SunSmart Policy Support Intervention Design & Evaluation

FOR: CANCER COUNCIL NSW AND THE NSW CANCER INSTITUTE

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EXECUTIVE SUMMARY:

The SunSmart Policy Support and Intervention Study (SSPSIS) sought to assist Cancer Council New South Wales (CCNSW) to improve the implementation of their flagship sun protection health promotion program for schools. The project outlined by the Cancer Council New South Wales (CCNSW) in relation to the SSPSIS for NSW primary schools wanted to collect data which captured teacher role modelling, sunscreen use and wearing of sun-safe hats in selected primary schools in NSW who were part of the SunSmart Program.

Once objective baseline data had been collected, the CCNSW wanted formative research to inform the design of the intervention to improve teacher role modelling, active encouragement of sunscreen use and wearing of sun-safe hats that could be delivered as part of an extended SunSmart Program and acceptable to the school community.

The main findings of the study were that just over 60% of students wear sun-safe hats (i.e. a legionnaire hat, a broad brimmed or a bucket hat) during recess and lunch periods, while 20% wear a baseball cap and 19% of students do not wear any type of hat during these times. There was no significant variation between boys and girls in regard to sun-safe hats but boys were more likely to wear a cap and girls more likely to wear no hat. Current national survey data on self-reported sun-safe hat wearing by primary school children as reported by school Principals states that 80% of students wear sun-safe hats during recess and lunch periods. This 20% discrepancy appears indicative of the contrasts between self-report and objective guideline adherence to public health recommendations for school-aged children. Whilst self-reported instruments are practical in large scale studies, this study provides further evidence for the need to validate self-report data with objective measures to understand the degree of bias reported in such studies.

Only a very small relationship was found between the teachers and students sun-safe hat wearing behaviours. This is of interest considering it has been established that children's behaviours are influenced by what they observe and learn. CCNSW's SunSmart policy requires that schools ask their staff to role model good sun-safety behaviours, including the wearing of sun-safe hats when they are outside.

A weak positive relationship was found between a school's Index of Community and School Economic Advantage (ICSEA) and the sun-safe hat wearing behaviours of its students. Whilst the relationship is based only on a correlational analysis and was weak, it was the only covariate to exhibit a meaningful relationship with sun-safe hat wearing of school children. This finding indicates that more research is needed to understand what socio-economic status plays in future SunSmart policy.

The qualitative data collected to inform the intervention design alluded to key messages in promoting the SunSmart outcomes in primary schools. The data suggests the exisiting SunSmart Program has been successful is raising general awareness of sun-safety and has successfully supported NSW primary schools to develop and implement a written sun protection policy. However, the findings of this study suggest that the broader school community has very limited understandings of individual school policy or the program itself, and these understandings are primarily associated with the enforcement of the No Hat, No Play concept. This is largely due to the limited communication in individual school organisation in terms of disseminating the policy. Although overall policy implementation has resulted in high levels of student hat wearing behaviours in SunSmart schools, it has also made teachers, students and parents relate sun protection with school rules and playtime. In particular, students perceive No Hat, No Play to be a negative policy model, aimed at punishing bad behaviour rather than rewarding good behaviour. Therefore a potential avenue to support

schools to implement SunSmart would be to maintain the current focus on play but align the program with a more positive message aimed at supporting positive behaviour that can be replicated outside of the school environment.

The intervention outlined in this study however had no significant effect on the wearing of sun-safe hats in the schools involved in this study. The reason for this is that, even when a positive approach is adopted to the SunSmart message, that the wearing of sun-safe hats during recess and lunch periods may need to be more targeted specifically to hat wearing behaviours.

To date, CCNSW had no data pertaining to the amount of sunscreen students consumed during school hours. Consumption of sunscreen by students during baseline measures was negligible. However, the intervention had a large effect on the per captia consumption of sunscreen in schools.

INTRODUCTION:

Australia has among the highest incidence of skin cancer in the world with approximately 750,000 treatments for melanoma and skin cancer every year [1]. Protecting skin from overexposure to ultraviolet (UV) radiation is the simplest and most effective way to reduce the risk of developing melanoma and other skin cancers [2,3]. The World Health Organization (WHO) [4] suggests that school sun protection programs are the key to skin cancer prevention. The New South Wales Department of Education and Communities (NSWDEC) has demonstrated its commitment to sun-safety, releasing updated Sun Safety for Students guidelines [5], which strongly encourage each school community to implement a comprehensive Sun Safety Action Plan.

Cancer Council New South Wales (CCNSW) is a not for profit research and advocacy organisation for all forms of cancer within New South Wales (NSW). The SunSmart Program is their flagship skin cancer prevention program, and supports primary schools to develop and implement comprehensive sun protection policies.The program is based on the World Health Organization's Sun Protection and Health Promoting Schools principles [6]. It applies these principles by; a) negotiating a school endorsed sun protection policy with schools and the systems that govern them, b) providing sun protection education resources, c) advocating for a healthy and sun-safe school environment that include the scheduling of outdoor activities, providing shaded play and recreation areas, encouraging sun protective clothing, providing and encouraging the wearing of sunscreen and encouraging the role modelling of sun-safe behaviours by teachers and other significant adults at schools, and d) encouraging community and family involvement in sun protection behaviour and awareness.

Previous national and state surveys of school sun protection policies and practices demonstrate that being a member of the SunSmart Program improves sun protection practices in primary schools [7,8]. The national survey of Sun Protection Policy and Practice in Primary Schools demonstrated an association between a written sun protection policy and more effective sun protection practices [8]. However survey results also demonstrate there are opportunities to embed sun protection practices more broadly in primary schools; in particular students' use of sun-safe hats and sunscreen, and teacher role modelling of positive sun protection practices [8].

A review of relevant Australian and New Zealand literature suggests that provision of policy support is likely to improve school sun protection practices [9,10]. Change agents (project champions/teachers) are suggested as one potential approach for improved policy implementation [11,12]. Furthermore, any policy intervention must consider the nuance and idiosyncrasies of the school and the communities they serve. Given the complexity of the school setting, intervention strategies will need to be innovative and consider issues of design and measurement in dealing with school-based samples.

In 2014 more than three-quarters of NSW primary schools are signatories to the SunSmart Program [13]. Previous evaluations of school sun protection policies have stated the data supporting the link between sun protection policies and observations of sun protective behaviour at primary schools are lacking [14]. This evaluation by Turner and colleagues also called for research involving independent assessment of policies and direct unannounced observations of behaviour to better represent usual sun protective practices (rather than self-reported data).

This study builds on the body of knowledge regarding sun protection behaviours in primary schools. The study used a novel application of an existing objective observational tool to collect data on key sun-safe

practices in schools that are members of the SunSmart Program, and developed and evaluated practical strategies to support schools in improving their sun protection policy.

RESEARCH AIMS AND OBJECTIVES:

The SunSmart Policy Support and Intervention Study (SSPSIS) aimed to collect and measure objective data around student use of sun-safe hats, student sunscreen consumption, and teacher role modelling of sun-safe behaviours in primary schools. This study builds on exisiting findings through observing students and teachers located in primary schools in Greater Western Sydney, and identifying opportunities to develop and implement a policy-based intervention.

The study's objectives were;

- To observe students' use of sun-safe hats, monitor students' use of sunscreen, and observe teacher role modelling of sun-safe hats and shirts with collars and sleeves.
- To collaborate with school communities to inform the design of an intervention to improve students' use of sun-safe hats and sunscreen, and teacher role modelling of positive sun protection practices.
- To determine the feasibility, acceptability and efficacy of the intervention.
- To disseminate the results and key lessons to a range of key stakeholders (such as other state and territory Cancer Councils, Cancer Institute NSW (CINSW) and Department of Education) and the broader public health community via reports and journal publications

METHODS:

Study design

The SunSmart Policy Support and Intervention Study (SSPSIS) was an 18-month primary school-based intervention and was evaluated using a cluster randomised controlled trial. Ethics approval was sought and obtained from the Charles Sturt University Human Ethics Committee (HREC 2014/062) and the New South Wales Department of Education (SERAP: 2014148). The SunSmart Evaluation and Policy Intervention study was also registered with the Australian and New Zealand Clinical Trials Registry (ACTRN12614000926639). The study protocol was also reviewed internally by the research committees of the funding agencies.

Following the initial recruitment processes, researchers conducted baseline assessments at participating schools. The design, conduct and reporting of this study adhered to the Consolidation Standards of Reporting Trials (CONSORT) guidelines for a cluster randomised controlled trial [15]. Principals, teachers, students and parents provided written informed consent based on their level of participation in the study.

Sample size calculation

Power calculations were conducted to determine the sample size and number of observations required to detect changes in the outcome of students wearing sun protective headwear in a cluster design. Calculations assumed baseline-posttest expected effect size gains of d = 0.4/r = 0.19 and were based on 80% power, with alpha levels set at $p < 0.05$. Using the standard deviation (SD) of change of SD = 0.5, it was calculated that

the study required 50 observations within the intervention and control groups to provide adequate power to detect a between group difference of d = 0.4 across the school day.

Recruitment and study participants

To be eligible to participate in the study, schools had to be government primary schools and a current signatory to the SunSmart Program in the Greater Western Sydney Region, NSW, Australia (Approx 33.75 deg S,150.70 deg E).

All eligible schools (n = 167) were sent an initial email with an invitation to participate in the study. CCNSW and the researchers identified a short-list of schools that may be receptive to participating in the study based on their response to the recruitment email (n = 40). Schools that responded to the initial email and the short-listed schools were pooled and received a follow up call in random order from the project researchers to ascertain whether they would like to participate in the study. The first twenty schools that demonstrated interest were recruited into the study.

Randomisation into intervention and control group occurred after baseline assessments. A simple computer algorithm was used to randomly allocate schools to either control (n = 15) or the treatment (n = 5) conditions by an independent researcher not involved in the study. This method ensured all schools had the same likelihood of allocation into one of the two study arms. This ratio of intervention to control schools was recommended as conducting the qualitative research and developing the intervention involves extensive formative research, is a costly and time-intensive process, and fitted best within the given budget and timeline.

Trained research assistants and project researchers conducted all assessments and performed focus groups and interviews. All researchers completed training sessions prior to assessment to maintain consistency and where possible, the same assessors were used at baseline, post-test and follow-up. Figure 1 shows the flow of participants through the study.

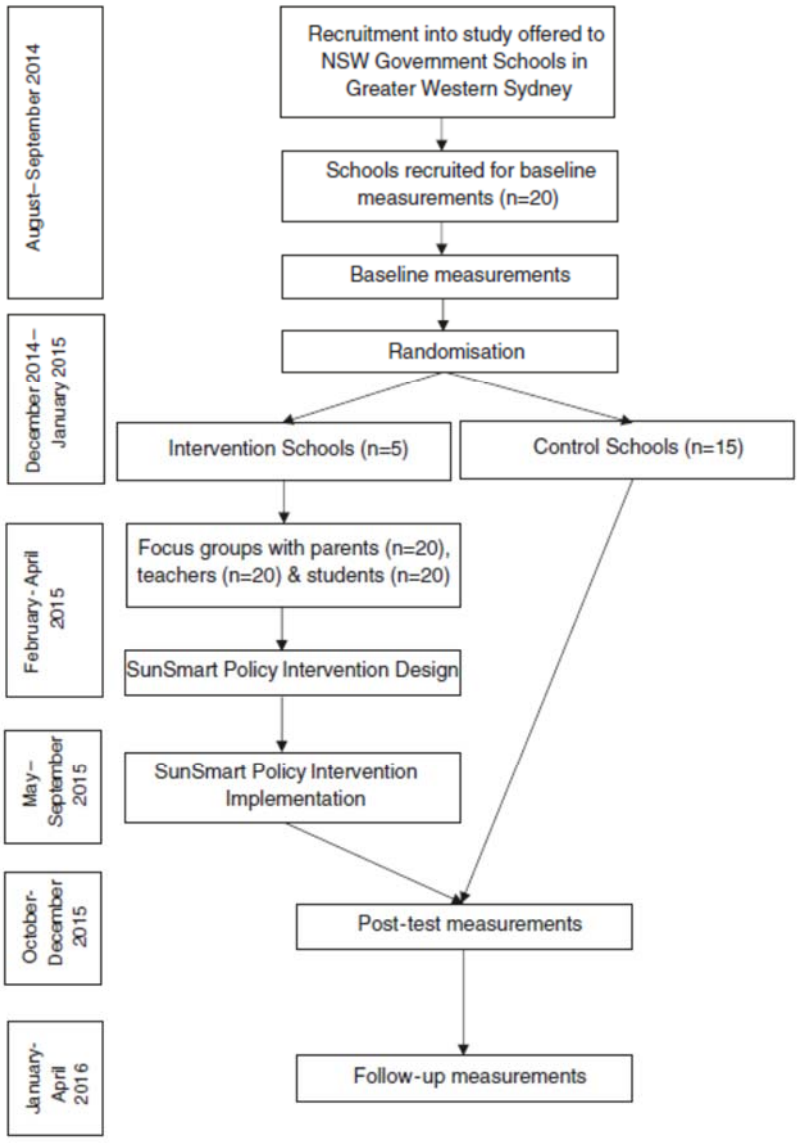

FIGURE 1: Flowchart of the study

In collaboration with CCNSW and each of the primary schools assigned to the intervention group, a policy driven intervention was rolled out over the course of two school terms (June-December 2015) with post-test data collected during the latter half (October-December 2015) of this period. Follow-up data was collected after the schools returned from summer break between January and April 2016.

Intervention design

After randomisation, researchers conducted focus group discussions with parents, Stage 3 (Grades 5 and 6) students, and individual interviews with teachers across the five intervention schools. This qualitative research investigated the results of the baseline data collection and informed the intervention design with these schools. These focus groups and interviews unpacked the positive and negative aspects the school's utilisation of sun-safe hats, sunscreen and staff to role modelling of sun-safe behaviours.

Interviews and focus groups also investigated the intervention schools' understanding of being 'SunSmart' and other aspects of the existing school sun protection policy; including sun-safe school uniforms, the provision of shade, scheduling of outdoor activities, sun protection within the school curriculum and finally, inclusion of the local community into school sun-safe practices. This broader context allowed analysis of the relative importance of the three specific study outcomes and other factors that may have influenced the baseline results.

Data from this formative research was analysed using coding and intra and inter-textual analysis to ascertain common themes across schools [16]. Formative interview data was then utilised to refine the design and enactment of the intervention.

Theoretical Framework

The intervention development and implementation was based on Social Cognitive Theory (SCT) [17] which focuses on the interplay between personal, behavioural, and environmental factors. The personal factors identified in SCT (such as the thoughts, emotions and biological dispositions of an individual) were used to inform the intervention program by influencing the value systems that may reinforce the low emphasis on the school sun protection policy. The nuanced behavioural factors associated with sun protection behaviours, such as the wearing of hats and sunscreen and playing in shaded areas also needed to be identified objectively and addressed within the intervention program. Finally, the environmental factors (both social and physical) that often exist beyond the immediate control of individual schools needed to be identified and addressed in order to remove potential barriers and to provide opportunities for social support.

The intervention was also based on the key principles of the World Health Oraganization's (WHO) Health Promoting Schools (HPS) Framework [18] that focused on the connection between formal curriculum, school ethos and the school-home-community partnership. By addressing these overlapping and interconnecting components, schools are more likely to provide comprehensive and effective health promotion throughout the entire school community. The formal curriculum of the HPS framework refers to the teaching and learning programs provided by the school, and advocates these be distributed in a variety of subjects and classes rather than just traditional health education classes [19]. A school ethos is derived by the components put in place which construct its values and atmosphere, including organisation, environment, policies and procedures [19]. The partnership between the school and local community is a vital component for school health promotion. By incorporating families and the community into the life of the school, a supportive learning and healthy environment can be established [19].

Research Instruments

Evaluation of the SunSmart Policy Intervention involved a variety of instruments reporting on sun protection behaviours that occured in primary schools. Trained research assistants, who were blind to the control or intervention allocation of the schools, collected all the data using these instruments. All sun protection behaviour practices were measured at baseline, post-test (12 months), and follow-up (15 months).

Wearing of hats and prevailing environmental conditions

The primary outcome was the wearing of a sun protective hats during break periods of the school day (i.e. recess and lunch) by children. At the commencement of the study, no direct observation instruments to record sun-safe behaviours existed. However several direct observation tools of physical activity did exist, and one of these was adapted to capture sun-safe behaviour data in children.

The System for Observing Play and Recreation in Communities (SOPARC) is based on momentary time sampling techniques in which systematic and periodic scans of individuals and contextual factors within predetermined target areas are made [20]. iPad tablets (Apple Inc, USA) installed with the iSOPARC Application Version 1.75 (CIAFEL, Portugal: http://ciafel.fade.up.pt) were used to provide an objective measure of the wearing of hats by children during recess and lunch.

During a scan each subject was electronically coded and identified by; sex (male or female), intensity of activity (Sedentary, Walking, or Very Active), and whether they were a Child, Teen, Adult or Senior. For this study, given all the subjects were children, the third battery of coding (Child, Teen, Adult or Senior) was changed to detect whether the student was Unprotected (no hat), Partially-Protected (wearing a baseball cap), or Fully-Protected (wearing a 360 degree brim; broad-brimmed, bucket or legionnaire hat).

Separate scans were made for females and males, and simultaneous entries were also made for time of day, temperature, UV radiation level, area accessibility, area usability and presence of supervision. Each observation was conducted twice during the recess and lunch breaks for both females and males.

Direct observations were made in designated Target Areas that represented all locations identified by schools likely to provide opportunities for students to have sun exposure during their recess and lunch periods (e.g. play equipment or outdoor sporting fields/courts). The Target Areas (one shaded and one non-shaded) were predetermined and identified for observations prior to baseline assessments. An aerial map was provided to identify Target Areas and a standard observation order established for each school.

Additional data recorded prior to the direct observation scans included;

1. Temperature and UV level at the start and end of the observation period; 2. Whether the observation was made available at recess or lunch; 3. Start and finish times of recess and lunch; and 4. The condition of the target area. This was coded as follows:

A = Area was accessible (e.g. not locked or rented to others).

U = Area was usable for activity (e.g. is not excessively wet or windy).

SS= Area was supervised by designated school personnel who were role modelling sun safe behaviour (e.g. wearing a broad brimmed hat, wearing a shirt with a collar and minimum short sleeves, sunglasses, using shade).

SN= Area was supervised by designated school personnel who were not role modelling sun safe behaviour.

O = Organised physical activity (i.e. scheduled, with leadership by school personnel apparent) is occurring in the area (e.g. intramurals, interscholastic practices, fitness stations).

E = Equipment provided by the school or other agency was present (e.g. balls, jump ropes). This was not coded as present if the only equipment was a permanent fixture (e.g. basketball hoops).

C = Covered area (e.g. the activity was taking place in an area where at least 50% of the target area was covered with shade provided by a permanent feature such as shade cloth or roofing).

Researchers also recorded whether the teacher supervising activities in the Target Area was role-modelling sun protective behaviour. An observation note was added to the final iSOPARC data on whether the teacher was wearing a) a hat (broad brimmed or baseball cap), b) sunglasses or other appropriate eye protection (i.e. transition lensed optical glasses, and c) a sleeved shirt and collar.

Wearing of sunscreen

The secondary outcome was the wearing of sunscreen by the school children during the school day. Currently no direct observation instruments to record the wearing of sunscreen exist. As a proxy measure of children wearing sunscreen, control and intervention schools were provided with multiple one-litre containers of sunscreen free of charge and consumption measured. Sunscreen was delivered to, and collected from the schools in the same week in order to ensure the period of use between schools was as close as possible; 50 days (10 school weeks) per interval. Each of the containers maintained their active ingredient information as required by the Therapeutic Goods Administration (TGA) [21]. A laminated instruction card was attached to each bottle requesting classroom teachers to use the sunscreen as they normally would with their students.

The consumption of sunscreen from these containers was recorded at the conclusion of the baseline, post-test and follow-up phases and replaced with full containers on demand by the schools.

In order to determine sunscreen consumption, 20 similar pump packs of sunscreen were weighed to record an average starting weight for comparison. Consumption was then analysed at the end of each data collection phase by comparing the net weight loss of each pump pack of sunscreen issued to each school and the number of students enrolled in each school.

Statistical methods

Statistical analysis of the primary and secondary outcomes were conducted with linear mixed models using SPSS statistics version 20 (IBM SPSS Statistics, 2012) and alpha levels were set at $p > 0.05$.

The models were used to assess the impact of treatment (SunSmart Policy Intervention or Control), time (baseline, post-test and follow-up) and the group-by-time interaction, these three terms formed the base model. The models were specified to adjust for the clustered nature of the data and included all randomised participants in the analysis. Mixed models are robust to the biases of missing data and provide appropriate balance of Type 1 and Type 2 errors [22]. Mixed model analyses are consistent with the intention-to-treat principle, assuming the data are missing at random [23]. Sex, temperature/UV, time of day, type of period (recess or lunch) and conditions of target area (as previously outlined) were all included as covariates in the models.

Qualitative methods

The focus groups and interviews of Stage 3 students, parents and teachers were used for the intervention design and were digitally recorded with the participants' consent and transcribed verbatim into a Microsoft Word document. Data was collected between February and April 2015. The interview guide consisted of pre-planned primary questions to consistently cover the same areas with each participant. In addition, participants were prompted to provide further relevant information depending on their responses to the semi-structured interview guide. The researchers also recorded field notes throughout the interviews.

There were a total of seven student focus groups, eight parent focus groups, and 14 individual interviews with teaching staff across the five schools. The teaching staff included 10 classroom teachers

and four executive staff members (i.e., the Principal or Assistant Principal). Individual interviews were selected for teaching staff to mitigate possible risks associated with participating in the study and allow teachers to be more candid in their responses. The number of participants in each focus group ranged from two to eight participants. All interviews were located at the participants' school and occurred during school time, lasting approximately 30 minutes.

Analysis was conducted by members of the research team using a standard general inductive approach to qualitative analysis and theme triangulation.

BUDGET:

Item	Amount spent	Balance
Total grant funds received from Cancer Institute NSW		$50,000
Total CCNSW contribution		$45,000
In kind salary contribution from Macquarie University 0.1FTE x 2yrs (Dr Dudley) inc. Project/staff management & data analysis Sydney University 0.1FTE x 2yrs (Dr Cotton) inc. Staff training, recruitment & data analysis		 $24,370 $25,450
Cash **In kind** **Total project income**		**$95,000** **$49,820** **$144,820**
Charles Sturt University Administration costs (10%) 10 x iPads with heavy duty covers for objective data collection Poster printing & postage Transcription of data Open-access publication expenses Conference presentation Travel costs (car, hotel, meals, training, & meetings)	 $2,500 $5,500 $1,000 $3,500 $6,000 $2,500 $4,000	
Macquarie University		

Research Assistants (wages & travel expenses) Open-access publication & dissemination of findings	$59,470 $10,530	
Cancer Council NSW Creative agency resource development fees	$3,600	
Printing of decals for Fun Wheelies	$710	
Fun Wheelies	$683	
478 x 1L pump pack of Cancer Council SPF 30+ sunscreen	$8,948	
Sunscreen holder attachments for Fun Wheelies	$446	
Cable ties for sunscreen holders & Zip lock bags for cable ties	$10	
Sports equipment for Fun Wheelies	$2,580	
Netted bags for Fun Wheelies	$112	
Captain's arm bands for intervention schools	$360	
Courier fees	$1231	
Total expenditure	**$113,680**	

All income and expenditure are in Australian Dollars and are exclusive of Goods and Service Tax

All figures are rounded to the nearest whole dollar

RESULTS:

Demographics

An overview of the demographic characteristics of the schools involved in the study can be seen in Table 1.

TABLE 1 DEMOGRAPHIC CHARACTERISTICS OF THE 20 SCHOOLS DIRECTLY INVOLVED IN THE STUDY

School Characteristics		
Student Population		
	Mean	398.5
	Range	136-818
Schools stratified by SEIFA Index (% of schools) based on postcode of school		
	1 (most disadvantaged)	0 (0%)
	2	1 (5%)
	3	3 (15%)
	4	5 (25%)
	5 (least disadvantaged)	11 (55%)
Distribution of school students stratified by the ICSEA		
	Bottom Quarter	30.6%
	Middle Quarters	49.8%
	Top Quarter	19.6 %

Table 1 gives an overview of the 20 schools that consented to being in the study. An important observation to make form this table is that 55% of the schools participating in the study (n=11) are located in the 5th decile of the Socio-Economic Indexes for Areas (SEIFA), with the remaining schools being in the lower deciles. This trend is highlighted when the students in the schools are stratified by the Index of Community Socio-Educational Advantage (ICSEA). This analysis reveals that 30.6 % of the students are in the bottom quarter of the Australian population, with only 19.6% being in the top quarter.

Reliability of the modified iSOPARC Tool

The main instrument used to collect the observational data was slightly modified to allow for the collection of student hat wearing behaviour. To test the reliably of this modified tool, 11 observation periods were systematically observed by two people (a trained research assistant and an Investigator in the project). The inter-observer reliability was calculated using interclass correlation coefficient (ICC) and returned a result of .962 suggesting a high level of reliability.

Baseline Behaviour Observations (2014 – Term 4)

Baseline data collection was conducted as planned during school term 4, 2014, although two of the 120 possible recess and lunch break observations did not take place due to bad weather. An overview of the

completed observations can be seen below in Table 2. The table shows 831 observations were conducted, with 59.8% of the students across all sites wearing a sun-safe hat (either a peak cap with a back flap or a 360° brimmed hat). The table also shows that 19.3% of the students were wearing no hat during these times.

TABLE 2 MEANS AND STANDARD DEVIATIONS FOR STUDENT AND TEACHER FACTORS OF SUN SAFE BEHAVIOUR

Category	Recess & lunch behaviour (%) (n=831)		Recess & lunch behaviour (%) Males Obs. (n=415)		Recess & lunch behaviour (%) Females Obs. (n=416)	
	M	SD	M	SD	M	SD
Student Hat Wearing Behaviour						
No Hat	19.3	26.16	14.9*	21.22	23.6	29.59
Peak Cap (No side brim or back flap)	20.4	33.80	24.6*	35.88	16.3	31.08
Peak Cap with back flap	10.6	26.25	12.1	27.35	9.0	25.04
360° Brimmed hat (Bucket or Broad)	49.2	41.79	47.7	42.47	50.6	41.09
Sun-safe hat^	59.8	40.19	59.9	41.27	59.7	39.14
Teacher sun safe behaviour						
Number of observations (n=514) with	M (%)	SD				
Hat wearing	46.3	46.98				
- Cap	11.1					
- Sun-safe hat	35.2					
Sunglass wearing	69.9	52.68				
Sun protective clothing	50.8	47.83				
Shade seeking	49.0	32.31				

(N.B. * $p<0.05$, ^ A sun safe hat is the sum of the peak cap with back flap and 360° brimmed hat)

An independent samples t-test was conducted to compare the student hat wearing behaviours for male and female students. The tests revealed that there was a significant difference between males and females, with 8.7% more females observed not wearing a hat, and with 8.3% more males wearing peak caps.

The lower section of Table 2 displays the sun-safe behaviours of the teachers on playground duty during the observational periods, with an average of 46.3% of the teachers observed wearing a hat (11.1% sun-safe hats). Although only an average of 69.9% of the teachers were observed wearing sunglasses.

The relationship between student hat wearing behaviours and environmental factors, schools factors and play factors was also explored, with the results dispayed in Table 3. The analysis reveals that there is either no or a very small correlation between any of the explored factors. A school's ICSEA score was the only factor to have a small correlation with the wearing of sun-safe hats by children at recess and lunch.

TABLE 3 CORRELATION OF VARYING RECESS AND LUNCH BREAK CONTEXTS WITH THE WEARING OF SUN SAFE HATS BY SEX

Category	Males and Females Obs. (n=839)		Male Observations (n=420)		Female Observations (n=419)	
	PC	*p* value	PC	*p* value	PC	*p* value
Environmental factors						
Temperature	0.00	0.91	0.02	0.71	0.03	0.58
UV Index	0.04	0.20	0.09	0.08	0.00	0.99
School factors						
School ICSEA	0.26	<0.01	0.28	<0.01	0.23	<0.01
Teacher on duty factors						
Teacher wearing hat	0.15	<0.01	0.14	<0.01	0.16	<0.01
Student play behaviour						
Sedentary	0.03	0.42	0.00	0.99	0.06	0.23
Walking	0.12	<0.01	0.14	<0.01	0.10	0.04
Vigorous	0.09	<0.01	0.13	<0.01	0.04	0.42

(N.B. PC= Pearson correlation; IRSD= Index of Relative Social Disadvantage)

Formative Phase (Intervention Design) Results

Following baseline observational research, five schools were randomly selected as intervention schools using a simple randomisation algorithm in MS Excel.

Semi structured focus groups (up to five people in each) and individual interviews were conducted with key stakeholders within each intervention school to provide a rich and in-depth portrayal of the SunSmart Program. In accordance with the Health Promoting Schools framework, the population groups were identified as students, school teaching staff and community members. Participants from these population groups formed the sample of the interviews.

All participants were recruited via convenience sampling. Invitations for students and parents to participate in focus group interviews were distributed via school networks, such as newsletters and social media posts. Teaching staff were invited to participate in individual interviews. All participants were required to sign consent forms prior to the commencement of data collection. All interviews were digitally recorded and transcribed by an independent agency.

The data analysis of the focus groups and interviews conducted with the key stakeholders in the five intervention schools revealed the following five themes:

1. Participants' understandings of the SunSmart Program

2. Compliance; No Hat, No Play

3. Sun protection behaviours

4. Practice; Role modelling

5. Triggers

This section of the report will explore these themes and explain how they influenced the recommendations for the SunSmart intervention.

Participants' understandings of the SunSmart Program

Students, teaching staff and community members generally associated the term "SunSmart" with sun protection behaviours and sun exposure risks, such as the prevention of sunburn and/or skin cancer. Research suggests this is due to the consistent and long-term promotion of sun-safety in Australia within education settings and via such methods as social marketing [1]. Conversely, only principals and executive staff exhibited an understanding of the SSP and how the program is intended to be implemented as a whole school initiative aimed at encouraging various sun protection practices. Apart from principals or executive staff, the wider school community had little or no knowledge of the membership process required to become a SunSmart school, or the current school SunSmart policy documentation. This is evidenced in the following statement:

> When it [school's SunSmart policy] was written and formulated, it certainly would have been… delivered to staff, consulted with staff, consulted with parents. Not so much now. (Relieving Principal, Site E)

These findings conflict with Sharplin & Roth [2], who reported schools with a written sun protection policy integrated staff in the development of the policy. Subsequently, it was recommended that the intervention adopt a fresh approach in order to reengage the wider school community.

Compliance; No Hat, No Play

Students strongly associated the use of a hat with a 'No Hat, No Play' rule, rather than informed sun protection behaviour. Although the No Hat, No Play rule was identified at all five sites, among all three key stakeholder population groups, there were inconsistencies regarding the reported implementation of the concept. Students generally identified No Hat, No Play in terms of a perceived punishment, whilst teaching staff often described the rule as an alternative to playing in the sun. Furthermore, variations occurred in regards to descriptions of the rule, ranging from the original version "No Hat, No Play," to "No Hat, Shade Play," to the current NSWDE recommended "No Hat, Play in the Shade." Notably, the "No Hat, No Play" variant of the policy was the most frequently identified, especially among parents, as is consistent with previous research [3].

These conflicts of policy title were evident across all sites as well as within sites, which led to teaching staff having varied perceptions as to whether students were or weren't allowed to play in the shaded areas. Students were also aware of the inconsistencies among teaching staff when enforcing No Hat, No Play, indicating a strong awareness that some teachers were stricter or more lenient than others. As a consistent and holistic policy is most effective for health promotion in schools, as emphasised by the Health Promoting Schools framework [4], a more consistent approach should be adopted by current and future school sun protection programs.

In addition to the confusion surrounding school policy implementation, hat wearing was often expressed as a legal requirement for children to attend school, as suggested by parents and teaching staff, who incorrectly perceived the No Hat, No Play policy was enforced by NSWDE. Furthermore, the principal of Site B allows community members to incorrectly perceive it is a NSWDE legal directive to support the enforcement of sun-safe hats at the school, as evidenced in the following statement:

> Legally I can't force them [students to wear hats], by the way. We are a public school; they could wear whatever they like to school and I cannot enforce the uniform… I have never informed the community, because I don't think it's in the children's best interests sometimes if you know, they've developed an idea that if they don't have a hat they can't play. We don't have a policy saying that, we don't, isn't that awful? So if they're found without a hat, and wearing a cap constitutes being without a hat. It's the same if they're in a cap they will be sent down to this area in the shade.

This statement reflects the issues discussed in the first theme surrounding a lack of policy dissemination among teaching staff and the broader school community. It also highlights a potential issue with the exclusion of the school community regarding policy development and implementation, which is discouraged by the Health Promoting Schools framework [4].

While the first theme of this analysis illustrated the broader school community's lack of understanding regarding formal policy documentation, their awareness of No Hat, No Play and advocacy for sun protection suggest these population groups are supportive of encouraging students' sun protection behaviours. While this support is promising for sun protection policy, the lack of community engagement and education is concerning. Engaging the wider school community to transition from the outdated No Hat, No Play policy, to the current No Hat, Play in the Shade policy, which is endorsed by NSWDE and CCNSW, would be beneficial.

Sun protection behaviours

Protective sun behaviours identified by the key stakeholders within the intervention schools included hat wearing, use of shade, sunscreen, protective clothing and sunglasses. These five practices align with the SunSmart recommendations advised by CCNSW to NSW schools. It has previously been found that the

Australian population has a sound understanding of sun-safety due to sustained sun protection awareness campaigns [5,6].

While Sharplin & Roth [2] had previously reported an increase in hat wearing behaviours among students in SunSmart schools since 2005, the findings of the baseline observations from this study found that hat wearing compliance in individual sites was as low as 60%. It was also reported by participants that hats which did not comply with SunSmart recommendations, such as caps, had been incorporated into some schools' hat wearing policy in an attempt to engage older students. This was apparent at Site C, as evidenced by the following quote:

> Because the kids are really resistant to wearing brimmed hats a few years ago we went with the year sixes wearing caps. (Teacher, Site C)

While the majority of students were likely to wear hats, the key stakeholders indicated that students were less likely to apply sunscreen. It was suggested that this was due to time constraints within the classroom, as the process of transitioning students from inside the classroom to outside was often rushed and sunscreen was rarely considered. Participants across all three groups indicated that shade availability, and the protection provided by school uniforms as recommended by the NSWDEC based on guidelines provided by CCNSW, were sufficient, as evidenced by previous research [2]. Protective clothing and sunglasses were suggested by a minority of participants and discussion around these issues was negligible. As such, shade, protective clothing and adoption of sunglasses has not been included in detail in the findings of this paper.

Practice; Role modelling

Findings indicated that students, parents and teaching staff identified role modelling as an important aspect of a sun protection program. However, participants justified this from different perspectives. Some parents and teaching staff suggested role modelling is important for young children as they replicate the behaviour of adults, while other teaching staff indicated they role modelled sun protection behaviours as they had been personally affected by skin cancer. The majority of participants indicated that role modelling is required for the No Hat, No Play rule to be enforced, as evidenced in the following statements:

> You can't expect them [students] to [wear a hat] if you don't. (Teacher, Site, E)

> [If teachers didn't wear hats] I'd be really, really angry at my teacher. I'd say why'd you get me in trouble when you're not wearing a hat? It's hypocritical. (Student, Site B)

> I think it does open the door for the child to turn around and say well how come you don't have one…if they expect the kids to do what they're told then they should follow what their teaching. (Parent, Site D)

The results of the baseline observation data from this study found that only 46% of teachers wear hats during recess and lunch periods. This is consistent with Sharplin & Roth [2] who report that teacher hat wearing rates have been declining since 2005 and that the reported amount of NSW primary schools that required teacher hat wearing compliance was almost 30% lower than other Australian states.

Notably, while it was suggested that Early Stage 1 students were positively influenced by teacher role modelling behaviour, Stage 3 students also admitted teacher role modelling has little impact on their personal desire to wear a hat, as they were primarily influenced by the No Hat, No Play rule, as evidenced in the following statement:

When you're older you don't really care what the teacher thinks or does as much as when you were a little kid. (Student, Site D)

These older students also suggested that their hat wearing behaviour was more influential than teachers for younger students.

Triggers

Participants across stakeholder groups identified the concept of triggers or cues that influenced sun protection behaviour, the most common being high temperatures and special school events, such as sport carnivals. Sunscreen application was the most common sun protection behaviour to be associated with a perceived trigger. School staff also suggested the provision of sunscreen increases when students are partaking in special school events. These participants' associations of sun protection behaviour with specific triggers are evidenced in the following statements:

I make sure they have it [sunscreen] on when it's a really, really hot day. (Parent, Site A)

I only use it [sunscreen] when I play sport. (Student, Site E)

Particularly when they have sport…we put on our sunscreen and during the athletics carnival I had a big thing of sunscreen going round and lots of kids brought sunscreen as well. (Teacher, Site E)

These results align with previous research which found that NSW schools were 20% more likely to provide sunscreen for special occasions but less likely to provide sunscreen regularly in classrooms when compared to other states and territories [2]. As a result of these findings and participants' suggestions, it was recommended that the SunSmart intervention include a manufactured trigger to promote sun protection behaviour.

Students provided a number of recommendations for the SSP, particularly associated with increasing sunscreen application. These included suggestions such as rewards for consistent sunscreen application, the provision of equipment to be provided for use in exposed areas such as ovals, competitions to engage student and community interest and message based posters "wear your hat and sunscreen so you don't get burnt" (Student, Site B). Students also felt that more posters placed around the school rather than at the front gate would be helpful to act as a reminder. Of importance to this study the majority of students recommended that sunscreen should be more readily available in the playground, and that teachers should more frequently remind students to apply sunscreen. Students indicated that, due to their motivation to play and engage in recess/lunchtime activities, they would often forget to apply sunscreen, even if they were aware of its availability in the classroom. They suggested sunscreen be provided in clear and easily accessible areas, which would act as a trigger for application:

A dispenser when you enter a certain area for sunscreen… need to have it there not in classroom. (Student, Site D).

Intervention Design

In July 2015, CCNSW commissioned Daisy Creative Ideas to develop a creative concept and collateral (including a slogan, signage and branding) to encourage sun-safe hat wearing and sunscreen use by students in the five intervention schools. The objective was to develop a fun and easy way for children to practice sun-safe behaviours and for selected schools to adopt a positive attitude towards responsible sun behaviour as an extension to the existing SunSmart Program. Daisy Creative Ideas presented to CCNSW

and the research team initial creative concepts and intervention slogans inspired by Manga caricatures; a known style that is well liked by older children while still appealing to younger children. The initial concept was adapted and a CCNSW branded version created. After consultation between CCNSW and the research team the following slogan was decided on due to its positive sun protection message - *'Protect your skin and let the fun begin'*.

Building on the concept of triggers identified in the qualitative research, 80 litre yellow 'Fun Wheelies' (wheelie bins) were decided on and produced as the central resource of the intervention. The Fun Wheelies had a one litre pump pack of sunscreen attached to the outside for use by students and housed sporting equipment including balls, skipping ropes and other active play items for use by students wearing sun-safe hats and applying sunscreen. Decals with the Manga caricatures, slogan and instructions for use were stuck to the outside of the wheelies.

To encourage students to take ownership of the intervention, the concept also included encouraging schools to provide students with the opportunity to take responsibility for the Fun Wheelie, equipment and sunscreen distribution. A yellow neoprene captain's armband was produced to be worn by the student(s) in charge of distributing the play equipment.

Daisy Creative Ideas also produced A3 sized colouring in posters containing the Manga caricatures, intervention slogan and Fun Wheelies. Schools were encouraged to use these as they saw fit.

The artwork, messaging and resources then went through several rounds of feedback with CCNSW, the research team and intervention school Principals and representatives.

Feedback from school Principals was collated and returned to the design team to inform modifications to the intervention. The principal from Site A was invited to join the design team to act as the partner school representative.

Constructive feedback included:

1) Discussion relating to images portrayed in the intervention.

It was felt that the images of school children required:

a) Increased multicultural aspects in order to reflect the diverse community in which the intervention was situated,
b) Include both male and female students, and;
c) Ensure the uniform of the students was reflective of the schools. This included adopting a polo shirt and removing bows on the pinafore.

2) Schools also felt that the intervention logo should only include students and not teachers as they believed the promotion of student orientated behaviour was most important.

School representatives provided positive feedback in regards to:

a) Slogan created to accompany the intervention, particularly the positive message.
b) Use of arm bands aligning with the idea of a student leadership team. School examples include Site D, whose representatives indicated they would align the program with their sports captain roles, and Site A, whose representatives indicated they would align with a leadership mentoring program between stages. The message of student involvement/ownership of the program was well received.

c) The creation of a trigger at the point of intended sunscreen application to encourage students to increase the practice.
d) A whole school approach to encourage both the student body and teaching staff to discuss/ educate sun protection in class time supported by a school-based enjoyable competition – colouring posters. Schools indicated they would be happy to provide prizes and promote the activity in the wider school community, through platforms such as Facebook. Schools also indicated they would be eager to display posters around the school.
e) The concept of students taking on responsibility for the intervention whilst having fun.
f) Distribution of equipment to support positive sun protection practices – to be referred to as the fun wheelie.

Final amendments to the intervention were made following the feedback, and the resources were developed and delivered to the intervention schools at the beginning of Term 4 2015. Each school was emailed in advance and instructions were delivered with the resources. A member of the research team also arranged to meet with the Principal in the same week the resources were delivered to provide face-to-face instructions. The final resources delivered to each intervention school included:

1. 2 x Fun Wheelies with decals
2. Sporting equipment in each Fun Wheelie
3. 8 x captain's armbands
4. Sufficient sunscreen to last the school term
5. Colouring in posters (these were also emailed to the school Principals should they have wished to print more)

See Appendix A for examples of the intervention resources.

Posttest (2015 – T4) & Follow-up (2016 T1-2) Behaviour Observations

Post-test and follow-up data were collected as planned in school term 4, 2015 and school terms 1 and 2, 2016. Although 13.7% of all observations were not able to be conducted

Across all three observation periods (pre-test, post-test and follow-up) a total of 2880 observations were possible. Of the possible observation periods 15.3% (n=441) were not able to be conducted due to playground areas being closed for safety reasons (too hot, windy or wet), or playground areas being out of bounds as a punishment, or only one gender was actually playing in the playground. This still resulted in 2439 systematic observations of hat wearing behaviours across 40 playground areas, in 20 schools over a 20 month period. The results of these observations can be seen in Table 4.

Table 4 displays the results from the control and intervention groups (distributed by gender) across the three observation periods. Kruskal-Wallis results (Chi-Square χ^2) were calculated between the three observation periods to determine if there were any significant differences across the periods and between the groups and genders. Mann-Whitney U Tests (Z) were also calculated to measure variance between pre-test and follow-up with subsequent effect sizes reported for each comparison.

While a number of the pre-test to follow-up comparsions resulted in a statistically significant finding, the effect size of these was considered small.

TABLE 4 PERCENTAGE OF HAT WEARING BEHAVIOUR DURING THE SUNSMART INTERVENTION PROJECT

Observed Hat Wearing Behaviour	Pre-test Observations N=831 (M=415, F=416)		Post-test Observations N=824 (M=410, F=414)		Follow-up Observations N=784 (M=401, F=383)		Variance Between all 3 observation periods	Variance Between Pre-test and Follow-up	Effect Size
	M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	χ^2 (*p*)	Z (*p*)	r
No Hat									
Control	16.0*	22.00	13.5*	19.89	10.6*	17.82	23.71 (.001)	-4.70 (.001)	.14
Male	13.1*	18.65	10.9*	15.82	9.1	16.36	5.21 (.074)	-2.13 (.033)	.09
Female	18.9	24.42	16.1	22.74	12.1	19.12	20.14 (.001)	-4.36 (.001)	.18
Intervention	29.2	32.72	28.0	30.77	21.1	26.19	6.42 (.040)	-1.96 (.050)	.09
Male	22.3*	25.39	21.0*	25.95	16.8*	22.31	12.15 (.002)	-1.52 (.129)	.10
Female	36.4	37.67	35.2	33.64	25.8	29.27	20.14 (.001)	-1.47 (.140)	.10
Cap									
Control	23.8*	37.13	27.2*	38.27	25.2*	38.02	1.23 (.540)	-1.11 (.268)	.03
Male	27.1*	39.15	27.9	40.50	27.9*	39.76	0.25 (.880)	-0.41 (.683)	.02
Female	20.4	34.77	26.4	35.73	22.4	35.99	1.55 (.462)	-1.11 (.269)	.05
Intervention	11.6	20.33	15.7	24.50	15.2	22.99	2.23 (.328)	-1.15 (.250)	.05
Male	17.9*	24.52	17.3	25.80	17.9*	25.45	0.55 (.760)	-0.60 (.548)	.04
Female	5.0	11.70	14.0	23.02	12.2	19.64	8.22 (.016)	-2.64 (.008)	.18
SunSafe Hat									
Control	60.0	41.26	59.3	41.43	64.3	39.58	7.41 (.025)	-2.29 (0.22)	.07
Male	59.9	42.83	60.8	42.66	63.0	40.98	1.51 (.469)	-1.12 (.264)	.05
Female	60.1	39.72	57.9	40.19	65.6	38.11	7.79 (.020)	-2.23 (.026)	.09
Intervention	59.2	37.31	55.7	37.24	63.8	34.99	6.43 (.040)	-1.22 (.222)	.06
Male	59.9	37.13	61.6*	34.31	65.3	34.81	2.87 (.238)	-1.33 (.184)	.09
Female	58.6	37.65	49.9	39.20	62.0	35.29	4.84 (0.89)	-0.51 (.613)	.03

(N.B. Kruskal-Wallis results (Chi-Square χ^2) were calculated between all three observation periods, * signifies $p<.05$ when comparing control to intervention or males to females during the same observation period, Mann-Whitney U Tests (Z) were calculated to measure variance between Pre-test and Follow-up with subsequent effect sizes reported

Baseline (2014 – T4) & Posttest (2015 – T4) Sunscreen consumption

Baseline and posttest sunscreen consumption data were collected as planned in term 4, 2014 and 2015. The scheduled follow-up sunscreen data collection scheduled for term 1, 2016 occurred however four schools (two from the small intervention group of five schools) did not return their used sunscreen containers within the required time period. For this reason, this third data set was excluded from the analysis.

At baseline, sunscreen consumption data was successfully obtained from 19 of the 20 particpating schools. When all Stage 3 classes were given free sunscreen to place in their classroom, the mean sunscreen consumption was 393g (SD=363) per school. On a per capita basis, the mean sunscreen consumption was 1.2g (SD=1.1) per student.

At posttest, sunscreen data was successfully collected from 18 of the 20 participating schools. When controls schools were simply given free sunscreen to place around the school as they saw fit the mean sunscreen consumption significantly increased to 893g (SD=995; $p<.05$) per school. There was also a large increase in the mean amount of sunscreen consumed in the intervention schools (1789g; SD=1760) but this was not statistically significant given the small sample size. However, the intervention effect size (Cohen's *d*) for school consumption of sunscreen was $d=0.63$ (medium) in favour of the intervention schools.

Mean per capita sunscreen consumption at posttest in the control schools was 2.1g (SD=2.4) per student compared to 5.1g (SD=2.3) in the intervention schools. This represented a large intervention effect of $d=1.3$ in favour of the intervention.

DISCUSSION AND RECOMMENDATIONS:

Discussion and Recommendations from the Objective Sun-Safe Behaviour Observations and Sunscreen Consumption Data

The main findings of the study were that 60% of students wear sun-safe hats (i.e. a legionnaire hat, a broad brimmed or a bucket hat) during recess and lunch periods, while 20% wear a baseball cap and 19% of students do not wear any type of hat during these times. Current national survey data on self-reported sun-safe hat wearing by primary school children as reported by school Principals states that 80% of students wear sun-safe hats during recess and lunch periods [7]. This 20% discrepancy appears indicative of the contrasts between self-report and objective guideline adherence to public health recommendations for school-aged children [25]. Whilst self-reported instruments are practical in large scale studies, this study provides further evidence for the need to validate self-report data with objective measures to understand the degree of bias reported in such studies.

There was a some small, but statistically significant increase, in male sun safe hat wearing in the intervention group group baseline to post-test and follow-up which was predicitably mirrored by a decline in males not wearing hats. Whilst these changes were small, they may be due to the boys wanting to access the equipment provided in the fun wheelies more than the girls. Deeper analysis (not presented in this report) demonstrate that sun exposed areas of the playground tend to be dominated by boys playing team-based sports/games. Future studies should investigate the links between motivations to certain types of physical activity and the sun safe behaviours most appropriately adopted. Furthermore, the activity and play interests of girls needs greater attention.

Other examinination of the data shows a weak positive relationship between a school's ICSEA and the sun-safe hat wearing behaviours of its students. No relationship was found between the teachers (which did not change significantly over the course of the study) and students sun-safe behaviours. This is of interest

considering it has been established that children's behaviours are influenced by what they observe and learn [26]. CCNSW's SunSmart policy [13] requires that schools ask their staff to role model good sun-safety behaviours, including the wearing of sun-safe hats when they are outside. Similar findings were reported in the observational research conducted by Turner and colleagues [14] which noted schools may assume teachers are acting as role models without being asked, resulting in schools potentially placing less importance on this component.

To date, CCNSW has no data pertaining to the amount of sunscreen students consumed during school hours. Consumption of sunscreen by students at baseline in this study was negligible. However, at posttest, external play-based incentives at the point of sunscreen consumption substantially increased both the total and per capita consumption of sunscreen in intervention schools compared with control schools who were only provided with free sunscreen.

Discussion and Recommendations from the Formative Data and Intervention Design Phase

The findings of this formative research suggest that the broader school community had a very limited understanding of individual school policy or the program itself, and these understandings are primarily associated with the enforcement of the No Hat, No Play concept, which is not supported by CCNSW or the NSWDE. This is largely due to the limited communication in individual school organisation in terms of disseminating the policy. Literature shows that, while the amount on NSW primary schools with a written sun protection policy increased between 2005 and 2011, the amount of influence from staff, parents and student bodies in the creation of individual school sun protection policies has declined [7]. Although overall policy implementation has resulted in higher levels of student hat wearing behaviours in SunSmart schools, the results of the formative data shows that the adoption of No Hat, No Play in schools has made teachers, students and parents correlate sun protection with school rules and playtime. In particular, students perceive No Hat, No Play to be a negative policy model, aimed at punishing bad behaviour rather than rewarding good behaviour. Subsequently, students' reported sun protection behaviours beyond school, where these factors cannot be enforced, appear to be lower than at school. This finding is consistent with additional research that found students attending SunSmart schools in Queensland were less likely to wear their hat before and after school, compared to during school [27]. Therefore a potential avenue to support schools' implementation of SunSmart policy would be to maintain the current focus on play but align the program with a more positive message aimed at supporting positive behaviour that can be replicated outside of the school environment. As the participants indicated student playtime as a strong motivator, it is likely that policy rewarding sun protection behaviour with an incentive associated with play would be influential. Ensuring schools adjust their hat wearing policy slogan to align to NSWDE and CCNSW guidelines (No Hat, Play in the Shade) would also be beneficial.

An increase in role modelling behaviour among staff and older students (Stage 3) has been identified as a key consideration for policy inclusion in order to improve sun protection practices. This finding is consistent with literature that recognises while role modelling is a strongly encouraged due to its influence on children's sun protection behaviour [30, 31] its practice is considerably low, especially among adults [7, 27]. Facilitating increased role modelling behaviours would support all other areas of any intervention. Increasing student responsibility and ownership via leadership roles and actively engaging teachers to consistently display and support sun-safe practices is crucial, as advised by the Health Promoting Schools framework [28], which was used as a model for this study. There needs to be a clear and consistent message to students in order to assist in the adoption of sun safe behaviour in the playground.

Sunscreen was identified as the sun protection behaviour most associated with a trigger, therefore it is recommended that any intervention aligns these two aspects. Sunscreen was recognised as a sun protection behaviour often forgotten by students, or not applied unless specifically reminded. Previous research supports the findings of this study in that students' application of sunscreen, and teachers' reminders for students to apply sunscreen, to be minimal [7]. In this light, students appear to readily recognise the potential of a trigger designed to act as a reminder for sunscreen application. This would then likely increase the success of sun protection behaviours associated with the SSP and therefore act as an imperative in future interventions. The use of a trigger for sunscreen application was also used by CCNSW in their development of the Sun Sound campaign, which resulted in increased sunscreen application practices [29]. In addition, warmer temperatures were identified by parents as a key trigger in regards to sunscreen use. Therefore, it is also recommended that any intervention take place during terms 1 and 4 of the school year to coincide with the Australian summer.

Strengths

A clear strength of this study is the rigorous evaluation process including quantitative and qualitative measures to explore program feasibility and potential efficacy. The empirically robust design with baseline, post-test and follow-up measures helped examine the views of participants (teachers, parents and students). Additionally, there was a high rate of observations recorded (<97%). This was partially attributed to favourable weather conditions and observation planning. Only a small proportion of observations were missed due to inclement weather. This also appears to be the first objective study of sun-safe behaviours conducted within school premises during the school day allowing for a clearer understanding of routine practices that may be occurring. Earlier observation studies by Turner and colleagues [14, 24] occurred from outside the school premises.

This study was also capable of collecting a host of covariates on the sun-safety behaviour of primary school children namely daily temperature, period of UV exposure during recess and lunch periods, size of play area, nature of play children undertake and teacher role-modelling behaviour.

Lastly, collaborating with key school stakeholders in the feedback process of the intervention design concept allowed for resources to be developed that would resonate well with the audience.

Limitations and challenges

The main limitation of this study was that it reports findings from a small number of schools within a relatively small geographic area. Future studies need to recruit more schools from a more diverse geographical settings that are more indicative of Australian population demographics. Another limitation is that data were only collected over a three-month period of the academic year. As such, we were unable to determine with these data if annual sessional issues, such as weather, influence these findings to a greater extent.

The research did not permit for any qualitative process evaluation to be undertaken either. For this reason, the fidelity of the intervention can not be determined.

Another challenge faced by the research team was that there appeared to be a misconception that sunscreen should not be provided to students with at least one school advising they did not use the sunscreen due to concerns about allergies. This is of interest considering the promotion and encouragement of sunscreen use forms one of the recommendations of the SunSmart Program, and is endorsed by the NSWDE.

Future recommendations

1. Future evaluations of the SunSmart Program should involve both objective and self-report data collection instruments of sun protective behaviours.
2. The correlation (whilst weak) with school socio-economic status and sun-protective behaviours warrents further investigation.

3. Sunscreen should be made available to children in areas of the school where children are making decisions to be exposed to direct sunlight. Play-based incentives seem to act as and appropriate 'trigger' for encouraging children to adopt this behaviour.
4. Future SunSmart Policy renewal processes should be more inclusive of the broader school community (students, staff and parents/community members).
5. The SunSmart Program should change their slogan from earlier iterations of 'No hat, no play' and 'No hat, play in the shade' to something attuned with a Health Promoting School and Strengths-based Approach to Health. This study recommends a slogan like 'Protect your skin, and let the fun begin' may be well received in primary schools and go some way to prevent the SunSmart policy being implemented in a punative manner.
6. Future SunSmart interventions may be well suited to being coupled with other Health Promoting School interventions so they are not perceived as 'additional' or 'low priority' health issues. The researchers believe that this program especially would be well-suited to being coupled with a physical activity or cross-curricula health intervention.

CONCLUSION:

The SunSmart Policy Support and Intervention Study (SSPSIS) was the first study designed to inform Cancer Council New South Wales (CCNSW) goal to continually improve the implementation of their flagship sun protection health promotion program for primary schools.

The main findings of the study were that just over 60% of students wear sun-safe hats (i.e. a legionnaire hat, a broad brimmed or a bucket hat) during recess and lunch periods. There was no significant variation between boys and girls. No relationship was found between the teachers and students sun-safe behaviours.

A weak positive relationship was found between a school's Index of Community and School Economic Advantage (ICSEA) and the sun-safe hat wearing behaviours of its students. Whilst the relationship is based only on a correlational analysis and was weak, it was the only covariate to exhibit a meaningful relationship with sun-safe hat wearing of school children. This finding indicates that more research is needed to understand what socio-economic status plays in future SunSmart policy.

The qualitative data collected to inform the intervention design alluded to key messages in promoting the SunSmart outcomes in primary schools. The data suggests the exisiting SunSmart Program has been successful is raising general awareness of sun-safety and has successfully supported NSW primary schools to develop and implement a written sun protection policy. Although overall policy implementation has resulted in high levels of student hat wearing behaviours in SunSmart schools, it has also made teachers, students and parents relate sun protection with school rules and playtime.

The intervention outlined in this study had no significant effect on the wearing of sun-safe hats in the schools involved in this study. The reason for this is that, even when a positive approach is adopted to the SunSmart message, the wearing of sun-safe hats during recess and lunch periods may need to be more targeted specifically to hat wearing behaviours. On the other hand, consumption of sunscreen by students during the intervention did have a large effect on the per captia consumption of sunscreen in schools.

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Appendix A – Intervention resources

210mm x 185mm decal

200mm x 275mm decal (instructions)

A3 colouring in poster

Fun Wheelie – Front view

FIND OUT MORE

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Fun Wheelie – Side View with Sunscreen

Fun Wheelie – Top view with equipment & decal

Sun Captain’s Armband