key informant interview methods; and document, and website analysis. This is followed by an outline of the data analysis process. The chapter concludes with a summary of the key points relating to the methodology.

3.1 Research focus

The international evidence suggests sun protection in early childhood centres is not ideal. Therefore, this research briefly examined sun protection policies and practices to obtain an indication whether this applied to New Zealand early childhood centre setting. The research focus also included examining the underlying influences on sun protection policies and practices in early childhood care because one of the research aims was to establish what action could advance sun protection in this area. Exploring the underlying influencers is vital, because addressing these influencers will be fundamental to effective change. This approach is consistent with the conclusion by Ettridge et al (2010) that their research on Australian
early childhood centres, “clarifies a need to identify the barriers that early childhood services encounter to improving their sun protection policy and also translating these polices into practice” (p.16).

3.1.1 Influence of research purpose on research design

Patton (2002) emphasises the importance of purpose in determining the research design, “purpose is the controlling force in research. Decisions about design, measurement, analysis and reporting all flow from purpose” (p.213). This is similar to the view of Davidson and Tollich (2003), “particular problems demand particular solutions. Research should always be tailor-made” (p.218). Patton identifies five purposes (or types) of research; basic research, applied research, summative evaluation, formative evaluation, and action research. This study fits Patton’s definition of applied research, the purpose of which is, “to contribute knowledge that will help people understand the nature of a problem in order to intervene” (p. 217).

Patton (2002) also discusses the influence of purpose in the decisions regarding depth of enquiry versus breadth, and the need to match research methods accordingly. As the purpose of this research was to gather in-depth information, a qualitative method was chosen. As Patton highlights, qualitative methods facilitate in-depth study, particularly because the study is not limited to, “pre-determined categories” (as is the case in quantitative surveys). As Pope and Mays (1995) identify, qualitative and quantitative research can be complementary, with qualitative research informing future quantitative research. This was particularly pertinent because understanding the key underlying influencing factors could provide valuable information for a future baseline survey of sun protection in early childhood care.

3.1.2 Influence of ecological perspective on research design

When considering the methodology, the ecological perspective, which stresses the importance of the interrelationships between people and their environment (physical, social and psychological), provided a particularly helpful approach (McLeroy, et al., 1988). The ecological perspective influenced the research design by highlighting the need to be aware of the wider environment and policy context in which early childhood care services are imbedded, and the ways these factors may influence sun protection behaviour within early childhood centres. Therefore, the research method needed to be capable of identifying broad issues, which may influence sun protection practices in many early childhood care services.

The ecological perspective also highlighted the need to consider “reciprocal causation” (Glanz, et al., 2005, p. 11), which highlights that factors should not be looked at in isolation,
(discussed in section 2.4.1). For example, reciprocal causation is illustrated in the interaction between UVR levels, shade provision and temperature. The CSNZ illustrates this when discussing the need for “warm shade” due to the frequency of days when the ambient temperature is low, but UVR levels are high (Cancer Society of New Zealand, 2010d). Consequently, it is important that shade does not produce cold areas that will be uncomfortable to use on such days. The researcher was mindful that the data collection needed to consider the interaction between factors, and the discussion needed to consider ways of using this interaction to maximize positive outcomes.

3.1.3 Theoretical perspective

This research was seeking to understand a real life situation, and was based on the theoretical perspective that there is not an absolute truth that was waiting to be discovered. As discussed by Crotty (1998), this approach comes under the constructionist view which emphasises that knowledge is constructed, and “truth, or meaning, comes into existence in and out of our engagement with the realities of the world” (p.8). This research aimed to understand the situation from the perspectives of the respondents, and to identify actions that would support sun protection practices in the real life setting. The approach to the research was inductive, because it did not seek to test a pre-established theoretical position or gather evidence to support or disprove a particular belief (Hancock, 1998). While the research was structured, and possible ways of promoting sun protection were considered, the outcome was not constrained by having to fit pre-determined criteria, and was open to “unexpected information” as discussed by Hancock (p. 10).

The literature review revealed theory that was useful in understanding some of the influences on sun protection behaviour, however, rather than attempting to test these theories, in this research the theories were used to indicate what areas could be fruitful for exploration. For example, the literature review identified that the concept of “self efficacy” from SCT had been useful in previous sun protection research, (James, et al., 2002, p. 312). Therefore, the interview guide included concepts from this theory.

3.2 Research methods

Prior to decisions about research methods, an Advisory Committee was established to provide expert advice and guidance. The committee consisted of the two academic supervisors and two outside experts, one from the early childhood area and one from the sun protection research area. Patton (2002) discusses how the research purpose has an influence in three key
areas: units of analysis; sampling decisions; and research design, and methods. These will now be considered.

3.2.1 Units of analysis

3.2.1.1 Consideration of case studies

When considering the research method, initially using case studies of individual centres as the units of analysis was considered. A case study approach could have involved studying individual centers that have good practices and those that do not. However, consideration of the ecological perspective indicated that case studies of a small number of individual services would give too narrow a focus. This approach had limited ability to yield information on wider underlying factors, and also ran the risk of providing information that was idiosyncratic, and therefore not as useful when seeking to understand the general underlying factors influencing sun protection in early childhood care. A method which would give a broader focus was required, so that wider social and organisational aspects which impact on a range of early childhood care settings could be included.

3.2.1.2 Consideration of policy and regulatory level

Consideration was then given to drawing key informants from organisations which regulate, monitor, or provide guidance to the early childhood care sector, (e.g. MoE, or PHUs), focusing on their role in influencing how services manage sun protection. However, in discussion with the Advisory Committee it was clear that, while this approach appeared to have the capacity to examine issues at policy and organisational levels, this would be limited to the perspective of the regulatory and monitoring organisations. In order to meet the research aims it was decided to concentrate on the perspective of those more closely involved with early childhood care. As this was a small project, drawing key informants from both those involved with the services, and the regulatory and monitoring organisations, could have provided breadth but not sufficient depth to understand the underlying influences adequately. Research involving key informants from the MoE, the Education review Office (ERO) and PHUs would also be useful, but was beyond the scope of this research and would need to be a separate project.

3.2.1.3 Professional development

In order to ensure the data collected would have sufficient depth, the Advisory Committee recommended the key informants should be people providing professional development support and advice to groups of centres. These people were between the two levels initially
considered above. It was considered that informants at this level would not be restricted to only knowing about an individual centre. At the same time they were likely to be aware of the day to day activities of the centres they were involved with, and therefore able to provide in-depth information about this group of centres.

3.2.2 Sampling

3.2.2.1 Selection of the area of the early childhood sector

As mentioned previously, the early childhood sector is diverse with a range of services including: home-based care, community crèches, playcentres, kindergartens, and full-time day care provided by private commercial organisations. As the organisational structures and philosophies of these providers are diverse, there may be differences in some of the issues influencing sun protection in the different areas of the sector (e.g. kindergarten versus home-based care). As the aim was depth, rather than breadth of information, it was beyond the scope of this research to look at the whole sector. After discussion with the Advisory Committee, it was decided to focus on early childhood centres, which cater for 92% of children in early childhood care, rather than including home-based care which caters for the remaining 8% (Ministry of Education, 2010f).

There is further diversity in regard to the way early childhood centres are organised (see Figure 1). Centers are either parent-led or teacher-led, with different funding streams and different regulations. Parent-led centres include playcentres and Kohanga Reo (Māori immersion centres). Teacher-led centres include: commercial child care centres, some not-for-profit organisations, and kindergartens. The scope of the research was further defined by deciding to focus on teacher-led centres, which cater for the majority (78%), of children attending early childhood centres (Ministry of Education, 2010f).

3.2.2.2 Sampling selection strategy

As discussed by Patton (2002), the research purpose determines the sampling strategy. Therefore, “purposeful sampling”, described by Patton as, “selecting information rich cases for study in-depth….those from which one can learn a great deal about issues of central importance to the purpose of the research” (p.46), was used. Purposeful sampling involved identifying organisations running teacher-led early childhood centres, and identifying key informants in these organisations who were able to provide in-depth information about sun protection policies and practices.
3.2.2.3 Selection of organisations

As shown in Figure 1, teacher-led centres are provided by four main groups: i) *independent centres*, which are stand alone centres not connected to an umbrella organisation; ii) *small local chains* which are small groups of centres run by one provider located over a relatively small geographical area; iii) *nationwide chains* of centres over a wide geographical area in multiple locations throughout New Zealand, run by their respective provider organisation; and iv) *kindergartens* which are community run centres that receive government funding and are administrated by a local kindergarten association (which oversee a group of kindergartens in their geographical area). The local kindergarten associations belong to one of the several large kindergarten associations which function as umbrella organisations. It was decided to seek key informants from organisations which cater for large numbers of children, as this would increase the representativeness of the study. Discussion with the Advisory Committee, and review of the MoE database of registered early childhood care centres (Ministry of Education, 2010g), identified the large national providers of teacher-led early childhood centres.

![Figure 1](image-url)

**Figure 1**

Structure of early childhood services in New Zealand

The organisations approached for the study were from: the commercial, and not-for-profit nationwide chains of early childhood centres; and kindergarten associations. The selection of organisation to approach was guided by the need to include organisations from a diverse range of areas, including North and South Island, metropolitan and provincial centers, as well as a range of SES areas. The map below (Figure 2.) shows the geographical spread of key
informants. The respondents were from Northland, Auckland, Wellington, Christchurch, Palmerton North, Hawke’s Bay, South Canterbury, and Dunedin.

![Figure 2](image.png)

**Figure 2**

**Location of key informants**

3.2.2.4 *Recruitment of key informants*

Where the organisation had a National Office, a senior manager was contacted by phone or email, and the background and purpose of the research was discussed (this included that the research was being carried out as part of a Masters Degree through Otago University.) The Advisory Committee supplied the name of a contact person for some organisations. The manager was asked if their organisation was willing to participate in the research. All national organisations approached agreed to participate. In order to select an appropriate person to interview, the need for the key informant to be knowledgeable about sun protection practices
and involved in support and advice to centres, was discussed with the manager. In most instances the senior manager organised for an appropriate person to participate in the research, and arranged for the person to contact the researcher directly by email. In the large (umbrella) kindergarten associations, managers were contacted by phone. They either provided the contact names of appropriate staff members from the smaller local kindergarten associations who were then directly telephoned by the researcher, or they referred the researcher to a senior advisor in their association, who was an appropriate key informant.

As the goodwill of the organisation was paramount, and the researcher was unfamiliar with the organisational roles, flexibility was required as the organisation ultimately decided who they would put forward for the interview. In many instances referral to several different people in the organisation was necessary before locating someone who was in a role where they had the appropriate experience and knowledge about sun protection. One organisation required the researcher to complete an ethics application which went through their Ethics Committee process, before they agreed to participate. Identifying suitable participants involved many telephone calls and emails.

3.2.2.5 Key Informants

Eleven potential organisations were contacted. Ten respondents were interviewed, one declined due to excess workload. Most respondents had extensive experience in the early childhood sector, working in a variety of roles, prior to their current position. Two respondents had 30 years experience, four had over 20 years and a further two had over 15 years. Data on the experience of the remaining two respondents was not collected. Seven respondents were directly working in roles where they provided advice and guidance to a group of centres run by their employing organisation. They were in professional development roles such as, “area manager”, “senior teacher” etc. One respondent was the manager of the professional development staff for her organisation. She had been a senior teacher and felt she was in the best position to participate in the research. Another respondent was involved in all the organisations policy development, had recently done workshops with the centres on sun protection, and also regularly visited centres to assess playground safety.

The tenth respondent, identified in the results as respondent 1, was a preschool health promotion advisor for a District Health Board (DHB). Respondent 1 worked with teacher-led centres, including independent centres (private kindergartens, and private and community early childhood centres), and therefore was able to provide a broad overview of sun protection
which included this wider group. Although she was not directly employed by an early childhood organisation, she was in the role of providing advice and support on health issues to a range of centres, which was in many respects similar to the professional development role of the other respondents. This respondent was initially contacted to be involved in pre-testing the questionnaire. However, during the initial discussion it became apparent that she was an “information rich case” as discussed by Patton (2002, p. 46), who could provide extensive information about sun protection in early childhood centres. Because the research was using a qualitative approach, which can accommodate new information, this provided the flexibility to include her as a key informant. She could provide significant information relevant to the research questions, even though she did not strictly fit the initial selection criteria. She did not take part in the pre-testing.

A further reason for including this respondent, was because she was not employed by, or affiliated to, an early childhood organisation, and therefore had the potential to provide an outsider’s view due to her independence. This independence was considered a strength, particularly in regard to supporting the research aim of understanding underlying influences on sun protection. Therefore, given her early childhood teaching background, and that her role included providing sun protection advice and support to centres, she was seen as having the potential to provide a complementary view. In order that it would be possible to identify if this “outsider” view differed, her responses were differentiated from the other respondents. She agreed to this provided the DHB was not going to be identified, and her anonymity would be preserved.

Once contact was made with the proposed key informant, the research was discussed with them, and they were asked to consider participating. They were then emailed an information sheet outlining the study, and their rights as participants; together with a consent form (please see Appendix 1); and interview guide (please see Appendix 2). They were given a copy of the interview guide at this stage so they would be aware of the questions, could give informed consent, and could reflect on their answers. They were re-contacted after they had read the information, and if they agreed to participate, they were asked to complete and return the consent form by post or email, and an interview time was arranged. Participant’s responses indicated they were very positive and enthusiastic about being involved in the research.

As the aim was for in-depth information, spontaneous answers were not sought. Discussing the purpose of the interview in detail, and providing the questionnaire in advance was
particularly helpful, as several respondents discussed the questions with other colleagues before the interview. This broadened the information the respondents were able to give. Key informants were also asked whether there were any relevant documents they could send to the researcher for inclusion in the documentary analysis. Seven respondents sent nine policy or procedure documents which were included in the documentary analysis. The remaining three respondents did not send any documents.

Early childhood centres require a licence to operate. There is a different licence for centres caring for under two year olds, compared to those caring for older children. Centres which cater for both groups require two licences. The MoE statistics reflect the number of licences, rather than the number of individual centres. Some respondents were referring to the number of licences in the centres they worked with, while others referred to the number of actual centres. In this research the term centre will be used, which may reflect a centre with more than one licence. The respondents in this research were commenting on their current experience working with over 92 centres, ranging from small centres to one with over 165 children. The early childhood organisations the respondents were employed by had a total of 668 early childhood care licences, catering for over 32,800 children (Ministry of Education, 2010f). This was assessed using the MoE database to identify the number of licences, and total number of children cared for by the organisations the participants were from. Respondent 1 was not included in this assessment because she was not employed by an early childhood organisation.

3.3 Data collection

3.3.1 Key informant interview

As the study required in-depth understanding, a key informant interview data collection method was used. Davidson et al. (2003), identify key informant interviews as:

*interviews with the ‘opinion leaders’ and ‘stakeholders’ for particular communities of interest. Key informant interviews involve interviewing such people as representatives of those communities in order to gain insight into the structure of the cultures and groups under study (p.131).*

Fitzpatrick and Boulton (1994), consider interviewing to be a very appropriate method, “allowing the investigator to respond to the individual way in which respondents interpret and answer questions” (p.107). Key points to be covered in the interviews were identified from
the literature review. Semi-structured interviews were chosen because as discussed by Hancock (1998), they allowed for exploration of these key ideas, while also accommodating new information as the interview structure was flexible.

3.3.2 Content of the interview guide

The literature review identified that sun protection policies and practices can be influenced by a variety of factors including: policy, economic (e.g. cost of shade development), social (e.g. role modeling,) and psycho-social factors (e.g. norms and beliefs about tanning). The interview guide asked open questions covering: regulations, policy, and organisational factors; sun protection measures used; staff knowledge and confidence; access to resources; and finally, recommendations for improving sun protection. The literature review also identified theoretical concepts relevant to sun protection. These were: 1) the ecological approach which includes the concepts of; multiple levels of influence, and reciprocal determinism; and 2) SCT theory which emphasises the importance of: knowledge, norms, self efficacy, impediments, facilitators, and observational learning. The researcher had an expanded version of the interview guide (please see Appendix 3), which included prompts to remind the researcher to explore the theoretical concepts that had been identified in the literature review (e.g. impediments and facilitators to sunscreen use, and reciprocal determinism).

3.3.3 Interview method

3.3.3.1 Pre-testing the interview guide

The interview guide was pre-tested on two respondents who were managers of early childhood centres, and one CSNZ health promotion advisor. Pre-testing was done in order to; identify any areas in the interview guide that were problematic, gather feedback from the pre-tests respondents as to interview technique, and familiarise the researcher with the research interview process. The pre-tests were conducted in the way that was planned for the actual research interviews. Feedback from the pre-test participants was positive, and no changes were made to the interview guide or technique.

3.3.3.2 Interviews

All participants returned their signed consent forms prior to the interview. All interviews were conducted by phone, as the research budget did not provide for travel. Ten interviews were conducted. The participants were from the following type of organisations: three private, commercial early childhood care organisations; one not-for-profit organisation, five kindergarten associations, and one DHB. Two interviews were conducted in July 2009, and
the remaining eight interviews between February and April 2010. (The delay in conducting the interviews was due to the ill health of the researcher). Conducting two interviews in the winter and the remaining interviews at the end of summer/autumn could potentially have had an impact on the results, particularly in regard to respondent’s recall. The first two respondents had to remember back over four months to the previous summer; whereas the remaining respondents were interviewed at the time sun protection was being implemented. In the data analysis the researcher was aware of this and looked for any differences in the responses which this may have caused. No significant difference was observed in the responses in relation to the time the interviews were conducted. This may be because sun protection is an ongoing consistent activity that occurs for a large part of each year.

All participants agreed to the interview being audio recorded. The researcher took brief notes during and following the interview to capture key ideas about the interview while they were fresh, and to assist recall during analysis. As described by (Hancock, 1998), audio recording was ideal as the whole interview was detailed, allowing the researcher to focus on interviewing, rather than detailed note taking. During analysis the interview notes could be confirmed by the audio recording. The respondents seemed enthusiastic about participating in the research, and rapport was established with all respondents. Interviews took around 60 minutes, and many respondents seemed pleased to be able to talk about the issue of sun protection. Most respondents gave comprehensive detailed descriptions of how staff in the centres managed sun protection. Telephone interviews proved to be a very satisfactory method of data collection, providing rich data, which was very relevant to the research aims of in-depth understanding.

3.3.4 Documentary and website analysis

The nine policy documents sent by seven respondents were analysed in comparison to the key measures in the CSNZ model policy (Cancer Society of New Zealand, 2008b). To complement the interviews, the MoE early childhood website (Ministry of Education, 2010k), was searched systematically, in September 2010, moving from “Regulations”, through to “Licensing Criteria” and “Guidance” levels, looking for sun protection information. The website search engine was also used with the key word “sun protection”.

3.4 Data analysis

Interviews were transcribed by a professional transcriber. Although the interviews were lengthy, the data analysis was done by hand by the researcher because the structure of the
interview guide facilitated data management. The data analysis was managed following the approach discussed by Patton (2002), where qualitative data are organised and reported according to the questions that were explored. The interview guide was specifically structured to cover all the main areas of interest e.g. use of sun protective hats, shade, etc. This provided clear categories of information, which meant collating the data for each category was straightforward because in each transcript, the data was located under the relevant question. After the data for each category was collated (e.g. hats), each category was analysed in two ways: 1) to assess the range of responses; and 2) to review each category, and across categories, looking for important themes (distinct issues related to sun protection), that emerged from the data (e.g. need for information). While the interview guide determined the main areas of interest, it was also important to maintain an inductive approach during the analysis by being open to new or divergent information that emerged from the data (as discussed by Hancock (1998), and Patton (2002)). This was done through careful analysis, looking for ideas that were new or different from the majority of respondents. The results and the possible implications in regard to recommendations were discussed with the Advisory Committee. The detailed results for each category are reported in chapter four, and the overall findings and themes that were identified are considered in the discussion and recommendations in chapter five.

3.5 Research credibility, fittingness and auditability

A major advantage of qualitative research is that by studying a small number of information rich situations in-depth and allowing respondents freedom in the way they respond, it is possible to develop a deeper understanding of the issues than a quantitative method could achieve. However, a potential risk in qualitative research is that the researcher may dominate and direct the research process to the extent that the study participants are not able to freely give their point of view. As the aim is not to standardise the process, this may limit the generalisability of the results. The way this research has dealt with these issues is discussed below.

Assessing the validity and reliability of research is an important aspect of evaluating the merit of a research study. While quantitative research emphasises large, statistically significant samples, standardizing the investigation to ensure generalisability and reliability, qualitative research takes a different approach to ensuring the research has merit. When assessing qualitative research Beck (1993) uses the terms identified by Guba and Lincoln ((1981), cited in Beck, 1993), of: credibility, fittingness, and auditability in qualitative studies. Beck aligns
these terms with the concepts of internal validity, external validity, and reliability used in assessing quantitative research. These concepts will now be discussed in regard to this research.

3.5.1 Credibility of the research

In regard to the influence of values and the credibility of this research, it is important to consider the perspective from which the research was conducted. This is particularly relevant because the researcher had a background in the area of sun protection working for CSNZ National Office, during the early stages of this research. The researcher was clearly approaching the research from the perspective that sun protection measures were valuable.

When discussing credibility Patton (2002) emphasises the importance of “neutrality” of the researcher. This suggests that for qualitative research to be credible the researcher needs to be open to what the research shows, rather than trying to direct the interview/data to a particular outcome. Patton does not suggest “neutrality” equals a disinterest in the topic, rather he identifies that, “qualitative inquiry depends on, uses, and enhances the researcher’s direct experience in the world and insights about those experiences” (p. 51). The research was open to new ideas, using open ended questions to find out about the experience of the respondents, and their views on possible supportive actions to improve sun protection. While the researcher’s version of the interview guide included suggestions of possible measures to support sun protection, new ideas were also encouraged. This was done by asking respondents an opened-ended question regarding their suggestions for improving sun protection, and at the end of the interview asking if they had any other comments.

Greenhalgh and Taylor (1997) stress that qualitative research does not attempt to eliminate the influence of the researcher, as is largely the case in quantitative research. When discussing interviews with patients, Greenhalgh et al. highlight this point, “it is inconceivable that the interviews could have been conducted by someone with no views at all and no ideological or cultural perspective…” (p. 742). The fact that the researcher is not value free is not a problem as long as the researcher outlines the perspective they bring to the research, as this enables those assessing the results to consider the potential influence of the researcher.

The researcher’s experience in sun protection was capitalized on, especially when developing the comprehensive, semi-structured interview guide. This gave focus to the interview, while allowing for respondents to discuss their experiences. The information sheet detailed the
researcher’s sun protection experience with the CSNZ, and may have assisted recruitment by enhancing the credibility of the research to the potential interviewees.

The use of multiple methods of enquiry also addresses the potential for bias in qualitative research. Having three sources of data, (key informant interviewing, documents, and website analysis), increased the credibility by providing different, but complementary information relevant to the research questions. The inclusion of the DHB respondent also increased credibility by providing a view independent of early childhood care providers.

3.5.2 Fittingness

A limitation of qualitative research when compared to quantitative research is that qualitative results are sometimes considered to not be as generalisable. Fittingness addresses this by considering whether the results apply to situations apart from the one being studied (Beck, 1993). The literature review evidence of infants’ and preschoolers’ vulnerability to excessive UVR applies generally to all children, whether or not they are in early childhood care, although specific sun protection recommendations may vary according to their skin colour. Children’s reliance on the adults providing early childhood care to protect them from excessive UVR applies generally to all children in care irrespective of the organisation providing care.

To enhance the fittingness of the research, the selection of key informants purposefully included those from very large nationally run organisations through to relatively small kindergarten associations. The geographical spread and inclusion of respondents from main cities and provincial areas increased the likelihood that the respondents represented a wide range of experience throughout New Zealand, rather than only focusing on the main centres. When selecting respondents, the researcher ensured as much as possible that they had detailed knowledge about sun protection practices in centres they were in contact with. These factors increase the likelihood that the results apply more generally to teacher–led organisations beyond the research sample, as the respondents were very experienced and knowledgeable about the area being researched. While the specific results can not be generalised to parent-led, or home-based care services, as they were not included in the sample; the underlying issues identified point to areas that may well be relevant, and therefore need to also be considered in these services.
3.5.3 Auditability

The auditability of qualitative research is related to the concept of reliability. Beck (1993) discusses auditability in terms of whether the steps taken in the research are clear, thus allowing another researcher to follow them. In order to ensure auditability, a detailed description of the methods used was included in section 3.2-3.5. Because the interviews were audio recorded and then transcribed, verbatim quotes from respondents were able to be included in the results section. The involvement of the Advisory Committee contributed to auditability by providing an independent review of the research process, as the researcher had to explain to the Committee the research methods and justify the decisions made. This process increased the auditability because knowing the research has been independently reviewed enables readers to have confidence in the research process. The selection of key informants discussed in section 3.2.1.3, illustrates how decisions about the research were influenced by involvement of the Advisory Committee.

3.6 Conclusion

This chapter has detailed the methodology used in this research. As the aim of the research was to gather in-depth information, a qualitative methodology using key informant interviews and documentary and website analysis was used. Given the diversity of the early childhood sector and the constraints of the research, the focus was limited to teacher-led early childhood centres. The larger national chains of early childhood centres and kindergarten associations were chosen as organisations in which to gather data, because they cater for the largest numbers of children. Key informants who were providing support and guidance to centres were selected due to their unique ability to provide breadth of knowledge across many centres, as well as in-depth knowledge. The rigor of the research was enhanced by involvement of an expert Advisory Committee who reviewed and advised on the research methodology and findings. Decisions about the research design considered the credibility, fittingness and auditability of the research. The next chapter reviews the research findings.
Chapter 4: Results

This chapter presents the results of the research on sun protection in New Zealand teacher-led early childhood centers. The research was seeking to: briefly examine sun protection practices, and policies; identify underlying influencing factors; and identify actions to support/improve sun protection in this setting. The results reflect the perspective on sun protection policies and practices of the ten respondents who were involved in providing advice and support to teacher-led early childhood centres, as well as the documentary evidence and website analysis.

Initially, the chapter provides a review of the relevant section of the MoE early childhood website in regard to: 1) regulation and monitoring of early childhood centres; and 2) website content on sun protection. This is followed by the respondents’ views on the regulatory, and monitoring environment, and how this influences the provision of sun protection. The respondents’ reports about the implementation of sun protection measures in the centres they are in contact with are described, including: attitude to sun protection, hats, clothing, shade, sunscreen and scheduling of time outdoors. The results also include whether the way staff provide sun protection is influenced by a child’s ethnicity or skin colour. The respondents’ sun protection information and resource needs are presented, together with their suggestions of actions that could improve sun protection. The analysis of the nine written sun protection policies that the respondents provided is given with a table showing which sun protection measures were included in each policy.

Throughout this chapter the respondent from the DHB is identified as respondent 1, in order that the “outsider” view can be differentiated from the other respondents. The chapter concludes with brief comments about the research and the overall results.

4.1 Regulation and monitoring

The background policy, regulatory, and monitoring environment has the potential to significantly influence the way sun protection is perceived and implemented in early childhood centres. Therefore, information available on the MoE website regarding sun protection in early childhood centres was reviewed. The early childhood section of the MoE website has two areas: a “Lead” section (about managing and administering early childhood services); and an “Educate” section (about curriculum and resources) (Ministry of Education, 2010e). As the research focus was on the management of sun protection, the search was done
on the “Lead” section.

4.1.1 Review of sun protection information on the MoE early childhood website

The Lead section of the website was initially reviewed using the website menus to search for content relevant to sun protection. This was followed by a search under the key words “sun protection”.

4.1.2 Regulations

As previously mentioned, the website showed that early childhood centres operate under the Education (Early Childhood Services Regulations) 2008, administered by the MoE (Ministry of Education, 2010b). These regulations set out the requirements in regard to both premises and operational issues, and were significantly updated in 2008, with additional amendments being made in 2009.

It is important to distinguish between: 1) the regulations that cover the general requirements, which all centres (both existing and new) are required to meet, and 2) the specific regulations that only apply when establishing a new centre. All centres require a licence to operate from the MoE. MoE staff visit and inspect the centre to ensure the centre meets the licensing criteria. Licences are granted in perpetuity.

4.1.2.1 Regulations applying to all centres

Premises and Facilities, Regulation 45 requires, “suitable and sufficient space for a range of activities” (Ministry of Education, 2008a).

Health and Safety, Regulation 46 requires providers of licensed centres to, “take all reasonable steps to promote the good health and safety of children enrolled in the service” (Ministry of Education, 2008a).

4.1.2.2 Regulations applying to new centres that are being established

Requirement for Health and Safety assessment when a new centre is established

Section 9 (2) of the regulations require:

Every application for a licence in relation to a new centre must be accompanied by a report from the Director-General of Health or a person nominated by the Director-General of Health for that purpose, assessing whether—
(a) relevant aspects of the premises and facilities standard set out in regulation 45 and relevant aspects of the health and safety practices standard set out in regulation 46 are, or are likely to be, complied with; and

(b) the premises and facilities to be used by the centre are suitable for use as a centre (Ministry of Education, 2008a).

4.1.2.3 Health and safety assessment by PHU’s when establishing a new early childhood centre

The website outlines the requirement for new centres to have an assessment of health, fire, civil defence, and building code compliance (Ministry of Education, 2010h). This involves the relevant agencies assessing the centre and reporting back to the MoE as part of the process for gaining a licence to operate. The website provides contact details and links to these services. The health report is undertaken by the local PHU staff who visit the centre prior to licensing and inspect the premises and practices in regard to health and safety (Auckland Regional Public Health Service, 2010). The details of the health and safety assessment outline the need for a sun-safe policy due to children’s sensitivity to UVR, indicating the policy should include: the times of outside play; children’s personal protection with hats, sunscreen, clothing etc.; and use of shade (Ministry of Health, 2010b).

4.1.3 Licensing criteria

For each regulation there are specific licensing criteria (Ministry of Education, 2009) which centres must meet. The Lead section of the MoE early childhood website includes the following information:

4.1.3.1 Early Childhood Regulation 45; Premises and facilities licensing criteria

Under Early Childhood Regulation 45, there are licensing criteria regarding Premises and Facilities. These cover a range of issues such as food preparation areas, and also include Criteria PF13 which covers outdoor activity spaces. Criteria PF13, specifies safety of the outdoor area regarding access, surfaces, gates, fences etc. However, there is no mention of the need for shade in the outdoor area. In the information related to Criteria PF13, no mention of shade was found.

4.1.3.2 Regulation 46; Health and safety licensing criteria

Under Regulation 46, there are licensing criteria regarding Health and Safety. Criteria HS 12 covering hazard management itemises specific hazards which need to be managed, including, electrical sockets, poisonous substances etc., and states that “hazards are
not limited to those listed”. There is no mention of, or criteria in relation to, the hazard of sun exposure. The only mention of sun exposure under the Criteria HS 12, appears to be in the list of “related links” which includes the CSNZ website for information about shade provision.

4.1.3.3 Bringing existing services under the 2008 regulations

The website states that MoE is currently undertaking a re-licensing process to bring services licensed prior to the 2008 regulations, into the 2008 regulatory system (Ministry of Education, 2010a). There is a transition period from September 2009-30 November 2014, (a 5 year period) during which services will undergo re-licensing in accord with the 2008 regulations and licensing criteria. When existing services are being re-licensed the MoE inspect centres but a health report is not needed. However, if the MoE have concerns about health and safety they can request a health report (Ministry of Health, 2010b).

4.1.4 MoE website management information on establishing a new centre

The Management Information section on the website provides information for those setting up a new centre. The information on “Establishing a centre-based service” has the following mention of sun protection under health and safety:

4.1.4.1 Health and safety policy:

Centres are required to have a health and safety policy, and the website has a template “Health and Safety” policy which centres can adapt. The sun safety section on the template has the following information: “What sun protection is used outside? Issues to consider: sunshades (where), sunblock (how often/documented?), hats and strategies you have in place to ensure children wear them” (Ministry of Education, 2010d). This document includes a reference to the CSNZ for information.

4.1.4.2 Design of early childhood centres

The Management Information section on establishing a new centre-based service includes a section on, “Designing and building your service”. This includes a subsection titled “Renovating an existing building or building a new service” which includes the questions, “will there be some shaded areas? What trees are there?” This includes a link to a CSNZ resource on shade planning (Ministry of Education, 2010j). Another subsection titled “Constructing a sand area” states that, “a suitable sun shade should be provided” (Ministry of Education, 2010c). The website includes a reference and a link to the CSNZ website. Information about dining mentions sun protection if eating outside and a document on playground development has a page on shade development.
4.1.5 Summary of MoE website information

This review of the MoE early childhood Lead website found no licensing criteria in regard to sun protection in general, nor for shade. The website has detailed information about a range of other health issues and hazards, such as hot water temperature, toileting facilities, sleeping areas etc. However, there is no specific information about sun protection measures such as sun protective hats, SPF ratings of sunscreen, time of year when sun protection is necessary, etc. There is a link to the CSNZ for information, sun protection is very briefly mentioned several times in the information about developing a new centre, and shade is mentioned several times in the design information.

4.1.6 Respondents’ knowledge of current regulations

Respondents were asked what the current regulations were, whether they considered the regulations to be satisfactory, and what changes if any, they recommended. The respondents’ views of the roles of the MoE and the ERO in regard to sun protection were also discussed. Several respondents stated they had to look up the regulations prior to doing the interview, as they were unfamiliar with what the current regulations contained in regard to sun protection. All respondents reported that they thought there was nothing specific about sun protection in the regulations, and several respondents said they were surprised when they realised this. All respondents referred to “Regulation 46” which covers general health and safety. One respondent mentioned Criteria PF13 (outdoor activity space), which she thought included shade. However, as discussed above, Criteria PF13 does not mention shade. One respondent mentioned the information on building a sand area, which does indicate the need for shade. One respondent mentioned the information on shade in the playground development guide.

4.1.7 Respondents’ attitude to current regulations

Respondents were divided as to whether the current regulations were satisfactory. Two respondents thought the regulations were fine as they were and specific requirements would not be helpful, one of these respondents considered sun protection to be a high priority in his centres saying, “we haven’t needed a regulation in there to enforce that” (R8). One respondent was uncertain. One respondent thought her organisation did not need any more regulation, but said, “I am not saying that it works alright for everybody” she also suggested that because of the “New Zealand sun” more specific mention of sun protection in the regulations could be considered (R6). Four respondents thought the regulations were inadequate and there should be some specific mention of sun protection in the regulations. One of these respondents was concerned that some centers were approved for licensing despite having inadequate shade.
She expressed her concern about the lack of reference to sun protection in the regulations saying, “there needs to be something…. because New Zealand has such a high ultraviolet that it is absolutely vital” (R3). Respondent 1 (from the DHB), thought the regulations were inadequate, but she preferred a solution of more practical support rather than regulation:

*I think rather than having more regulations, ...there should be more support for early childhood settings to ensure that they do have more shading, that they do have a program in place to actively...be able to inform parents and be more proactive really* (R1).

There was a general view that any change should not to be too prescriptive because centres are so diverse. Several respondents indicated there should be an emphasis on the requirement for sun protection e.g. need for a policy, rather than a specific regulation requiring a certain amount of shade.

### 4.1.8 Ministry of Education information

Respondents were asked about the role of MoE in providing information on sun protection to centres. No respondents reported receiving information from the MoE about sun protection. Interestingly, respondent 1 (from the DHB) mentioned that MoE advisors were available to centres if required. However, the other respondents did not mention the advisors even when prompted.

### 4.1.9 Licensing of early childhood centres

As previously mentioned, prior to opening, early childhood centers are required to gain a licence from the MoE, which involves MoE staff visiting and inspecting the centre to ensure the centre meets the licensing criteria. Four respondents mentioned their involvement in the licensing process when discussing regulations. One respondent talked about licensing by the MoE stating, “when you’re establishing an early childhood centre you do have to ensure that there is shade” (R 2). (As outlined above, the website search showed this was not a licensing criterion, but shade was mentioned in the Management Information section). This respondent commented on the lack of focus on sun safety saying that she had been involved in licensing for twenty years and, “at licensing they may ask to see our sun safe policy, I’ve had that happen twice… so it is not very often” (R2).

Another respondent who commented about the MoE licensing process had seven of her centres recently re-licensed under the new 2008 regulations. This respondent said the MoE
did not seem to take notice of sun protection, but she was unsure if this was because her centres have good shade. She thought they would have seen the policy, as they looked at all the policies, but they had not raised the issue of sun safety. Another respondent also commented that MoE may have seen the sun protection policy, but sun protection was not mentioned during the recent re-licensing of ten centres.

4.1.10 Education Review Office reviews of early childhood centres

Regular reviews (2-3 yearly) of early childhood centres are conducted by the Education Review Office (ERO), a government agency responsible for monitoring and reporting on the quality of education in pre-schools and schools. Following the review visit the ERO provides a written, publicly available, report as to how the centre is functioning (Education Review Office, 2010). To consider the influence of the ERO and the review process, respondents were asked about the role of the ERO in regard to sun protection. Respondents gave a range of responses with most respondents generally agreeing that the ERO might ask about sun protection, but this was not routine. Two respondents indicated this was routinely done at the ERO reviews. One respondent indicated sun protection was rarely or never mentioned, commenting, “I have had nine ERO reviews in about two years, and I have never had one ERO official ask me about sun safety” (R 4).

Respondents were asked whether there would be a consequence from the ERO if sun protection was inadequate. Four respondents indicated they were not aware of any consequence. Two respondents indicated that the ERO was more focused on curriculum than on issues such as sun safety. In contrast, another respondent indicated that if the ERO noticed a problem it would be followed up and possibly documented in the report, and the ERO would raise it with management. One respondent suggested the ERO would make recommendations if they were concerned, but she pointed out that written ERO reports comment on areas of non compliance with a mandatory safety requirement (e.g. if swings were in a hazardous place). She indicated that because sun protection was not regulated, “they wouldn’t class that as a noncompliance…well it’s not a mandatory area” (R10). There was general agreement that there was no specific consequence from the ERO, but respondents considered that while they had not been asked about sun protection, if the ERO were concerned they would raise the issue and work with the centre to improve the situation.

There appeared to be a degree of confusion among some respondents as to whether the ERO were not discussing sun protection because they were satisfied with the current situation, or
because it was not included in their focus.

4.2 Sun protection policies

All respondents reported that their centres had written sun protection policies or procedures. Three of ten respondents reported there was a standard policy which all centres in their organisation followed. Six respondents reported that there was an overall policy for their organisation, from which individual centres within that organisation developed their own procedures, to reflect each centre’s sun protection practices. Respondent 1 (from the DHB) indicated that all the centres she worked with had written policies.

4.2.1 Documentary analysis of sun protection policies

Nine sun protection policies/procedures were supplied from seven respondents (one respondent supplied policies from three different centres). The words policy and procedure were used interchangeably in the documents but for ease of reporting they will all be referred to as policies. As outlined in section 3.3.4, the policies were assessed by comparison with the CSNZ model policy (Cancer Society of New Zealand, 2008b) (see Appendix 4) which is consistent with the WHO school sun protection recommendations (World Health Organization, 2003).

The analysis of the policies is shown in Table 1. Two policies covered all areas in the CSNZ policy. Many policies lacked detail on the way sun protection would be implemented e.g. sunscreen was mentioned but there was no detail as to the SPF rating of the sunscreen provided. There were both practices that respondents reported which were not included in the policies, and also some policies that included practices such as staff role modeling, where respondents had reported this practice was not consistently carried out. The practices described by the respondents were generally much more comprehensive than what was documented in the written policies. Six lacked a statement as to when the policies would be implemented (e.g. Terms One and Four), and one policy indicated sun protection was required in winter on sunny days, which is contrary to CSNZ recommendations (Cancer Society of New Zealand, 2008b).

Role modeling was included in eight policies, of these, seven required staff role modeling, while one encouraged it. The requirement for hats to be sun protective was mentioned in five policies, and three policies mentioned the provision of spare hats by the centre. The lack of inclusion of sun protective clothing was common, with only five policies including a
reference to clothing. All centres are reviewed regularly by the ERO, but analysis of the policies reviewed here suggests that comprehensive sun protection policies covering the full range of sun protection measures were not routine.

<table>
<thead>
<tr>
<th>Sun protection measure included in policy</th>
<th>Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A  B  C  D  E  F  G  H  I</td>
</tr>
<tr>
<td>Statement of when policy is active</td>
<td>✓  ✓  X  X  ✓  ✓  X  X  X</td>
</tr>
<tr>
<td>Hat</td>
<td>✓  ✓  ✓  ✓  ✓  ✓  ✓  ✓  ✓  ✓</td>
</tr>
<tr>
<td>Sun protective hats</td>
<td>✓  ✓  X  X  ✓  ✓  ✓  X  X</td>
</tr>
<tr>
<td>Clothing</td>
<td>✓  ✓  ✓  ✓  ✓  ✓  X  X  X  X</td>
</tr>
<tr>
<td>Shade</td>
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</tr>
<tr>
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</tr>
<tr>
<td>Sunscreen SPF factor Specified</td>
<td></td>
</tr>
<tr>
<td>15-30+</td>
<td>X  15+ X  15-30+ X  X  15+ X</td>
</tr>
<tr>
<td>Role modeling</td>
<td>✓  ✓  ✓  ✓  ✓  ✓  X  ✓  ✓  ✓</td>
</tr>
<tr>
<td>Teach children sun protection</td>
<td>✓  ✓  ✓  ✓  ✓  ✓  X  ✓  ✓  ✓</td>
</tr>
<tr>
<td>Parent information</td>
<td>✓  ✓  X  ✓  ✓  X  X  ✓  X</td>
</tr>
</tbody>
</table>

Table 1
Sun protection measures included in sun protection policies

4.3 Attitudes to sun protection

The attitudes of staff to sun protection can potentially have a strong underlying influence on the way sun protection is implemented. Respondents were asked about staff attitudes to sun protection: whether it was seen as a priority; whether staff considered sun protection easy, or difficult to implement; and whether management and staff differed in their views about sun protection.

The respondents appeared to be committed to providing high quality care, and were very positive about the need for sun protection. They also reported that management were generally very supportive of the need for sun protection. All respondents considered that the
centre staff they were in contact with definitely saw sun protection as an important part of their role, with statements such as: “they are quite vigilant about it” (R6). Five of ten respondents did not think sun protection was difficult to implement, with comments such as it is, “just part of the everyday routine” (R2). However, sometimes this response was given despite them later describing problems implementing consistent practices.

One respondent thought there were inconsistencies in how sun protection was carried out, suggesting it depended on how sun protection was modeled by senior staff, and their leadership in this area. Interestingly, she suggested that staff can become complacent; failing to notice what was occurring. She suggested a fresh pair of eyes were needed to monitor what is really happening:

*I think to ensure that consistency about what is appropriate for children in the sun and what isn’t, it’s really important that you do have someone in the centre that is monitoring that, and is feeding back to staff and giving teachers feedback, or is ensuring that parents are getting that feedback as well* (R5).

In a similar vein, another respondent stressed the importance of staff working together as a team, to provide sun protection. She stressed the benefit of the organisation being able to provide support and advice e.g. regarding shade. She suggested sun protection may be more of a challenge for “stand alone” centers which may not have access to as much information and support. Respondent 1 (from the DHB), discussed the difficulty some centres have in providing sufficient shade and getting parent commitment to sun protection, “I think they find it very challenging...Staff role modeling is also quite challenging for some centres” (R1). Another respondent talked about the fact that sun protection needs to be continually implemented and that sometimes the policy is not reflected in practice.

An unexpected response came from one respondent, when specifically mentioning the “no hat, no play” policy, which she considered to have drawbacks:

*That in itself is contrary to a lot of things in early childhood philosophy, that, ...exploration is wonderful, and they [children] can go where they need to go...I would say for the people who don’t go with the ‘no hat, no play’ policy, and enforce it... then it is much easier, there are less challenges for them* (R7).

She suggested that it was more effective for children to learn about hat wearing themselves rather than enforcing hat wearing:
my personal belief is that it’s more effective for children. Because those children learn to start thinking about that for themselves, rather than, oh, somebody’s telling me I need to wear a hat, but I’m buggered if I know why (R7).

4.4 Sun protective measures

Sun protection practices in early childhood centres are ideally guided by policy. However, as highlighted in the ecological model (McLeroy, et al., 1988), the social, physical and psychological environment also has an important influence. The way in which policy is implemented can be influenced by: the expectations of staff, parents and children; and the degree to which the overall environment supports sun protection. As one of the research aims was to briefly explore sun protection practices, respondents were asked about specific sun protection measures, in order to establish: the norms and expectations regarding sun protection; how supportive the physical, and social environment was; and what impediments there were to effective sun protection.

4.4.1 Hats/Clothing

Eight respondents reported that children were required to wear hats. The remaining two respondents indicated that hats were not required but were encouraged. One respondent outlined a clear “no hat, no play” policy in her centres, describing the staff as, “very vigilant … to ensure they [children] have their hats on” (R2). Two respondents stated that hats were required and spare hats were provided to reinforce this. One respondent stated that a lot of her centres, “now actually provide hats so that they’ve all got the same, and they are good ones [hats]” (R6). She also mentioned “peer pressure on children to wear a hat because they do not want to be the odd one out” (R6).

Respondent 1 (from the DHB), indicted that hat wearing was universally required in the centres she visited but practices around provision of hats varied,

Some believe that regardless of things like head lice, they will still have hats.
Some have the hats, but wash them every day, some have the hats and children put them in their cubby holes...some also believe that’s taking away the responsibility of parents….it’s all discussed with their committees, and their parents, and it’s how they want to do it. (R1).

However, in discussion several respondents who had reported that hat wearing was required
admitted that there was variability in regard to whether hat wearing was actually enforced. This indicated there was a gap between the expected behavior and actual practice. One respondent reported a “no hat, no play” policy, but said this was not universal, as some centres within that organisation were not consistent at requiring hat wearing despite the policy. Several respondents mentioned hat wearing could not be enforced, because parents may not have brought a hat for their child and spare hats were not available.

Of the two respondents who reported hat wearing was not required, one reported that hat wearing was encouraged but not compulsory. When talking about the organisation’s policy on hat wearing another respondent stated, “the centres do not require children to wear sun hats. Some of them do, and some of them don’t” (R.7). She said they may focus on shade rather than hat wearing. However, spare hats were available and children could “take one if they wanted to” (R7). This was the same respondent who suggested compulsory hat wearing could conflict with the center’s philosophical approach.

As previously mentioned in the literature review, research has clearly shown that caps provide inadequate sun protection to the ears, neck and face (Gies, et al., 2006). Almost all respondents were aware that sun protective hats (which shade the face, neck, and ears) were the ideal and they reported that sun protective hats were encouraged. However, when specifically asked, they all indicated children could also wear caps. This was usually because parents decided what hats the children brought. One respondent reported that some of her centres supplied sun protective hats for all children; therefore, they had largely managed to overcome this issue.

There was less emphasis on sun protective clothing compared to hats. The use of spare clothing if children were not adequately protected was variable. Most respondents said their centres had clothes available, and the majority reported that staff would/could use this if children were not clothed adequately. Some respondents clearly indicated spare clothes would be used, “if children arrive without appropriate clothing …we have spare clothing to put on them” (R3). Two respondents indicated that sunscreen may be applied rather than putting on extra clothing if children were not adequately protected; one of these respondents commented, “it would be just a matter of the hats and sunscreen” (R8). This respondent highlighted the underlying need to not impose views on parents saying, “I guess the one thing on the clothing is that we’re seen as not trying to make judgments on what the parents have decided that the children can wear” (R8). When talking about policy, one respondent reported, “they need to
have either clothing, or sunscreen to protect them from the sun” (R9). As mentioned above, only five written policies mentioned the use of sun protective clothing. From the discussion, it was clear that generally there was greater awareness and action in regard to the need for hats, in comparison to the need for sun protective clothing.

4.4.2 Shade

Shade provision and management is a crucial aspect of sun protection in early childhood centres, because children can potentially spend a considerable amount of time outside. Respondents were asked about the adequacy of shade and children’s use of shade, in order to assess what issues influence shade provision and management. Those from larger organisations appeared to have had more experience with shade development and frequently reported they had staff dedicated to property management, who had established good working relationships with shade supply companies.

Two respondents did not think shade was an issue because it was developed when centres were being built. However, one of these respondents said that a lack of shade can be an issue when taking over existing centres which may not have enough shade. Another respondent discussed the fact that older established centres often have large trees, whereas newer centres had to develop these and were more likely to use built shade.

Shade development was a concern for some respondents, particularly in regard to knowing what shade methods to choose. Respondent 1 (from the DHB) talked about smaller organisations where shade was developed on an individual basis, and the difficulties that could be encountered:

They had companies – two or three companies come in with quotes and their advice was quite different ... it was a huge amount of money ... then going on to the management and explaining all that and there was a parent who said ‘oh well, look I can do this, this and this’ ... and so that’s what they did and actually they’ve got something that doesn’t work very well at all (R1).

Three respondents identified the placement of the poles for large shade structures as a problem when they interfered with the play area. Poles need to be positioned at the edge of the play area rather than the middle. One respondent talked about the complexity of shade development.

It is all very well having shade, but then if you’re creating a hazard where a...
Another respondent talked about the difficulty of developing shade in a centre that was not at ground level, “one of the challenges we have had recently is in a centre … that’s on the third floor, and designing shade that isn’t going to sort of take off in a fierce southerly” (R3). One respondent talked about her previous problems with shade development when running a centre:

> We had designed the shade to be effective in the morning, but by late afternoon it was so dark we couldn’t see .... it was quite difficult, and we also picked the wrong colour shades. We picked navy blue ones because we thought they’d look pretty. But no, the light levels went down (R4).

The cost of shade development was mentioned by some respondents. Respondents indicated that commercial centres cover the cost of shade development themselves, whereas kindergartens and not-for-profit centres use a combination of operational funding from the MoE, fundraising, and grants to fund shade. The benefit of a large organisation with specialized staff was also discussed in regard to funding shade. One respondent illustrated this with comment about applying for grants to fund shade, “we have a grants person that completely looks after that sort of thing [grant applications]” (R10). Several respondents who had centres in low socio-economic areas commented that the organisation had to assist with funding shade in low SES areas, because the centres themselves do not have the capacity to fund raise sufficiently to cover the cost.

When asked about any difficulties getting children to use shade, most respondents said shade was deliberated positioned over key activity areas. The following comment was typical, “the shade is actually positioned in places where there are activities like sand or water which will engage children for quite … some time” (R4). Most respondents reported that shade sails were removed during winter. However several respondents said they were moving more towards solid shade structures because of vandalism, and because these also provide outdoor play space in winter. Respondents were not asked specifically to report the amount of shade in their centres as this would vary from centre to centre and therefore, a general indication of shade levels would not be very accurate or informative.
4.4.3 Scheduling of time outdoors

The early childhood centre Licensing Criteria PF13, requires easy access for children between the indoor and outdoor environment (Ministry of Education, 2009). Sun protection measures can include scheduling to limit time outdoors during the time of day when UVR levels are highest. Respondents were asked whether centers scheduled children’s time outside to reduce sun exposure. Most respondents mentioned the regulatory requirement for early childhood centres to have what they referred to as, “indoor outdoor flow” and many indicated this requirement precluded scheduling of time indoors.

However, several respondents mentioned measures such as lunch being eaten inside, and sometimes encouraging children to come inside if it is very hot. One respondent reported that children are often inside between 11.30am and 1.30pm eating and resting. Another respondent reported indoor play between 11am and 2pm which was eating, sleeping and rest time. She suggested this was for the teacher’s benefit as well, “a lot of teachers … who are fair skinned themselves don’t really go out between eleven and two” (R4). Another respondent reported that centres do not restrict time outside as many children are only there for four hours, however; if children are there for longer they have lunch inside. She also suggested children were choosing to stay out of the sun, “in the heat of the day children prefer not to be in the sun anyway, even if they have a choice” (R6).

4.4.4 Sun protection and physical activity

The potential for sun protection to limit children’s physical activity, or cause tension for staff when balancing children’s sun protection and physical activity needs was explored, to see if this had an underlying influence on sun protection. Most respondents reported there was no conflict between ensuring children could have sufficient physical activity and providing sun protection. However, one respondent was very concerned about a centre she had visited where children where kept inside between 11am and 4pm, because of the need for sun protection. This practice had been modified since her visit.

4.4.5 Sunscreen

Sunscreen is an important sun protection measure, however this requires access to sunscreen (which can be costly), and correct application. Respondents were asked about management of sunscreen. A key finding was the large variation in sunscreen provision, application, and the degree to which application is systematic, versus ad hoc.
4.4.5.1 Sunscreen application in early morning

A key issue in sunscreen management was whether parents applied sunscreen to children prior to arrival, or alternatively staff applied sunscreen before children went outside. Requesting parents to apply sunscreen was very common. In some centres children arrive from 7am and therefore they have sunscreen applied before 7am. This could have implications for Vitamin D levels as the literature review identified the early morning as an appropriate time for safe UVR exposure (Cancer Society of New Zealand, 2008a). One respondent reported that staff put sunscreen on all children before they went outside, and therefore parents were not expected to have done this prior to arrival.

Respondent 1 (from the DHB) talked about the impact of the CSNZ workshop for early childhood staff discussed in the literature review (section 2.5.3). Participants at the workshop were advised sunscreen was unnecessary in the early morning, as safe sun exposure at this time was important for Vitamin D production. She reported that centres changed their practices from parents applying sunscreen prior to arrival, to staff applying sunscreen at the appropriate time. However, some centres found this very difficult to manage and had to revert back to previous practice.

4.4.5.2 Children’s self application of sunscreen, hygiene and allergies

Several respondents stated that children were encouraged to apply their own sunscreen. Two respondents discussed the importance of ensuring children are applying it correctly. Many respondents discussed the problem of sunscreen allergies but these were well managed by parents proving a sunscreen the child was not allergic to. Several respondents mentioned concern about the possible transmission of infections when staff apply sunscreen to children. One respondent mentioned that encouraging parents to apply sunscreen to their own child before they come to the centre reduced this risk.

4.4.5.3 Management of Sunscreen application

Respondents reported a wide variation in the degree to which sunscreen application was organised. This varied between systematic applications for all children at specific times, versus a less definite, more individual arrangement. Four respondents reported routine sunscreen application (in the morning and afternoon). This was more common where children attended centres for a full day. One respondent reported that a negative attitude by staff contributed to sunscreen application being challenging. Another respondent reported that extra staff at the centre at lunchtime assisted with sunscreen application. One respondent
raised the issue of the potential for concern when male teachers apply sunscreen.

One respondent reported practices around sunscreen application varied from centre to centre, and several other respondents reported no set routine for sunscreen application, reporting that teachers would check whether children had sunscreen on and apply if necessary. However, it was not clear exactly how teachers managed to ensure that all children were protected.

4.4.6 Sun protection and skin colour/ethnicity

To assess whether a child’s skin colour or ethnicity influenced the sun protection they received, respondents were asked if staff attitudes and practices around sun protection varied with the skin colour/ethnicity of the child. The literature review identified that Vitamin D production is influenced by the level of skin pigmentation (English, et al., 1997, p. 274), and the CSNZ recommends sunscreen is unnecessary for people with very dark skin (Cancer Society of New Zealand, 2010b). If children with very dark skin are receiving the same level of sun protection as those with lighter skin, this may potentially have a negative impact on their Vitamin D levels.

Most respondents stated clearly that skin colour did not influence the sun protection children received, and emphasised that all children were treated the same. Statements such as, “I would hope all children would be treated the same” (R6). One respondent who had a large percentage of Asian children stated, “it’s just all the same, every child is treated the same” (R2). However, another respondent with a large multicultural mix of children, initially indicated children were all treated the same, but then suggested that teachers may particularly focus on fairer skinned children. Another respondent thought that teachers may be more aware of the need to check “white skinned” children were wearing sunscreen (R7). All respondents who indicated children may be treated differently said this was based on skin colour and not ethnicity.

4.4.7 Role modeling

A key aspect of effective sun protection promoted by the CSNZ (2008b), is role modeling, therefore respondents were asked about staff attitudes and practices in regard to role modeling. All respondents considered role modeling to be important. However, while many respondents reported that role modeling was expected or encouraged, several reported that the degree to which role modeling actually occurred was inconsistent. Respondent 1 (from the DHB) considered role modeling to be very important, but sometimes very difficult to implement,
due to the negative attitude of some staff, as shown in her comment on the attitude of some staff to hat wearing:

    Yeah, because they’re not keen on it, cos they’ve never had to do it, because ‘don’t tell me what to do’, ‘because I have hat hair and I don’t want to have hat hair’ ... ‘I’m not normally outside at that sort of time, so look, it won’t matter if I duck in and out, you know’ (R1).

One respondent clearly indicated it was up to teachers to decide about role modeling, “it’s certainly up to the individual teachers, there’s no directive ... to say that teachers must wear hats or whatever. But they ... usually wear a hat of some kind” (R7).

In contrast, several other respondents reported strong expectations that teachers would wear hats, as indicated in the following comment:

    And it’s about role modeling, like all the teachers wear hats. Like when I go and visit, and if I’m going to be going outside, I have to wear a hat, and that’s the rules, and so if you don’t have a hat on, you don’t go outside. And they soon learn, and so all their peers are doing it, so they don’t want to be the odd one out, so they- yeah, they wear hats, ... if they are going to expect a child to cover up, well then they need to role model that as well (R6).

Three respondents reported that staff were supplied with uniforms; another reported they had a dress code and two others respondents reported that hats were provided for staff.

4.4.8 Information for Parents

The interviews with respondents highlighted the important role parents play in regard to sun protection in early childhood centres. In most instances parents were responsible for providing children’s clothing and hats and they were often expected to apply sunscreen. From the interviews it was very clear that centres needed co-operation and commitment from parents to carry out sun protection effectively. All respondents reported that sun protection information was given to parents, usually through newsletters, at enrolment, and during informal conversations with parents. When discussing children’s compliance with sun protection, respondents talked about the importance of the informal education that teachers engage in on a day-to-day basis with parents. This was highlighted by one respondent who commented, “they’ll get most of what they want to know from the teachers.... Teachers are seen as the resource for parents.... I just watch them [parents] asking teachers about everything under the
sun really (R4).

Clearly, where relationships with parents were supportive, it was much easier to promote sun protective behaviour such as wearing of sun protective clothing. Several respondents also emphasised the need to respect parental choice. When discussing talking to parents about hats, one respondent emphasised the importance of not being too directive:

*talking to parents about it, about ... what’s a good hat to wear, ... without being too, ... you must do this, or you must do that, cos we don’t want to turn them off, but certainly encourage, and role model (R10).*

### 4.4.9 Emphasis on different sun protection measures

The choice as to which sun protection measures are emphasised above others can have an important influence on sun protection behaviour. Respondents were asked to rate the following sun protection measures in order of the priority given to each measure in their centres; clothing (including hats), sunscreen, shade and scheduling time indoors. The CSNZ recommends hats and clothing as the primary measure, with sunscreen reserved for skin not able to be covered by clothing. Hats were clearly important with eight out of ten respondents listing hats as the first priority, two listed sunscreen as the first priority (ahead of hats). Coupled with the information about clothing discussed above, (in section 4.4.1), it appeared that there was not a strong emphasis on sun protective clothing apart from hats.

### 4.5 Staff knowledge and confidence

#### 4.5.1 Availability of information

The importance of knowledge in determining behaviour is indicated by Bandura’s (2004) identification of knowledge as a “core determinant” of behaviour (p.144). This suggests that the sun protection knowledge of early childhood staff could potentially have an important influence on the sun protection measures they implement. While the interview did not assess staff knowledge itself, respondents were asked about staff access to sun protection information, and what information the organisation provided to staff.

All respondents reported that centres had written polices or procedures. This was sometimes mentioned as the only sun protection information the early childhood organisation provided for staff. One respondent said she sought information from the Citizen’s Advice Bureau, but none was available. Six respondents mentioned the CSNZ as a source of information. One
respondent specifically mentioned the MoH publication *Nga Kupu Oranga Health Messages. A Health and Safety Resource for Early Childhood*, which was discussed in the literature review. This resource has a brief section on “Suncare” and is available online (Ministry of Health, 2003), and is also listed as a resource on the MoE website with a link to the document. Interestingly, while this publication is for early childhood centres, only one respondent mentioned this resource. Four respondents also mentioned “public health or “Ministry of Health” in regard to information. Other sources mentioned were television, radio, and the pharmacy, with two respondents indicating staff would gain information individually in an informal way.

4.5.2 Staff knowledge

Respondents were asked whether staff had knowledge about the link between melanoma and sun exposure. All respondents thought staff would know this, many mentioning the publicity campaigns that had been on television as a source of information. One respondent said staff would know about as much as the general public. The lack of consistency in teacher’s level of knowledge was particularly expressed by one respondent:

> Oh, I think it would be good for them to have more knowledge, like I mean some people probably have the knowledge, ... we’ve got nearly a hundred teachers, I’m sure that they’re not all sun aware, but I haven’t got that knowledge to be going telling them (R6).

The need to continually provide information for staff was expressed by another respondent, “staff leave for different reasons … there’s that re-educating of those new people coming in which is really important” (R5).

4.5.3 Teacher confidence

James et al. (2002) identified self efficacy as an important factor influencing sun protection behaviour by early childhood teachers. Therefore, respondents were asked for suggestions of ways to increase the confidence staff have in their ability to provide effective sun protection. (The word *confidence* was used instead of *self efficacy* as respondents may not have been familiar with the concept of self efficacy).

Five respondents thought their staff were already confident, with one respondent indicating staff were confident because they were certain of what they needed to do, due to clear expectation backed up by policy. In contrast, another respondent indicated that staff just
needed to enforce the policy, but when this does not occur staff have to be directed. As discussed previously, another respondent mentioned the dilemma of making judgments about parent’s choice of clothing for their child, indicating staff would prefer to use sunscreen rather than use spare clothing to protect a child.

Some respondents indicated the need for more information, and if this was not mentioned spontaneously by respondents, they were asked whether more information would be helpful. One respondent particularly discussed the need for guidelines on sun protection, “they’re looking for good information … you are left in a bit of an information void … because we’re getting generalist information from … the newspaper and TV” (R4). One respondent specifically mentioned the apparent lack of information on sun protection, compared to water safety.

Several respondents thought more information for staff would have an impact on the confidence staff have when discussing sun protection with parents. Interestingly, two of the respondents who did not think their staff lacked confidence, identified that more information would support teacher’s confidence when discussing sun protection with parents:

> the way to improve their ability to articulate the importance of sun safety would be to give them some good research and facts about it … if teachers have got facts behind them, they’re more than happy, but they don’t want to just go talking off the top of their head (R6).

Another respondent thought there would be “inconsistencies” in staff confidence when discussing hat choice with parents, “I don’t know how confident they would be in expressing that [information about hats] to parents” (R5). Respondent 1 (from the DHB) talked about the need for information to be consistent, describing how conflicting information from different sources actually decreased confidence. She indicated teachers would be less likely to discuss sun protection with parents if they had conflicting information.

### 4.5.4 Vitamin D

In view of the link between sun exposure and Vitamin D levels, respondents were asked about their knowledge of Vitamin D and whether they had given staff information about Vitamin D. All respondents had some knowledge about Vitamin D, but for most this was limited to what they had gained through the media. Most respondents had not discussed Vitamin D with staff, nor given them any specific information about Vitamin D. As previously mentioned,
respondent 1 (from the DHB) had been involved in the workshop run by the CSNZ which included information on Vitamin D. Respondent 1 reported that and in response to the workshop, centres had changed to applying sunscreen later in the morning, however, many had found this very difficult to carry out and some had reverted back to their previous practice of asking parents to apply sunscreen before the child arrived. Another respondent mentioned the removal of shade in winter to enable sun exposure. Respondents had little knowledge about the role of sunlight in the production of Vitamin D, except for the general awareness of the need for sun exposure and that lack of Vitamin D caused rickets. Two respondents mentioned they had seen children with rickets: one of these respondents commented about a school aged child with rickets, reporting “he was from a different culture, and the mother used to keep him inside all the time, didn’t let him outside” (R10).

4.5.5 Teaching children about sun protection

As teaching children about sun protection can potentially help children develop sun protective habits, respondents were asked how much emphasis there was on teaching about sun protection and how this was done. Most respondents described the way teaching about sun protection was incorporated into children’s learning; informally during activities such as putting on hats, and sunscreen; and in general conversations. More formal activities included: story reading, songs, and conversations about sun protection during “mat time”. Respondents mentioned the importance of incidental learning (such as from teacher role modeling), which reinforced behaviour, by giving consistent messages to children. When discussing teaching, several respondents mentioned the New Zealand early childhood curriculum “Te Whariki”, suggesting sun protection learning would come under the “wellbeing and belonging” area of the curriculum.

4.6 Sun protection educational resources

4.6.1 Useful resources for children

Respondents were asked about the resources that were available to teach children about sun protection, and whether more resources were needed. Respondents identified several types of resource used currently including: Undercover Cody resources produced by Waikato division of CSNZ (Waikato Bay of Plenty Division Cancer Society of New Zealand, 2010), which were mentioned by two respondents. Nearly all respondents thought more resources would be helpful. Specific suggestions included; games, books, puzzles, posters, and a puppet with a sun protection theme. Respondents were asked whether a sun protection song would be useful, (a sun protection themed song has recently been produced in Australia for preschool children).
Respondents were generally enthusiastic about a song with comments such as, “anything with music that's active is really, really helpful … it reinforces the learning and embeds it” (R3).

4.6.2 Resources for teachers

Respondents were asked whether they thought there was a need for more resources to increase teacher knowledge of sun protection, and if so, what type of resource would be appropriate. Most respondents thought that teachers would benefit from more information. Respondents thought teachers needed to know where to access information and emphasised that it was important the information was consistent. A major theme was the lack of time teachers have for accessing/reading information. Posters and pamphlets were suggested as being helpful because they give concise messages. The need for simple, clear messages rather than too much information was highlighted with the suggestion that references could be included for those wanting more information.

Respondents were specifically asked about the suitability of an online learning module, and a DVD showing best practice, as a DVD was used successfully by Gritz et al., (2007). In regard to a DVD, several respondents mentioned an earthquake video which had been produced many years ago, but which was still useful as a means of learning. Several respondents suggested they would use a DVD at staff meetings, showing staff examples of good practice before facilitating a discussion where they could reflect on the sun protection practices at their centre. Respondents emphasised that to be useful the DVD would need to show a link to the early childhood curriculum, and present a range of types of centre e.g. kindergarten, day care, community crèche etc.

Most respondents thought teachers would not have time to use an online learning module. Some respondents suggested website information was preferable, while two respondents commented that not all centres have internet access. Several respondents were concerned that resources could be left on shelves. They suggested therefore, that the way the resource was distributed to the centres would be important. For example, a resource could be sent to professional development staff rather than just sent to each centre. One respondent also emphasised that when staff assess the credibility of the information they could be influenced by the credibility of the organisation that supplied the information.

4.7 Key actions to improve sun protection

At the conclusion of the interview respondents were asked if they had a key action that they
thought would improve sun protection in early childhood centres. They were also asked if they thought a sun protection accreditation programme for early childhood centres would be useful.

The importance of access to more information was specifically emphasised by half of the respondents, with one respondent commenting that information would support staff decision making resulting in staff: “actually being able to have enough knowledge to be able to make informed decisions” (R3). Several respondents suggested that a website is good medium for information as it can be updated. The inclusion of sun protection and or shade in MoE regulations was mentioned by four respondents. Most respondents supported the idea of an accreditation programme. Their comments included that providing an accreditation programme would put early childhood on a consistent level with schools, and being an accredited centre could be an asset when marketing centres to parents. Other suggestions included money for shade from the MoE.

4.8 Outsider’s view of sun protection issues

As previously mentioned, respondent 1 who worked for the DHB provided an outsider’s view, as she was not employed by an early childhood organisation. The analysis did not identify marked differences in her views compared to the other respondents. However, she did consider that centres found sun protection challenging, especially in regard to role modeling and difficulty developing appropriate shade. This could reflect her work with independent teacher-led centres which may have less access to organisational support. Key influences she discussed were the importance of the relationship with parents, and that centres had diverse ways of managing sun protection which reflected the way the individual centres operated.

4.9 Conclusion

This chapter has reviewed the results of the research on sun protection in teacher-led early childhood centres using key informant interviews, and documentary and website analysis. The research gave a view of sun protection policy and practice from the perspective of the ten respondents. The respondents had a lot of information to share in response to the research and the results indicated that all centres had written policies, and many positive sun protection practices were happening. However, an important finding was that while this research indicates the staff in the early childhood centres clearly saw sun protection as an important issue, and were working hard to protect children, there were areas that could be improved in accordance with best practice recommendations. Key sun protection practices that could be
improved were: consistent wearing of sun protective hats, emphasis on sun protective clothing, and staff role modeling sun protective behaviour. There was an emphasis on providing the same level of sun protection to all children regardless of their skin colour, which may potentially have implications for the Vitamin D levels of very dark skinned children. Fundamental findings were the need expressed by the respondents for more information to enable staff to make decisions based on sound evidence, and the lack of specific licensing criteria in regard to sun protection in the Early Childhood Regulations 2008. The following chapter discusses the significance of the findings and gives recommendations about possible ways to support sun protection in this setting.
Chapter 5 : Discussion and Recommendations

This chapter discusses the significance of the research findings on sun protection in teacher-led early childhood centres, and provides recommendations to address the areas identified as being amenable to health promotion intervention. Initially, the key research findings are briefly outlined in relation to the research aims. The overall results are then summarised, followed by consideration of how they compare to the literature reviewed in chapter two. The strengths and weaknesses of the study are then discussed. The significance of the results and recommendations on ways to support sun protection in early childhood centres are then presented. The recommendations focus on interventions at a range of levels to improve the situation, based on the framework of the ecological perspective’s five levels of influence (Glanz, et al., 2005).

In this chapter it is argued that while the respondents viewed early childhood staff as being committed to sun protection, and many positive practices were being carried out, when questioned in more depth, there were significant inconsistencies in policy and implementation. A particularly important influence was the lack of access to appropriate information. The chapter concludes with an overview of the research and draws conclusions about a way forward in promoting effective sun protection for the infants and children who participate in early childhood centre care.

5.1 Research aims and results

This research aimed to cover three areas relating to sun protection in teacher-led early childhood centres: 1) brief examination of the sun protection policies and practices; 2) development of an understanding of the underlying influences; and 3) identification of steps to support sun protection in this setting. The main findings in relation to these research aims are:

1) The respondents reported all the centres they were in contact with had written sun protection policies. However, the analysis of the nine written policies provided by the respondents showed that most policies were not comprehensive and many lacked detail as to the specific sun protection practices that would be implemented. While all respondents reported sun protection practices were being implemented, there appeared to be a gap between some of the practices being implemented and the recommendations by expert agencies such as, WHO (World Health Organization, 2010b) and CSNZ (Cancer Society
of New Zealand, 2010c). A more detailed summary of these results is discussed in sections 5.2.2-5.2.4.

2) The research identified two key positive underlying factors influencing sun protection in the centres the respondents were in contact with. Firstly, respondents reported a high level of awareness by staff of the need for sun protection and secondly, a positive relationship and involvement of parents facilitated implementation of sun protection. The main underlying factors which were identified as impeding effective sun protection were: no licensing criteria specific to sun protection; the apparently low profile given to sun protection by licensing and monitoring agencies; staff resistance to role modeling; and lack of information available to staff to guide their practice.

3. The key steps the respondents identified which could support sun protection were: access to information; specific inclusion of sun protection in licensing regulations; provision of educational resources, and possibly an accreditation programme.

5.2 Summary of research findings

5.2.1 Regulation

There is no specific mention of sun protection in the MoE Education (Early Childhood Services) Regulations, 2008 (Ministry of Education, 2008a) and the related licensing criteria (Ministry of Education, 2009). Criteria PF13 covering outdoor activity spaces, does not include shade. While the hazard of sun exposure would come under Criteria HS 12, (which covers hazards management), there is no specific licensing criteria related to the hazard of UVR exposure. While the MoE website has some information about shade and a link to the CSNZ website, the search of the MoE Lead website did not find any detailed information about the hazard of UVR exposure and the recommended sun protection measures. Respondents perceived that neither the MoE (when licensing centres), and the ERO (when reviewing centres), routinely focused on sun protection. Respondents did not mention the health and safety assessments by PHUs which are required prior to a center obtaining a licence. Four of ten respondents thought sun protection should be included in the regulations, recommending this as a key way to support sun protection. Several were unsure but only two respondents thought regulation would be unhelpful. There was an emphasis on the need to raise awareness rather than making the regulations too specific.

5.2.2 Sun protection policies

All respondents reported that the centres they were in contact with had written sun protection
policies. Documentary analysis showed that some policies lacked detail and many practices reported by respondents were not mentioned in the policies. The need for sun protective clothing was commonly not included in policies. In contrast, several respondents reported that some practices that were written in the policy were not consistently implemented.

5.2.3 Implementation of sun protection in teacher-led early childhood centres

**Attitude to sun protection:** All respondents reported staff thought sun protection was important and seven reported that staff considered sun protection relatively easy to implement. **Hat wearing:** Most respondents reported that hat wearing was required. Whether this happened in practice was influenced by the way hat provision was managed. In most centres parents supplied the hat and several respondents reported that because spare hats were not supplied, hat wearing was not able to be consistently enforced if parents forgot the hat. While “sun protective hats” were “encouraged”, almost all centres allowed caps. **Clothing:** There was less emphasis on clothing than hats, with sunscreen being used as an alternative. Most respondents reported that centres had extra clothing available which could be used for sun protection. **Shade:** Several respondents reported that the cost of shade was a problem, particularly in low SES areas. Knowing what type of shade was appropriate was difficult and consequently, some centres had erected inappropriate shade. Respondents from larger organisations, with specific property staff and more experience developing shade, generally reported fewer problems with shade development. Vandalism was also a concern for some. **Scheduling time outside:** Respondents reported little scheduling of time outside to avoid peak UVR exposure, due to the regulatory requirement for “indoor outdoor flow”. The exception was lunch time, which was generally spent inside or in the shade, and several respondents reported that full day centres had an indoor rest time. **Physical activity:** Almost all respondents considered that sun protection did not compromise physical activity. **Sunscreen:** Respondents reported that all the centres used sunscreen, which was sometimes emphasised over sun protective clothing. A key influence was the management of sunscreen application. This varied, from having a definite routine for sunscreen application, to a more ad hoc approach. In most centres parents applied sunscreen to children prior to their arrival at the centre, this could be as early as 7am. **Sun protection based on skin / colour ethnicity:** A key influence on sun protection practices was the emphasis by respondents on all children being “treated the same”. However, several respondents indicated staff would be especially careful to protect fair skinned children, based
on skin colour, not ethnicity.

**Role modeling:** While role modeling was considered important, several respondents reported the degree to which role modeling *actually occurred* was inconsistent. A negative attitude, including thinking hat wearing was unnecessary, and not wanting “hat hair”, was a barrier. Where role modeling was consistent, leadership and clear expectation were key influencers.

**Emphasis on different sun protection measures:** Hats were reported as being the most important with sunscreen sometimes preferred over other measures such as clothing.

### 5.2.4 Information and resources

**Information for parents:** All respondents reported that sun protection information was given to parents. The relationship with parents was identified as having an important influence on sun protection practices.

**Staff access to sun protection information:** Information available to staff was variable, with many respondents reporting the only information the organisation provided for staff was the sun protection policy. Most respondent had not given staff any information about Vitamin D. Key influences were respondents not knowing where to access appropriate information, and the lack of time to access information. The CSNZ was the main source of sun protection information.

**Staff confidence:** Many respondents reported staff were already confident. However, many respondents also thought that more information would support staff confidence, especially when they were interacting with parents to promote sun protection.

**Resources for children:** Many respondents wanted more resources for children. The currently available, Waikato CSNZ “Undercover Cody” resources were mentioned by two respondents. Respondents suggested puppets and posters, and when prompted, most were positive about a development of a song to teach children about sun protection.

**Resources for staff:** Information for staff was identified as a key requirement by most respondents. There was a very positive response to the suggestion of a DVD showing sun protection practices. Variable availability of computer access indicated both web based, and hard copy information would be ideal.

### 5.2.5 Key actions to improve sun protection

Five respondents identified the need for more information, and four of ten suggested sun protection should be included in the MoE regulations. Most respondents were positive about an accreditation programme; several suggested that accreditation would increase the marketing ability of the centres.
5.3 Comparison of research findings to the literature

The results of the current study largely confirm the findings of the research discussed in the literature review. The study found that many sun protection policies did not cover the full range of sun protection practices. This was also found by Ettridge et al. (2008) in the National study of the relationship between sun protection policies and practices in Australian early childhood services, and Kenfield et al. (2005) in the study of sun protection policies and practices in child care centres in Massachusetts. The current study found a high level of awareness of the need for sun protection, but staff lacked access to appropriate information. These results are similar to findings by Grin et al. (1994), of a high level of awareness by staff of the need for sun protection, but inadequate sun protection practices at twenty-five randomly selected day care centres in Connecticut. Grin et al. concluded that education for both parents and staff was necessary.

The results of the current study indicate that sun protective hats were not consistently worn, and some respondents reported sunscreen was emphasised over clothing. Stanton et al. (2003), in the observational study in Queensland early childhood centres, and the Massachusetts study by Kenfield et al. (2005), also found that sun protective hats were not consistently worn. Stanton et al. (2003) reported an emphasis on sunscreen, and following the “Sun protection is Fun” intervention in the U.S., Crane et al. (1999) found an increased use of sunscreen, describing child care centre staff as seeing sunscreen as a “magic bullet” (p.36).

The current study showed staff role modeling of sunhats was inconsistent. Parkinson et al. (2003) in the Australian study of Hunter Valley child care centre sun protection policies and practices found that sun protection was focused on children, with less protective practices being undertaken by staff.

In the current study the results suggest that more consistent role modeling occurred where respondents reported leadership and a clear expectation that staff would role model SunSmart behaviour. This reflects the importance of norms influencing sun protective behaviour. James et al. (2002) looked at the behavioral and psychosocial factors which influence the sun protection behaviour of preschool staff towards children, in a study involving 245 preschool staff in Houston U.S.A. James et al. identified perceived norms as a key psychosocial factor influencing preschool staff behaviour.

In the current study respondents suggested that access to information could increase staff
knowledge and potentially increase staff confidence in their ability to discuss sun protection issues with parents. This shows the importance of the interaction between factors as highlighted in the ecological model (Glanz, et al., 2005). The emphasis on information is significant as this supports Bandura’s (2004) discussion of SCT which identifies knowledge as a “core determinant” of behaviour (p.144). The “Sun Protection is Fun” intervention by Gritz et al. (2007), implemented over a two year period in Houston preschools used observational learning (based on SCT), and found this increased staff knowledge and self efficacy, leading to improved sun protection practices.

While the current study did not explicitly compare centres in high and low SES areas, several respondents reported low SES areas had more difficulty funding shade, and one respondent mentioned difficulty for parents in providing sun protective clothing. Kenfield et al.’s (2005) study in Massachusetts reported low SES centres had less sun protective practices.

5.4 Strengths and weaknesses of the study

The discussion of the strengths and weaknesses of the research will include reference to Guba and Lincoln’s criteria ((1981), cited in Beck, 1993) of credibility, fittingness and auditability.

5.4.1 Strengths

This study has explored an important public health issue focusing on sun protection in teacher-led early childhood centres. This topic was chosen because children in this age group are particularly vulnerable to the effects of excessive UVR. In regard to credibility, Patton (2002) emphasises the “neutrality” of the researcher, and the importance of being open to new ideas.

A strength of this study was that the semi-structured format of the key informant interview allowed for exploration of new information, as well as including underlying factors such as attitudes, which can have an unseen influence on the way staff carry out sun protective behaviour. As discussed by Greenhalgh and Taylor (1997), the aim was not to eliminate the influence of the researcher, but rather to acknowledge the researcher’s influence. To address this, the researcher’s perspective and influence was examined in Section 3.5.1. The researcher’s prior experience in the sun protection area was utilised, particularly in the design of the interview guide.

The credibility of the research was supported by consultation with the Advisory Committee,
which provided a broader perspective to the research process. As discussed by Beck (1993), multiple sources of data were used and “rich excerpts” of quotes from respondents were included to increase the research credibility. The fittingness of the research was enhanced by selection of key informants from a range of large and small organisations throughout New Zealand. The auditability of the research was supported by the audio recording of the interviews which allowed for accurate recall of the information during the analysis stage, plus the inclusion of a detailed description of the research process (Beck, 1993).

This is a small study and therefore care must be taken in generalising from the results. However, as the findings are supported by the literature there is reason to have more confidence in the results. This research concentrated on chains of early childhood centres and kindergarten associations and therefore did not include key informants from independently run teacher-led centres (as discussed in section 3.2.2.3). However, respondent 1 (from the DHB) was reporting on her observation of the centres she was in contact with, which included independent teacher-led centres (as discussed in section 3.2.2.5).

While the full research findings can not be generalised to independent centres, the lack of licensing criteria in the regulations applies equally to independent centers, and the underlying issues such as lack of information, and staff resistance to role modeling may also be applicable. However, the findings on the influence of the role of the licensing and monitoring agencies may be less applicable to independent centres, as these agencies may treat independent centres differently in some respects. Clearly, more information would be needed to confirm the policies and practices in these centres. An important finding of this research was that larger organisations had experienced support staff to manage issues such as shade development. It is possible that independent centres, which may not have access to experienced support staff, could experience more difficulty implementing effective sun protection. More research would be needed to confirm this.

5.4.2 Weaknesses

A weakness of the study was the reliance on interviews with key informants who provided advice and guidance to a number of early childhood centres, without direct observation of sun protection practices. As this study was an unfunded Masters dissertation the project did not have the budget, or the time, to include visits to centres. However, it is also possible that having a researcher observing sun protection practices may have influenced the way staff usually implement sun protection, thus leading to biased results. A further limitation of the
research was that because the focus was on gathering data from respondents who worked with a range of centres, interviews with staff members who actually work in centres providing care to children were not included. This was because if the study had focused on key informants who were staff members of individual centres; this would have severely limited the generalisability of the results. However, the fact that the respondents themselves had extensive past experience working in a range of roles in early childhood centers mitigated somewhat the fact that respondents did not include staff currently providing care in centres. A further area of data collection that was not included was discussions with MoE, MoH, the ERO, and organisations providing professional services to the early childhood sector, as well as providers of education programmes for training early childhood staff.

While the data collection was limited, the other potential data sources were not casually overlooked. Rather, they were not able to be included as they were outside the scope of this research. Not being able to include these areas does not undermine the credibility of this research; instead it indicates the need for these aspects to be explored in further research.

### 5.5 Framework for the discussion of significance and recommendations

Initially both the Ottawa Charter of Health Promotion (World Health Organization, 1986) which focuses on levels of intervention, and the ecological perspective (McLeroy, et al., 1988) which focuses on levels of influence, were considered as frameworks for discussing the research findings. There is considerable fit between these two frameworks as they both encompass a wide perspective on health promotion ranging from the individual level through to community and public policy levels. Both the Ottawa Charter and the ecological perspective incorporate a holistic viewpoint, acknowledging the interaction between the different levels, rather than looking at issues in isolation. The ecological perspective was considered to be the most appropriate framework as the focus on levels of influence fitted particularly well with the research aim of identifying key factors which influence sun protection practices in the early childhood care setting. As discussed in chapter three, the ecological perspective stresses the importance of the interrelationships between people and their environment (Glanz, et al., 2005). The ecological perspective identifies five levels of influence: intrapersonal, interpersonal, institutional/organisational, community and public policy (McLeroy, et al., 1988). The ecological perspective enables a holistic viewpoint, acknowledging the interaction between the different levels, rather than looking at issues in isolation. This perspective provides a useful framework for considering
the significance of the research findings and developing recommendations to address these through focusing on these five levels of influence.

In applying the ecological perspective’s concept of levels of influence, it is important to be aware that the focus is on the target of the intervention not the level of intervention. As McLeroy et al. (1988) states “the distinction between the levels of an intervention and the targets of intervention is an important one” (p.357). This means that when the target of influence is the intrapersonal level, multiple levels of intervention may be used e.g teaching personal skills, providing individual resources etc., but the aim of these interventions will be to change the individual rather than to change the wider environment.

The Public Policy influence in the ecological perspective emphasises the way public policies can support or undermine health. The target of intervention at this level is facilitating public policy which supports health. As McLeroy et al. (1988) discuss, the Community level of influence in the ecological perspective includes influencing the co-ordination between agencies, to enhance collaboration and efficient use of resources. In the early childhood care context the coordinated action of agencies involved with centres can have a key influence in regard to sun protection, through consistently supporting appropriate policies and practices.

The Organisational /institutional level of influence in the ecological perspective includes influencing: “the organisational structures and processes of settings [which] can have substantial influence on the health and health related behaviour of individuals” (McLeroy, et al., 1988, p. 359). Action at this level would focus on influencing the way early childhood organisations/centres manage sun protection. The interpersonal level of influence focuses on the role of social relationships in influencing people’s decisions and behaviour. The Organisational/institutional and interpersonal levels of influence have been combined as the recommended interventions discussed in section 5.6.3 have a broad target of influence across both these two levels, incorporating the organisations and their communities.

The intrapersonal level of influence in the ecological perspective focuses on influencing factors within the individual that determine health behaviour. The focus of intervention at this level is on “changing individuals” (McLeroy, et al., 1988, p. 356). Health service institutions have been included as an additional level of influence because influencing the way health priorities are set and funded has a flow-on effect on the ability of health services to address particular health issues. However, it is important to remember that supportive public policy
may also be necessary in order to focus health resources towards health promotion action.

5.6 Significance of the results and recommendations

5.6.1 Public Policy Level

5.6.1.1 Research on sun protection in early childhood care

A significant underlying influence on sun protection practices in New Zealand early childhood centres is the lack of research, both nationally and internationally, on sun protection in this setting. In order to ensure effective sun protection it is necessary to have an accurate picture of the current situation. The lack of research in this area reflects a wider pattern across the New Zealand social services and policy areas generally, where the focus is on adults, with children, and especially preschool children, receiving the least amount of attention. A report on child health in New Zealand, recently released by the Public Health Advisory Committee, specifically focuses on children from birth to six years (Public Health Advisory Committee, 2010). The report identifies that New Zealand children have poor health status compared with similar OECD countries. The report states that the causes of the poor health status of New Zealand children include, “comparatively low Government investment in early childhood, uncoordinated services, and a lack of information for policy decisions and service delivery” (Public Health Advisory Committee, 2010, p. 5). The report found that Government spending on early childhood was “less than half the average for OECD countries” but spending on older children, youth, and older adults “compares well internationally” (Public Health Advisory Committee, 2010, p. 6). A similar pattern is seen in the way early childhood centres historically have had low levels of qualified staff. The current regulations require 50% of the staff in teacher-led centres to be qualified (Ministry of Education, 2008b). It is unlikely that prior to 2007, it would have been tolerated for universities (that cater for adults), and schools (that cater for older children), to have less than 50% of teaching staff qualified. However, this is clearly the situation in early childhood care, reflecting the reduced focus on the quality of services for preschool children.

This research focuses on sun protection in large and small organisations providing care at teacher-led early childhood centres, and is based on the viewpoint of those providing advice and support to these centres. To complement this, research is needed on independent “stand alone” teacher-led centres, home-based services, and parent-led services. A quantitative survey of sun protection policy and practices in early childhood care would also be very helpful in establishing baseline information on the current situation. As discussed in Section
5.4.2, there are several key areas that were beyond the scope of this research, including how the MoE and MoH view sun protection in this setting. The lack of research internationally on effective interventions also means there is no clear evidence about strategies to successfully ensure children receive effective sun protection in this setting. Intervention at the public policy level could enable research in these areas to establish the present situation in more detail, and develop and evaluate strategies to support sun protection policies and practices.

**Recommendation 1:** That further research is carried out:

a) To establish the way in which MoE, the ERO and MoH view sun protection in early childhood centres, particularly what criteria are used by MoE, PHU and the ERO staff when assessing sun protection policies and practices.

b) To examine other areas of the early childhood sector (i.e. playcentres and home-based care), to establish how sun protection is implemented, and ways to promote sun protection in these settings.

c) To ascertain the extent to which sun protection is included in the curriculum for early childhood training courses.

d) To quantitatively research the extent of children’s exposure to excessive UVR in the early childhood setting, and the extent of early childhood policies and practices to prevent this.

5.6.1.2 Early childhood regulation and monitoring

A key finding is that the *Education (Early Childhood Services) Regulations, 2008* (Ministry of Education, 2008a), and their accompanying licensing criteria (Ministry of Education, 2009), do not specifically include sun protection, and the MoE website provides very little sun protection information. The experience of MoE and the ERO visits was that sun protection was seldom mentioned. This is significant because if early childhood staff find that regulating and monitoring agencies do not emphasise sun protection, this may contribute to decreasing the likelihood of staff examining and reflecting on their practice. The significance of the lack of regulation is also reflected in the fact that four of ten of respondents thought inclusion in the regulations was a key initiative that would improve sun protection. This could be addressed by intervention at the public policy level, requiring regulating and monitoring agencies to include a focus on sun protection.

It is very pleasing that the MoH have a specific reference to sun protection in the operational guidelines to PHU staff who carry out the initial health and safety assessments of new early childhood centres, prior to licensing (Ministry of Health, 2010b). However, it is noteworthy
that none of the respondents mentioned the health and safety assessment during the interviews, which may indicate respondents did not view this assessment as having an important influence in regard to sun protection. (This may also reflect the fact that the initial health and safety assessment of well established centres will most probably have been conducted a long time ago).

The current programme of re-licensing centres under the new 2008 regulations (Ministry of Education, 2010a), could have provided an opportunity for PHU staff to assess established centres’ sun protection policies to ensure they meet the current sun protection guidelines. However, while the MoE can request a health and safety report where there is cause for concern, the re-licensing process does not routinely require a health and safety assessment (Ministry of Health, 2010b).

It is positive that when a new early childhood centre is being set up, sun protection policy and practices are considered during their health and safety assessment. However, this research which reviewed the nine sun protection policies of established centres found that many lacked detail and did not cover the full range of sun protection measures. Therefore, it is concerning that there does not appear to be a clear process whereby already established centres also will have their policies and practices reviewed. The lack of specific licensing criteria relating to shade or sun protection in the regulations tends to give the impression that sun protection does not require specific attention. Inclusion of sun protection in the licensing criteria would acknowledge the importance of the hazard of excess UVR, strengthen the focus on sun protection, and ensure that the ERO would need to consider sun protection during review visits. This would ensure sun protection remains on the agenda of those responsible for regulating, monitoring and providing early childhood centre care.

**Recommendation 2:** That (i) the *Education (Early Childhood Services) Regulations, 2008* licensing criteria include sun protection, and (ii) regular assessment of sun protection policy and practices is undertaken by MoE/PHU during licensing/re-licensing and by the ERO during review visits.

5.6.2 Community level

5.6.2.1 Availability of sun protection information for staff in the early childhood setting

A positive underlying influence identified in the research was the high level of awareness of the need for sun protection amongst the early childhood staff the respondents were in contact
with. Respondents considered that staff were actively engaged in sun protection, and they clearly saw this as an important aspect of their role. This is significant because this positive commitment could be utilised to improve sun protection practices.

A key underlying factor was that staff lacked the background knowledge to support their practice. As knowledge is a key component of self-efficacy, appropriate sun protection knowledge to support practice can have a significant influence on the sun protection practices of staff. The research has identified the difficulty some of the respondents had finding appropriate sun protection information for their staff. The significance is that while staff may be well motivated, if they lack correct information, the management of sun protection is likely to be less than ideal. Respondents identified that increasing knowledge would help to increase staff confidence to work with parents in regard to sun protection, (which reflects the interaction between these factors). The need for sun protection information to be easily available is particularly significant, as the respondents emphasised they lacked time to find information.

The lack of awareness of the issue of Vitamin D, which is an important emerging issue in regard to sun protection, is a further reflection of the general lack of information available to the sector. The research indicates that respondents did not think concern about Vitamin D had led to staff *reducing* children’s level of sun protection. Staff need information about Vitamin D and the variation in UVR levels so children are not protected from the sun at times when sun exposure is safe, such as early morning or during the winter months. Also the CSNZ has recommended sunscreen is not required for those with very dark skin, it is important this message is communicated to the sector in a manner that is easy to implement, and which does not conflict with the respondents’ clear emphasis on treating all children the same. Information needs to be available so staff understand that children’s sun protection needs may vary depending on skin type, and that the approach of universally treating all children the same may need to be modified in some circumstances. The report of access to sun protection information indicated access was haphazard, with some centres having access to PHU staff and/or CSNZ information, while others appeared to only have access to information publicly available through the media.

Providing appropriate information on sun protection for the early childhood sector is a community level influence, because it is targeting the whole early childhood community, seeking to influence the level of knowledge across the whole sector. A further issue is the
need for co-ordination between agencies so information content, and accessibility, is consistent; and resources are not duplicated. Providing easy access to good information is a fundamental way to support early childhood staff to manage children’s sun protection needs.

Recommendation 3: That the MoE, MoH and CSNZ work together to provide early childhood staff with easily accessible, concise information on sun protection to support their practice. It is very important that these agencies co-ordinate to ensure the information gives a consistent message as conflicting messages may lead to confusion. The need for consistency was specifically mentioned by several respondents. In order to cater for the variety of centres, this ideally needs to be web based and hard copy. A DVD showing best practice could be considered, as this may be a catalyst for centres to reflect on their own practice. Consultation with the early childhood sector during development of information is essential to ensure a communication style that is most appropriate and user-friendly to early childhood staff. This recommendation should be the first priority, as an informed workforce is fundamental to the provision of effective sun protection.

5.6.2.2 Opportunities for early childhood centre staff to increase sun protection knowledge

The need for increased availability of sun protection information has been discussed in section 5.6.2.1. A different, but related, influence is whether opportunities to access information are actually available to staff. Several respondents mentioned concern that resources can be left on shelves and available information may not be utilised. Therefore, while recommendation three addresses provision of information, recommendation four addresses distribution of information to early childhood staff.

Recommendation 4: That there should be consultation between those providing resources and early childhood organisations, about the best ways to distribute information and resources to ensure they are accessible to early childhood staff.

5.6.2.3 Sun protection accreditation programme

The ecological perspective emphasises the interaction between factors. This is clearly illustrated in the way early childhood centres (like most community organisations) do not operate in isolation, as they are influenced by wider community attitudes and practices. Early childhood centre sun protection practices will to some extent, reflect the degree to which effective sun protection is considered an important priority by the wider community. A significant research finding was that when prompted, most respondents supported the idea of
a sun protection accreditation programme. Several respondents suggested that accreditation could provide a positive marketing attribute for centres. This is significant because a successful accreditation programme could potentially promote a high standard of sun protection, provide an external endorsement for those achieving accreditation, and provide support from the wider community reinforcing the importance of sun protection in this setting. An accreditation programme could be similar to the Australian SECP, and would involve promoting best practice sun protection to centres, and educating parents about sun protection. The effectiveness of the Australian SECP has not yet been definitively established (as discussed in chapter 2.5.3.1). However, the literature review showed evidence of the success of a similar Australian programme in schools (S. Jones, Beckmann, & Rayner, 2006), which suggests there is potential for an accreditation programme to have positive results.

McLeroy et al. (1988) emphasises the “active involvement of the target population in problem definition, the selection of targets of change and appropriate intervention, implementation and evaluation” (p.369). This underscores the importance of involving the early childhood sector in development of any future accreditation programme. Intervention to create a supportive environment amongst the wider community will likely foster effective sun protection in early childhood centres.

**Recommendation 5:** That the MoE, MoH, and CSNZ work together to investigate developing a sun safety accreditation programme for early childhood centres. The early childhood sector should be consulted in the development of any accreditation programme, to ensure it is developed in a way that encourages and supports the participation of the sector.

### 5.6.3 Institutional/Organisational and Interpersonal level

#### 5.6.3.1 Sun protection policies

In regard to sun protection policies, while only a small number of policies were analysed for this research, the findings are noteworthy because the policies analysed included those from large organisations which cater for many children. The analysis showed many policies lacked detail, and they did not cover the full range of recommended sun protection measures. This has a significant influence on sun protection because ideally policy should guide the way practices are implemented, and incomplete policies are unable to provide a sound basis for practice. The lack of comprehensive policies further supports the finding that early childhood centres do not have easy access to information. Supporting early childhood organisations to review their sun protection policies is an essential way to support effective sun protection.
Recommendation 6: That early childhood centre organisations, in consultation with their communities develop and implement comprehensive sun protection policies, at least to the standard of the CSNZ model policy.

Recommendation 7: That early childhood centre staff, in consultation with their communities, consider including compulsory wearing of sun protective hats in their sun protection policies. This would provide a supportive environment where sun protective hat wearing would be the expected behaviour, and therefore not up to the individual child, parent, or staff member to make independent decisions about children’s hat wearing.

5.6.3.2 Role modeling

Another key influence is the way in which centres’ organisational characteristics and expectations of staff behaviour influence the way the centre provides sun protection. The research findings identified a conflict in some areas between the commitment to children’s sun protection, and the lack of commitment to staff role modeling sun protective behaviour through hat wearing. If staff do not model SunSmart behaviour they are in effect expecting children to, “do as I say, not as I do”. This does not support children’s understanding of the need for sun protection. As role modeling is an important means of teaching and reinforcing behaviour, lack of consistent role modeling may result in children getting conflicting messages, potentially undermining their understanding of the need for sun protection. It is significant that in centres where role modeling occurs, clear leadership and expectation in regard to staff role modeling is a key factor. This suggests norms regarding early childhood staff sun protective practices are a key influence. Concerns such as staff resistance to hat wearing due to “hat hair” need to be addressed, as they decrease the effectiveness of sun protection practices. This issue could be addressed by professional development with staff.

Recommendation 8: That early childhood centre organisations, in consultation with their communities; provide leadership and a clear expectation that staff will consistently role model SunSmart behaviour.

5.6.4 Intrapersonal level

5.6.4.1 Sun protective clothing

As parents frequently provide hats and usually provide children’s clothing, their choices are crucial to effective sun protection practices. The research identified the importance of positive
relationships with parents, indicating that early childhood centres need to maintain close relationships with parents in order to work effectively. From a marketing perspective, centres also need to be attractive to parents in order to keep their roll full. Therefore, any sun protection measures need to have parental support. A key unknown is the extent to which parents understand the recommendations about sun protective hats and clothing, provided by agencies such as the CSNZ. It is important that parents are able to base their decisions on adequate knowledge of what will protect their children, otherwise their decisions may be largely influenced by factors such as current fashion trends for children which may promote clothing styles that are not sun protective. Influencing parents’ choice of clothing for their children through providing information, enabling parents to make informed decisions is a logical way to support effective sun protection.

Recommendation 9: That the MoE, MoH, CSNZ, and early childhood centres co-ordinate to focus on educating parents about the need for sun protective hats, and clothing. Most centres require children to wear some type of hat; however, it would provide a greater protection if the hats were required to be sun protective. If parent commitment to sun protective clothing and hats is increased then some of the difficulties centres experience will be overcome.

5.6.4.2 Children’s resources

Awareness of the need for sun protection is an important influence at the personal level. In order for children to develop an understanding of, and positive attitudes towards, sun protection, staff need appropriate teaching resources. Intervention by staff with children will be facilitated by appropriate sun protection educational materials. The lack of awareness of “Undercover Cody” resources suggests that respondents are not accessing some resources that are currently available. The research showed the respondents were interested in new sun protection educational resources. The considerable support from the respondents for a song to teach children about sun protection suggests early childhood staff may find this a useful resource. The suggestion of a puppet with a sun protection theme is a novel idea which may enable staff to communicate the sun protection message to children in an enjoyable rather than a more formal context. Any new resources would need to be pre-tested.

Recommendation 10: That the CSNZ publicise the availability of “Undercover Cody” resources nationwide, and that MoH, MoE and CSNZ consider developing additional resources to teach children about sun protection.
5.6.5 Health Sector Institutions

This research indicates while PHUs are involved in health and safety assessments of new centres prior to licensing, the degree to which the respondents saw PHUs being a source of information is varied. It is important that PHUs nationwide are consistently working with early childhood centers to promote sun protection. Recommendation 1 (section 5.6.1.1), includes research to examine how PHUs are working with early childhood centres on sun protection. As respondents specifically noted that a lack of time is a factor which limits their ability to access information, ideally PHU staff would visit centres to raise awareness and provide guidance. Intervention to influence health sector institutions such as PHUs to re-orientate their services towards a greater emphasis on sun protection in early childhood centres would be an appropriate way to support sun protection in this setting. Low SES areas are likely to need more effort by PHUs in order that inequalities are not increased as the literature review suggested some low SES areas have more difficulty implementing sun protection.

Recommendation 11: That MoH contract with PHUs nationwide to increase their focus on sun protection in the early childhood care setting, with a particular focus on low SES areas.

5.7 Conclusion

This research has used key informant interviews; coupled with documentary and website analysis; to briefly examine sun protection policies and practices, and identify important underlying factors influencing sun protection in New Zealand teacher-led early childhood centres. The research has also identified key steps which could support effective sun protection in this setting.

The literature review showed that skin cancer is a significant public health problem as New Zealand has one of the highest levels of melanoma incidence in the world (International Agency for Research on Cancer, 2002), and an estimated 67,000 new cases of NMSC annually (O'Dea, 2009). Excessive UVR exposure is estimated to cause up to 90% of skin cancer in high UVR environments such as New Zealand (Armstrong, 2004). Children in early childhood care potentially could be exposed to high levels of UVR, unless definitive steps are taken to protect them.

The literature review revealed a lack of studies internationally regarding sun exposure in early childhood settings, and a lack of evidence of effective strategies to promote sun protection in
this setting. The lack of evidence on the current sun protection policies and practices implemented in New Zealand early childhood services, identified the need for this study which focused on sun protection in teacher-led early childhood centres.

This research indicated that the early childhood staff the respondents were in contact with, were very aware of the need for sun protection, and very committed to the children in their care. However, while the staff appeared well motivated, there were important ways in which both the policies and practices fell short of best practice recommendations of organisations with expertise in skin cancer prevention (Cancer Society of New Zealand, 2010c; World Health Organization, 2010a). The research results were consistent with the findings of other research studies in this regard (Grin, et al., 1994; Kenfield, et al., 2005; Stanton, et al., 2003).

Early childhood services are regulated by the MoE and monitored by the ERO. A key research finding was that the Education (Early Childhood Services) Regulations, 2008, have no specific reference to sun protection. The licensing criteria which specify the requirements services must meet in order to gain a licence, do not contain any specific criteria in regard to sun protection or shade. This is concerning as it may contribute to sun protection not being seen as a high priority, and therefore, not receiving the level of attention and scrutiny it requires. This is supported by the research finding that respondents did not consider sun protection to be a regular focus of the licensing and monitoring process for early childhood centres. The findings indicate that the current situation is not supporting a high level of sun protection in early childhood care. The lack of focus on sun protection may be influenced by the long latency period from excessive UVR exposure, to the development of skin cancer, which may diminish awareness of the seriousness of the problem. It is very positive that the MoH are taking action in this area and have included sun protection in the health and safety report when new services apply for a licence. However, the majority of services are already established and the re-licensing under the 2008 regulations does not require a new health and safety report (Ministry of Health, 2010b).

The sun protection policy analysis in this research indicated that most policies did not cover the full range of sun protection measures; most included hats and sunscreen, but clothing and scheduling of time outside were less frequently included; the policies lacked detail as to how practices would be implemented, and some did not cover all the practices that were reported being implemented. This indicates that policy was not fulfilling the role of guiding practice. While a limited number of policies were reviewed, this suggests that the current regulatory
and monitoring system does not ensure services have comprehensive policies based on best practice.

Key best practice sun protection measures were not uniformly implemented. Sun protective hats were not consistently worn, sun protective clothing did not appear to be greatly emphasised, with sunscreen sometimes preferred over sun protective clothing, and inconsistent staff role modeling of SunSmart behaviour, especially hat wearing. These findings indicate that changes may be needed to ensure recommended sun protection practices are consistently implemented.

This research has identified a lack of access to information to support the implementation of sun protection. In order to be confident in providing sun protection early childhood staff need easy access to accurate, consistent, concise information that is formulated in a manner that is appropriate for them, and supports clear decision making. Access to information would also enhance the crucial role of staff in educating parents about sun protection.

This research also showed that respondents lacked accurate information about Vitamin D. There is an increasing focus worldwide on the role of Vitamin D and health, and the available information about Vitamin D and sun exposure is becoming increasingly complex (International Agency for Research on Cancer, 2008). There is a risk that if early childhood staff are not well informed about recommendations regarding sun exposure and Vitamin D, they may become confused, and consequently less confident when implementing sun protection practices. This could lead to staff attitudes and beliefs about sun exposure and Vitamin D being influenced by media reports, and advice which is not evidence based. The emphasis on all children being treated the same may need to be addressed, as sun protection advice in the future may increasingly vary depending on the characteristics of the individual, rather than being a standardised message for all. This further highlights the importance of the early childhood workforce having access to accurate, evidence based, information which will give them confidence to make appropriate decisions about sun protection.

While this is a small study, primarily focused on the views of those providing professional advice and support to early childhood services, the combined experience of the ten respondents is substantial. This study was very positive as it indicated there was a strong commitment to sun protection by the early childhood staff. However, key changes in policies and practices could significantly improve sun protection in this setting. These changes do not
involve a radical shift from current practices; rather they involve a refinement of current practice in ways that will maximize sun protection for children. Given the lack of information about sun protection in the New Zealand early childhood care setting, there is clearly an urgent need for more research.

The recommendations to improve sun protection, based on the ecological perspective, encompass action by the key stakeholders: MoE, MoH, and CSNZ, and are consistent with the Ottawa Charter (1986) strategies for health promotion. The recommendations include: addition of sun protection in early childhood licensing criteria; provision of accessible, concise and consistent information for centre staff; consideration of the development of a Sun Safety Accreditation programme; policy development by early childhood centres to ensure policies incorporate key sun protection recommendations; and education of parents about the importance of sun protective hats and clothing. While a range of recommendations are given, the first priority should be to provide information about sun protection for early childhood staff as an informed workforce is an essential requirement. A fundamental requirement of a health promotion programme would be consultation with the early childhood sector to engage with them and seek their commitment to any developments in regard to promoting sun protection.

The literature review indicates that investment in sun protection programmes can be cost effective both in reducing skin cancer, and savings on future health care costs. This suggests there are savings to be made in the long term through a small investment now, which could support early childhood centres to implement best practice sun protection. If skin cancer prevention is to be seriously addressed, then sun protection policies and practices must be based on sound information. This will enable staff and parents to be confident children are well protected, and their risk of skin cancer later in life is not increased. The research suggests early childhood services are already motivated and committed to the idea of sun protection, and are already putting time and effort into this. Therefore, it makes good sense to ensure the practices they are implementing are ones most likely to make a difference.

Given that children in general, and infants and preschoolers in particular, are a vulnerable group, who are largely unable to take responsibility for their own sun protection needs, it is critical that effective sun protection policies and practices are consistently implemented in early childhood care settings. As discussed in the introduction, New Zealand has a responsibility under the 1990 Convention on the Rights of the Child, to protect children from
excessive sun exposure and the consequent risk of skin cancer (United Nations General Assembly, 1990). The current lack of research evidence of how sun protection is implemented in New Zealand early childhood services, coupled with the findings of this research that more support is needed to ensure sun protection in early childhood centres reflects best practice, suggests that the responsibility to protect children from excessive sun exposure has not been considered a priority by Government.

This research suggests urgent action is needed by the MoE, and MoH, to address this issue. Given that the CSNZ has considerable experience and expertise in skin cancer prevention, and they have a lead role in promoting sun protection in primary schools, consultation with and involvement of the CSNZ is essential. However, action must not be left up to the CSNZ, a non government not-for-profit organisation, to instigate and fund sun protection promotion in early childhood care. The evidence suggests supporting effective sun protection would be cost effective for the Government in regard to the future cost savings from reduced skin cancer incidence. Government involvement is necessary both in terms of fulfilling Government responsibility to protect children from excessive UVR, and in terms of the responsibility to reduce unnecessary future health expenditure on a preventable disease. There is an opportunity to ensure sun protection practices in early childhood services are evidence based, and consistently implemented which could significantly contribute to the future health of New Zealand children. To continue with the status quo, when this research suggests early childhood services need support to consistently implement key sun protection practices, would ignore a cost effective opportunity to promote a healthy future for our children.
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Appendix 1

Improving Sun Protection in the Early Childhood Care setting in New Zealand

INFORMATION SHEET FOR PARTICIPANTS

Thank you for showing an interest in this project. Please read this information sheet carefully before deciding whether or not to participate. If you decide to participate we thank you. If you decide not to take part there will be no disadvantage to you of any kind and we thank you for considering our request.

Please note that this project has been reviewed and approved by the Department of Public Health, University of Otago (Wellington).

Background

This study is being undertaken as part of the requirement for a Masters of Public Health Degree through the University of Otago, by Mary Duignan has previous experience working for the Cancer Society, in the area of sun protection promotion.

What are the Aims of the Project?

We will be investigating (i) the key factors influencing sun protection in Teacher-Lead Early Childhood Care settings and (ii) what can be done to promote effective sun protection in these settings.

Who will the Participants be?

The study participants will be those who provide Professional Development and Education to staff in Teacher-Lead Early Childhood Centres.
What will Participants be asked to do?

Should you agree to participate in this project, you will be asked to take part in an anonymous telephone interview. You will be sent a copy of the questions before the interview. If you find that you are not able to answer all the questions that is fine. Even if you feel you do not know a lot about sun protection, the information you give will still be helpful, as part of the research is to find out what knowledge there is in the Early Childhood sector. If possible, it would be helpful if we could also have a copy of relevant documents such as examples of sun protection policies, if these are available.

What does the anonymous interview involve?

- The interview is intended to gather ideas about sun protection in this setting. The interview will be done over the phone at a time that suits you. The interview may take up to 1 hour. The interview may be audio-taped if you agree to this. If you do not wish the interview to be taped only notes will be taken.

- This project involves open questions. The exact questions depend on the way the interview develops. Consequently, although the University of Otago is aware of the general areas to be explored in the interview, it has not been able to review the precise questions to be used.

- You have the right to decline to answer any particular question(s) and you may withdraw from the project at any stage without any disadvantage to yourself of any kind.

How we would use the information

- The interview data may be transcribed. The interview data (and any documents you supply) will be made anonymous, to ensure that you and your organisation are not are not identified. General Terms such as “Professional Development Advisor” will be used as opposed to exact titles. No comments will be attributable to individuals or organisations in any reports from the research.

- The results may be published in papers, media releases or presentations and will be available in the University of Otago Library, Dunedin, New Zealand, but any data will in no way be linked to any specific participant or organisation unless we have the specific permission to do so.

- The data collected will be securely stored in such a way that only the project staff will be
able to gain access to it. At the end of the project any personal information will be destroyed immediately except that, as required by the University's research policy, any raw data on which the results of the project depend will be retained in secure storage for five years, after which it will be destroyed.

- No personal information will be provided to others beyond the project staff.

- Should you wish we would be very happy to send you the results of the project.

- Reasonable precautions will be taken to protect and destroy data gathered by email. However, the security of electronically transmitted information cannot be guaranteed. Caution is advised in the electronic transmission of sensitive material.

**What if I have any Questions?**

If you have any questions about the project, now or in the future, please feel free to contact either:

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Sun Protection in the Early Childhood Care Setting in New Zealand

CONSENT FORM FOR PARTICIPANTS

I have read the Information Sheet concerning this project and understand what it is about. All my questions have been answered to my satisfaction. I understand that I am free to request further information at any stage.

I know that:-

1. My participation in the project is entirely voluntary;

2. I am free to withdraw from the project at any time without any disadvantage;

3. Any personal information will be destroyed at the conclusion of the project but any raw data on which the results of the project depend will be retained in secure storage for five years, after which it will be destroyed;

4. This project involves open questions. The exact questions depend on the way in which the interview develops. In the event that the line of questioning develops in such a way that I feel hesitant or uncomfortable I may decline to answer any particular question(s) and/or may withdraw from the project without any disadvantage of any kind;

5. The results may be published in papers, media releases, presentations and will be available in the University of Otago Library, Dunedin, New Zealand, but my anonymity and that of my organisation will be preserved;

6. This project has been reviewed and approved by the Department of Public Health, University of Otago (Wellington).

7. If I wish, a summary of the results of this research will be provided to me.

I agree to take part in this project.

I consent to the interview being tape recorded YES / NO (PLEASE CIRCLE ONE).

................................................................. ..............................................
(Signature of participant) (Date)
I would like a copy of the results. **YES / NO (PLEASE CIRCLE ONE).**

<table>
<thead>
<tr>
<th>Name:</th>
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<tr>
<td>Address:</td>
<td>Email contact</td>
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Appendix 2
Respondents INTERVIEW GUIDE
Key Informant Interviews for
Improving Sun protection in the New Zealand Early Childhood Care setting.

In this discussion sun protection measures include: wearing of sun protective hats and clothing, use of shade, use of sunscreen and scheduling outside activity to reduce sun exposure.

Organisation’s role
1. What is your role regarding your centres. How much contact do you have with your centres? What is the usual form of contact: email, newsletters, visits etc? How many centres do you have contact with?

2. What is your understanding of current regulations in regard to sun protection in Early Childhood Care? Are the regulations satisfactory? Would a more regulated environment be helpful, or be a hindrance.(e.g increased requirements re shade). If recommend increased regulation, what would be useful?

3. How do you think the management and staff in your centres usually view sun protection?

Sun protection measures
4. Clothing
In the summer months, do your centres require children to wear sunhats and/or clothing that protect them from the sun, such as longer sleeves? If yes, how is this encouraged? What helps or hinders this?

5. Shade
How is the provision of shade managed in your centres? Is there a minimum amount of shade which all your centres provide (e.g. % of the outdoor area), or does this vary from centre to centre? How do staff ensure shade is used? What helps/ hinders the provision and use of shade in your centres?
6. **Outdoor activity**  
Do your centres scheduled children’s time outdoors to reduce sun exposure? If yes, what do they do? What helps/hinders this?

7. **Sunscreen**  
How do your services manage the use of sunscreen? What difficulties (if any) does using sunscreen present?

8. Do staff attitudes and practices around sun protection vary depending on the ethnicity/skin colour of the child? If yes, how do the child’s ethnicity / skin colour affect the way staff implement sun protection?

9. **Role modeling**  
How much emphasis is there in your centres on staff “role modeling” SunSmart behaviour?

10. What emphasis is there on each of the following sun protection measures; sunscreen, shade, clothing, limiting time outside?

**Staff knowledge and confidence**

**Staff Education/ Parent information**

11. Where do your centre staff usually get information about sun protection? What advice or information is given to your centres about sun protection (written policies, workshop etc)? What determines the information/ advice you give? (Is it given to all centres?)

   What information are parents given about sun protection? Is this the same in each centre?

12. **Staff Confidence**  
Research shows that even when Early Childhood staff have a positive attitude towards sun protection if they do not have a not high level of confidence in their ability to effectively carry out sun protection they are unlikely to implement sun protection measures.

   Do you have any suggestions about how to improve staff confidence so they consider sun protection to be something they can do effectively?
13. **Vitamin D**
Are you aware of recent information about Vitamin D and health? Have you given your centre staff information about Vitamin D? Do you know of instances where concern about Vitamin D is having an impact on sun protection in your centres? If yes, what sort of impact?

14. **Teaching children about sun protection**
How much emphasis is there in your centres on teaching children about sun protective behaviour? How is this teaching done? What resources are used?

**Sun protection Resources**

**Children’s resources**

15. Is there a need for more resources for teaching sun protection to children in your centres? If yes, what type of resources?

16. **Staff resources**
Do you think there is a need for more resources to increase Early Childhood teacher’s knowledge about appropriate sun protection? If yes, what type of resources would be helpful?

**Improving sun protection**

17. What suggestions do you have for key actions that would improve sun protection in Early Childhood care?

18. Do you have any other comments or other documents/ information that may be useful for this research? Are there any other people who you recommend I talk to about sun protection?
Appendix 3

Researcher’s INTERVIEW GUIDE

Key Informant Interviews for

Improving Sun protection in the New Zealand Early Childhood Care setting.

This researcher’s version of the interview guide includes prompts to explore with the respondents. These prompts provide the researcher with the theoretical concepts and extra areas relevant to each question to explore in depth with the respondents.

In this discussion sun protection measures include: wearing of sun protective hats and clothing, use of shade, use of sunscreen and scheduling outside activity to reduce sun exposure.

Organisation’s role

1. What is your role regarding your organisation’s Early Childhood centres? How much contact do you have with your centres? What is the usual form of contact: email, newsletters, visits etc? How many centres do you have contact with?

   [Organisational level of influence- Ecological perspective]

   Explore

   * Do you regularly/ occasionally initiate contact with centres?
   * To what extent are your centres independent, versus having set policies that all centres follow?
   * Do services regularly seek advice or only for crisis?
   * Is role directive or advisory?

2. What is your understanding of current regulations in regard to sun protection in Early Childhood Care? Are the regulations satisfactory? Would a more regulated environment be helpful, or be a hindrance.(e.g increased requirements re shade)? If recommend increased regulation, what would be useful?

   [Public Policy level of influence- Ecological perspective]

   Explore

   * Knowledge of regulations- interpretation through lens of sun protection?
   * What the requirements are re shade?
   * How regulations re sun protection are enforced -perception of E RO role?
   * How does Ministry of Education provide advice? Is this useful?
   * What is the consequence for centre for inadequate sun protection?
3. How do you think the management and staff in your centres usually view sun protection? 
[Expectancy component of Social Cognitive Theory]

Explore

* Is it seen as part of their role, or not their responsibility? Why/why not?
* Is it seen as a priority why/why not?
* Is sun protection seen as easy/difficult to implement?
* Are there different views between management and staff, if yes, why?
* What influence do you have regarding sun protection in individual centres?

Sun protection measures

4. Clothing
In the summer months, do your centres require children to wear sunhats and/or clothing that protects them from the sun, (e.g. long sleeves)? If yes, how is this encouraged? What helps or hinders this?

Explore

* Supportive/resistant parents
* Compliant resistant children
* Availability of clothing
* Practicalities of carrying out sun protection
* Interactions between factors [Reciprocal Determinism Component of Ecological perspective]
* Other

5. Shade
How is the provision of shade managed in your centres? Is there a minimum amount of shade which all your centres need to provide (e.g. % of the outdoor area), or does this vary from centre to centre? How do staff ensure shade is used? What helps/hinders the provision and use of shade in your centres?

[Impediments component of Social Cognitive Theory]

Explore

* Tension - physical activity and sun protection
* Development – (cost time and effort) / what is appropriate
* Portable shade
* Getting children to use (practicalities of using shade)
* Do you take shade on trips
* Removing in winter
* Difficulties utilising shade (e.g. if have portable shade on very windy day’s this can not be used) [Reciprocal Determinism Component of Ecological perspective]
* Interactions between factors [Reciprocal Determinism Component of Ecological perspective]

6. Outdoor activity
Do your centres scheduled children’s time outdoors to reduce sun exposure? If yes, what do they do? What helps/hinders this?

Explore
* Limit overall time outside
* Limit to early morning / late afternoon
* Restrict to shaded areas
* Difference for infants/ older children
* Autonomy re scheduling etc.
* Tension between physical activity and sun protection
* Interactions between factors [Reciprocal Determinism Component of Ecological perspective]

7. Sunscreen
How do your services manage the use of sunscreen? What difficulties (if any) does using sunscreen present? What helps/ hinders use of sunscreen?

[Impediments component of Social Cognitive theory]

Explore
* Do parents enquire re sunscreen provision?
* Who provides sunscreen- parents or centre?
* Supportive/resistant parents
* Compliant /resistant children
* Scheduling application and re- application- a problem?
* Awareness that applying sunscreen early in day when not required could be preventing Vitamin D synthesis
* Cost
* Allergies

8. Do staff attitudes and practices around sun protection vary depending on the ethnicity/ skin colour of the child? If yes, how do the child’s ethnicity/ skin colour affect the way staff implement sun protection?

Explore
* Sun protection more important for some ethnic groups/ skin colours
* Left up to individual staff member or consistent policy for whole centre?
* Related to ethnicity or skin colour or both?
* Sun protection different emphasis in centres with many dark skinned children?

9. Role modeling
How much emphasis is there in your centres on staff “role modeling” SunSmart behaviour?

[Social expectancies and observational learning components of Social Cognitive theory]
**Theory**

Explore

* Hats
* Clothing
* Attitude to tanning/sun
* Parental education

10. What emphasis is there on each of the following sun protection measures; sunscreen, shade, clothing, limiting time outside?

[Reciprocal determinism Ecological perspective]

Explore

* Preference for sunscreen over clothing
* Acceptance of need for Sun protective hats/clothing
* Knowledge re sun protective hats/clothing
* ?Centres/parents provide hats/clothing
* Consequences re not wearing hat or sun protective clothing-Play in shade or indoors

**Staff knowledge and confidence**

**Staff Education/Parents information**

11. Where do your centre staff usually get information about sun protection? What advice or information is given to your centres about sun protection (written policies, workshops, resources, etc)? What determines the information/advice you give? (Is it given to all centres?)

What information are parents given about sun protection? Is this the same in each centre?

[Knowledge component of Social Cognitive Theory] [Organisational level of influence- Ecological perspective]

Explore

* Knowledge about link between melanoma and sun exposure/mole development
* Why they do or don’t provide information
* Is it left up to each service to decide
* Recommendation to have written policy
* Sample policy available

12. **Staff Confidence**

Research shows that even when Early Childhood staff have a positive attitude towards sun protection if they do not have a not high level of confidence in their ability to effectively carry out sun protection they are unlikely to implement it.

Do you have any suggestions about how to improve staff confidence so they consider sun protection to be something they can do effectively?

[Self efficacy component of Social Cognitive Theory]
Explore

* Use/provision of shade
* Increased control of scheduling
* Knowledge of effective practices/UV levels
* Practical Skill at carrying out practices

13. **Vitamin D**
Are you aware of recent information about Vitamin D and health? Have you given your centre staff information about Vitamin D? Do you know of instances where concern about Vitamin D is having an impact on sun protection in your centres? If yes, what sort of impact?

*Reciprocal determinism component of Ecological perspective*

Explore

* Confusion re what the information about Vitamin D means
* Concern sun protection is reducing Vitamin D
* Sunscreen put on early in day?

14. **Teaching children about sun protection**
How much emphasis is there in your centres on teaching children about sun protective behaviour? How is this teaching done? What resources are used?

*Knowledge and observational learning components of Social Cognitive Theory*

Explore

* Emphasis on children learning about sun protection
* Availability/ suitability of resources

**Sun protection Resources**

**Children’s resources**

15. Is there a need for more resources for teaching sun protection to children in your centres? If yes, what type of resources?

*Knowledge and observational learning components of Social Cognitive Theory*

Explore

* Books
* Posters
* Songs
* DVD
* Other

16. **Staff resources**
Do you think there is a need for more resources to increase Early Childhood teacher’s knowledge about appropriate sun protection? If yes, what type of resources would be helpful?
[Knowledge and observational learning components of Social Cognitive Theory]

Explore

* Books
* Posters
* DVD- showing examples of centres with effective practices
* Internet learning programme
* Newsletters
* Role modeling of effective practices

Improving sun protection

17. What suggestions do you have for key actions that would improve sun protection in Early Childhood care?

[Facilitator component of Social Cognitive Theory]

Explore

* Would accreditation programme be useful- (Centres accredited if meet standard re policy and practices)?
* Education of staff
* More public awareness of sun protection
* Shade sponsorship
* Other
* Policy changes

18. Do you have any other comments or other documents/ information that may be useful for this research? Are there any other people who you recommend I talk to about sun protection?
Appendix 4

Sun Protection in Early Childhood Centers

Excessive exposure to ultraviolet radiation (UVR) during childhood and adolescence is a risk factor for skin cancer later in life. New Zealand, along with Australia, has the highest melanoma rates in the world. Episodes of sunburn, particularly in childhood and adolescence, also increase the risk of melanoma later in life.

An emphasis on sun protection and skin cancer prevention in early childhood centers is important for two reasons:

- Centers are places where children spend much of their time during the High UVR months of September to March inclusive.
- Centers provide opportunities through staff professional development and children’s activities, for both staff and children to learn about sun protection.

Comprehensive sun protection policy

A Sun protection policy needs to:

- outline the way in which the center will protect students and staff from the harmful effects of excessive ultraviolet radiation (UVR)
- include behaviour, environment and policy review.
- be developed in consultation with parents and caregivers.

Sample sun protection policy

The following sample sun protection policy covers all essential sun protection strategies necessary to protect children from excessive sun exposure.

We encourage centers to copy this policy directly or incorporate all of the main points into their own sun protection policy.

This information sheet was reviewed in November 2008 by the Cancer Society. The Cancer Society’s information sheets are reviewed every two years.

For cancer information and support phone 0800 CANCER (226 237) or go to www.cancernz.org.nz
Centres/Preschools are welcome to copy this SunSmart sun protection policy directly and use it as their own or incorporate all of the main points into their own sun protection policy.

**Rationale**

Excessive exposure to ultraviolet radiation (UVR) from the sun causes sunburn, skin damage and increases the risk of skin cancer. New Zealand, along with Australia, has the highest melanoma rates in the world. One or more episodes of sunburn in childhood and adolescence have been shown to increase the risk of melanoma later in life.

This policy is followed whenever ultraviolet index (UVI) levels reach 3 and above. For most parts of New Zealand this is from the beginning of September until the end of March, especially between 11 am and 4 pm.

The Cancer Society recognises that a balance is required between avoiding an increase in the risk of skin cancer and getting enough sun exposure for children to maintain adequate vitamin D levels, particularly in the winter months. Between April and August the UVI is 3 or under in most parts of New Zealand, especially in the south, so it is recommended that children do **NOT** wear hats, sunscreen or play in the shade during these months. During the winter months, encourage children to actively enjoy the sun.

This policy is adopted from (DATE) so that children attending (NAME OF CENTER) are protected from harmful UVR from the sun.

**Aim**

<Name of centre / pre-school>’s SunSmart policy has been developed to ensure that all children and staff are protected from damaging levels of UVR from the sun.

**Our Sun Protection strategies:**

All children and staff use a combination of sun protection measures whenever UV Index levels are 3 and above. Particular care is taken during the daylight savings months (between 11 am and 4 pm) when UV levels reach their peak.

**1. Shade**

There are natural shelters (eg trees) and other shade areas providing enough coverage for all children playing outside.

The availability of shade is considered when planning excursions and outdoor activities.
Children are to use available areas of shade when outside. Children who do not have appropriate hats or outdoor clothing are required to play in the shade or indoors.

2. Clothing

When outside, children are to wear loose fitting clothing that covers as much skin as possible. Tops with elbow length sleeves, and if possible, collars and knee length or longer style shorts and skirts are best.

3. Hats

Children are required to wear hats that protect their face, neck and ears, i.e. legionnaire, broad-brimmed (min 7.5 cms brim) or deep crown bucket hat (minimum 5 cm brim). (Please note: Baseball caps do not offer enough protection and are therefore not recommended.) It is recommended that the centre provide a personal sunhat for each child to use.

4. Sunscreen

It is recommended that SPF 30+, broad spectrum sunscreen is available for staff and children’s use. Sunscreen is applied at least 15-20 minutes before going outdoors and reapplied every two hours. It must not be used to extend time outside. If children are playing in water, sunscreen must also be water resistant.

5. Sunglasses

A good hat significantly reduces the level of UVR reaching the eyes. If parents want their children to also wear sunglasses, these should be close fitting and cover as much of the eye area as possible. Sunglasses should meet the Aus/NZ Standard 1067.

Role Modelling

Staff act as role models by:

- wearing sun protective hats and clothing, and sunglasses when outside
- applying SPF 30+ broad spectrum sunscreen
- seeking shade whenever possible

Sharing Information about Sun Protection

The children learn about skin and ways to protect their skin from the sun. The sun protection policy is reinforced through staff and children’s activities, and centre/pre-school displays. Staff and families are provided with information on sun protection at enrolment and through family newsletters, notice boards and meetings.

When enrolling their child, families are:

- Informed of the centre / pre-school’s sun protection policy
- Asked to ensure their child wears sun protective clothing (and to provide a suitable hat if the centre does not provide one).
• Asked to provide SPF 30+, broad spectrum, water-resistant sunscreen for their child
• Required to give permission for staff to apply sunscreen to their child
• Encouraged to practice SunSmart behaviours themselves when at the centre / pre-school and in the home environment

Review
Management and staff monitor and review the effectiveness of the sun protection policy every two years and revise the policy when required.

Policy Prepared by: Name or title on (Date)
Policy approved by: Name or title on (Date)
Policy will be reviewed on (Date)

For further information about sun protection, please contact your local Cancer Society or email Cancer Society at: admin@cancer.org.nz.