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1  
2 **AN INTERVENTION TO DISCOURAGE AUSTRALIAN MOTHERS FROM**  
3 **UNNECESSARILY EXPOSING THEIR BABIES TO THE SUN FOR THERAPEUTIC**  
4 **REASONS**  
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50 **Summary:**

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52 Parents play a key role in children's sun-protective behaviour, with good sun-protective habits  
53 established early tending to be sustained. We designed a maternity-hospital based educational  
54 intervention to reduce myths that could result in mothers intentionally sunning their babies. Interviews  
55 were conducted with two cross-sections of healthy post-partum inpatients in the maternity ward of a  
56 large regional public hospital. The first group (n=106) was recruited before the commencement of  
57 educational in-services for maternity nursing staff; the second group (n=203) was interviewed after  
58 the last staff in-service session. More pre-intervention than post-intervention women reported they  
59 would expose their baby to sunlight to: treat suspected jaundice (28.8% vs 13.3%;  $p<0.001$ ) or help  
60 their baby's skin adapt to sunlight (10.5% vs 2.5%;  $p=0.003$ ). Fewer post-intervention women  
61 indicated they would sun themselves to treat breastfeeding associated sore/cracked nipples (7.6% vs  
62 2%;  $p=0.026$ ). This educational intervention should be used to educate parents, health professionals  
63 and students.

64

65 **Key words:** infants, perceived therapeutic benefits, sun-exposure, neonatal jaundice, nappy rash,  
66 post-partum women.

67 **Introduction**

68

69 Childhood is a critical period for reducing the lifetime risk of skin cancer,<sup>1,2</sup> with an estimated two-  
70 thirds of melanoma cases resulting from excessive sun-exposure in the first 15 years of life.<sup>3</sup>

71

72 Despite a substantial investment in skin cancer prevention, particularly in Australia,<sup>4,5</sup> inappropriate  
73 beliefs about the perceived therapeutic benefits of sun-exposure still prevail. More than half the  
74 mothers of newborns in sunny Queensland (which has high skin cancer rates) favour deliberately  
75 sunning babies to treat jaundice, nappy rash and prevent rickets.<sup>6,7</sup> Research suggests midwives and  
76 paediatricians are major sources of inappropriate advice about sun-exposure.<sup>7,8</sup>

77

78 Here we report the effectiveness of a maternity-hospital based education program to discourage  
79 mothers from exposing themselves and their infants to sunlight for therapeutic reasons in an intense  
80 ultraviolet radiation environment (average UV index: September-March >10; April-August  $\geq$ 6).<sup>9</sup>

81

82 |

**83 Methods**

84

85 In 2002-3 midwives and nursing staff of maternity units of three public hospitals (1 intervention, 2  
86 controls) in northern Queensland (Cairns 16°51'S; Townsville 19°16'S; Mackay 21°10'S) and post-  
87 partum in-patients from the intervention hospital, participated in the study (James Cook University  
88 Ethics Committee approval H1333).

89

90 Posters, bookmarks and brochures giving correct information about sun-exposure were developed for  
91 mothers<sup>10</sup> (Figure). The development of the educational intervention and resources, which was  
92 informed by aspects of the Communication-Behaviour Change Model,<sup>11</sup> has been described  
93 elsewhere.<sup>10</sup>All intervention hospital maternity nursing staff were invited to attend an educational  
94 workshop and/or receive resources outlining risks of therapeutic sun-exposure. Appropriate treatment  
95 of ailments commonly encountered in infancy and the post-partum period were discussed. A resource  
96 package received by staff included: a detailed literature review; a one page fact sheet; and educational  
97 pamphlets (Figure) to use in discussions with parents. The posters, bookmarks and brochures were  
98 displayed in the ward and included in bedside reading materials, baby sample packs and maternal  
99 record books distributed to all women giving birth in the intervention hospital.

100

101 The investigators invited healthy post-partum inpatients in the intervention hospital to participate in a  
102 short semi-structured interview after providing written informed consent. The first cross-section (106  
103 women) was recruited prior to staff in-service workshops commencing; the second cross-section (203  
104 women) was recruited after the last scheduled workshop. Seven in-service workshops and 11  
105 individual sessions were conducted; 86.8% staff attended.<sup>10</sup>

106

107 Process evaluation of the workshops has been conducted previously.<sup>10</sup> Here we assess the  
108 effectiveness of the program among post-partum inpatients of the intervention hospital. Statistical  
109 analysis was conducted using unpaired t-tests, Wilcoxon-Mann-Whitney-U tests, and approximate or  
110 exact Chi-square tests. Multivariable logistic regression analyses were conducted to determine  
111 independent predictors of mothers' intentions to expose themselves or their babies to the sun.

112  
113

**114 Results**

115 Pre- and post-intervention women (mean age 27.8±5.6 years, n=106; vs 27.0±5.7 years, n=203) were  
116 demographically similar except that fewer pre-intervention women had Caucasian ancestry (77.2% vs  
117 84.4%; p=0.030). Of the 67 post-intervention women asked about the intervention materials displayed  
118 in the maternity ward of the intervention hospital, 71.6% reported seeing at least one of them.

119

120 More pre-intervention than post-intervention women reported they would “sun” their baby when  
121 asked what they would do if they suspected jaundice in their newborn (28.8% vs 13.3%; p<0.001),  
122 with a higher proportion of post-intervention than pre-intervention women (81.5% vs 46.7%)  
123 mentioning indirect/filtered sunlight. In a similar question, (possible responses agree/disagree/unsure),  
124 a higher proportion of pre-intervention than post-intervention women reported an intention to “sun”  
125 their child as treatment (28.6% vs 8.9%; p<0.001). This was confirmed by multivariable logistic  
126 regression analysis: POR=0.25, 95%CI [0.12, 0.52] p<0.001, adjusted for confounding effects of  
127 maternal skin colour and maternal education.

128

129 A higher proportion of women in the pre-intervention than post-intervention group considered it  
130 appropriate to intentionally expose their babies to help adapt their skin to sunlight (10.5% vs 2.5%;  
131 p=0.003). There was no significant change in the beliefs about “sunning” for the treatment of nappy  
132 rash (2.9% vs 2.0%; p=0.694) or to obtain adequate vitamin D (6.7% vs 4.4%; p=0.403) following the  
133 intervention.

134

135 When asked about remedies for sore or cracked nipples due to breastfeeding, a higher proportion of  
136 pre-intervention than post-intervention women suggested sunlight for treatment (7.6% vs 2%;  
137 p=0.026), with a quarter of participants from each group mentioning indirect/filtered sunlight. In a  
138 related question (agree/disagree/unsure), more pre-intervention than post-intervention women  
139 considered sunlight a good remedy for cracked nipples (8.6% vs 3.4%; p=0.055). The change in the  
140 response for sunlight for treatment for acne was similar (8.6% vs 3.4%; p=0.055).

141

142 Treatment group did not predict mothers intentions to sun themselves or their babies to synthesize  
143 vitamin D ( $p=0.452$ ) or treat nappy rash ( $p=0.281$ ), and was borderline significant for treating acne  
144 ( $p=0.057$ ) and sore/cracked nipples ( $p=0.059$ ).

145

146



147 **Discussion**

148

149 This unique educational pilot program achieved its aim of improving the quality of information  
150 available to post-partum women, with the intention of affecting their beliefs and behaviours about  
151 using sunlight to treat neonatal jaundice, cracked nipples, acne and adapting baby skin to the sun. This  
152 aspect of skin cancer prevention has not been addressed previously.

153

154 Targeting early childhood is important in primary skin cancer prevention. Excessive sun-exposure  
155 combined with inadequate sun-protection is common during childhood,<sup>2</sup> resulting in 82% of  
156 Australian children experiencing a sunburn by age three.<sup>12</sup> While some progress has been made in sun-  
157 protection of young Australian children, duration of sun-exposure did not decrease.<sup>13</sup> Strategies to  
158 reduce melanoma risk, by curtailing development of melanocytic naevi, should begin in infancy.<sup>14</sup>

159

160 Parents play a key role in their child's sun-protective behaviour<sup>1,15,16</sup> and those who use sun-protection  
161 themselves are more likely to protect their children.<sup>16,17</sup> Thus education about repercussions of  
162 childhood sun-exposure should begin with the parents of neonates and be reinforced throughout  
163 childhood and adolescence.<sup>2,6,14,17,18</sup> There are many skin cancer prevention strategies, yet little  
164 emphasis is placed on sun-protection in infancy or correction of myths about the perceived benefits of  
165 sun-exposure among either parents or health professionals.<sup>8</sup> However, health professionals influence  
166 both parents and children,<sup>6,19</sup> thus their professional education should promote appropriate beliefs.

167

168 This program could be used to educate: health professionals; parents in the pre-natal period and  
169 during infancy; and adapted for undergraduate and post-graduate curricula and in-service training for  
170 health professionals.

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173

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177

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181

**References**

- 182  
183  
184 1. Marks R. An overview of skin cancers. Incidence and causation. *Cancer* 1995;75(2  
185 Suppl):607-12.
- 186 2. Lowe JB, McDermott LJ, Stanton WR, Clavarino A, Balanda KP, McWhirter B. Behavior of  
187 caregivers to protect their infants from exposure to the sun in Queensland, Australia. *Health*  
188 *Educ Res* 2002;17:405-14.
- 189 3. Giles GG, Armstrong BK, Burton RC, Staples MP, Thursfield VJ. Has mortality from  
190 melanoma stopped rising in Australia? Analysis of trends between 1931 and 1994. *BMJ*  
191 1996;312:1121-5.
- 192 4. Buettner PG, Raasch BA. Incidence rates of skin cancer in Townsville, Australia. *Int J*  
193 *Cancer* 1998;78:587-93. Erratum in: *Int J Cancer* 2001 Jul 15;93(2):302-3.
- 194 5. Sinclair C, Foley P. Skin cancer prevention in Australia. *Br J Dermatol* 2009; 161 Suppl  
195 3:116-23.
- 196 6. Harrison SL, Buettner PG, MacLennan R. Why do mothers still sun their infants? *J Paediatr*  
197 *Child Health* 1999;35:296-9.
- 198 7. Harrison S, Büttner P, Nowak M. Maternal beliefs about the reputed therapeutic uses of sun  
199 exposure in infancy and the post-partum period. *Aust J Midwifery* 2005;18:22-28.
- 200 8. Harrison S, Hutton L, Nowak M. An investigation of professional advice advocating  
201 therapeutic sun exposure. *Aust N Z J Public Health* 2002;26:108-15.
- 202 9. Australian Radiation Protection and Nuclear Safety Agency.  
203 <http://www.arpana.gov.au/uvindex/models/towuvmodel.htm> Accessed 13-03-13.
- 204 10. Devine SG, Harrison SL, Buettner PG. Building capacity of maternity staff to discourage the  
205 use of sunlight therapy in the post-partum period and infancy. *Women Birth* 2008;21:107-11.  
206 Epub 2008 Jul 23.
- 207 11. McGuire J. Theoretical foundations of campaigns. In: Rice RE, Atkin C, editors. *Public*  
208 *communication campaigns*. Thousand Oaks, CA: Sage; 1989.
- 209

- 210 12. Stanton WR, Chakma B, O'Riordan DL, Eyeson-Annan M. Sun exposure and primary  
211 prevention of skin cancer for infants and young children during autumn/winter. *Aust N Z J*  
212 *Public Health* 2000;24:178-84.
- 213 13. Smith A, Harrison S, Nowak M, Buettner P, MacLennan R. Changes in the pattern of sun  
214 exposure and sun protection in young children from tropical Australia. *J Am Acad Dermatol*  
215 2012 Dec 22. doi:pii: S0190-9622(12)01197-8. 10.1016/j.jaad.2012.10.057. [Epub ahead of  
216 print].
- 217 14. Harrison SL, MacKie RM, MacLennan R. Development of melanocytic nevi in the first 3  
218 years of life. *J Natl Cancer Inst* 2000;92(17):1436-8.
- 219 15. Weinstein JM, Yarnold PR, Hornung RL. Parental knowledge and practice of primary skin  
220 cancer prevention: gaps and solutions. *Pediatr Dermatol* 2001;18:473-7.
- 221 16. O'Riordan DL, Geller AC, Brooks DR, Zhang Z, Miller DR. Sunburn reduction through  
222 parental role modeling and sunscreen vigilance. *J Pediatr* 2003;142:67-72.
- 223 17. Grob JJ, Guglielmina C, Gouvernet J, Zarour H, Noé C, Bonerandi JJ. Study of sunbathing  
224 habits in children and adolescents: application to the prevention of melanoma. *Dermatology*  
225 1993;186:94-8.
- 226 18. Sancho-Garnier H, Pereira B, Césarini P. A Cluster Randomized Trial to Evaluate a Health  
227 Education Programme "Living with Sun at School". *Int J Environ Res Public Health* 2012  
228 July; 9(7): 2345–2361.
- 229 19. Worsley A. Perceived reliability of sources of health information. *Health Educ Res*  
230 1989;4:367-76.
- 231

232           **Figure Legend:**


233           Posters and a pamphlet produced for the educational intervention to discourage mothers from

234           inappropriately intentionally sunning their babies.

235

# CRACKED NIPPLES

## THE SUN DOES MORE HARM

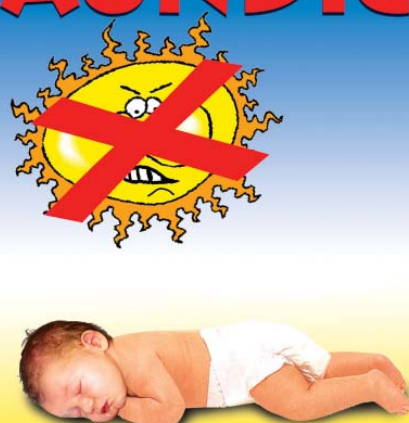


**SEEK ADVICE FROM A HEALTH PROFESSIONAL**

**ALWAYS USE SUNSAFE ALTERNATIVES**

SKIN CANCER RESEARCH GROUP • JAMES COOK UNIVERSITY  
• SCHOOL OF PUBLIC HEALTH AND TROPICAL MEDICINE

# JAUNDICE




**NO NEED FOR SUN**

**SEE YOUR DOCTOR**

**ALWAYS BE SUNSAFE**

SKIN CANCER RESEARCH GROUP • JAMES COOK UNIVERSITY  
• SCHOOL OF PUBLIC HEALTH AND TROPICAL MEDICINE

# NAPPY RASH



**THE SUN DOES MORE HARM**

**ALWAYS BE SUNSAFE**

SKIN CANCER RESEARCH GROUP • JAMES COOK UNIVERSITY  
• SCHOOL OF PUBLIC HEALTH AND TROPICAL MEDICINE

### SUN EXPOSURE AND YOU THE FACTS

- It is **NOT** necessary to expose **NIPPLES** to sunlight as preparation for breast feeding.
- It is **NOT** necessary to use sunlight to treat **CRACKED NIPPLES** caused by breast feeding.
- It is **NOT** necessary to expose **YOURSELF** to the sun to promote healing.

### SUN EXPOSURE AND YOUR BABY

For further information contact

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OR CONTACT YOUR CHILD HEALTH NURSE, MIDWIFE OR DOCTOR.



### CHILDHOOD RISK FACTORS FOR SKIN CANCER

- Australia has the highest rates of skin cancer in the world and the problem is greatest in North Queensland.
- Babies and young children have skin that is very sensitive to sun exposure.
- Exposure to sunlight causes mole development.
- The more moles your child develops the greater the risk of developing melanoma.
- North Queensland children develop moles earlier and in higher numbers than children in other parts of the world.
- Prevention of skin cancer **MUST** start early. **YOU** can lower your child's future risk of skin cancer by protecting their skin from sunlight **NOW**.

### SUN EXPOSURE AND YOUR BABY THE FACTS

- JAUNDICE** should **NOT** be treated by placing your baby in the sun.
- Sunning your baby to treat **NAPPY RASH** does more **HARM** than good.
- Most non-migrant babies in Australia receive enough sunlight to maintain healthy **VITAMIN D** levels and develop healthy bones.
- Regular exposure of your baby's skin will **NOT** increase their tolerance and will **NOT** reduce their risk of getting **CRACKED NIPPLES**.

### HOW TO PROTECT YOUR BABY'S SKIN FROM THE SUN

- Keep your baby out of direct sunlight whenever possible, even in winter.
- Seek shade whenever possible when outdoors.
- Use sun protectors over prams and strollers and over the window of your car.
- Cover your baby with clothing that offers maximum protection - collar, sleeves, darker colours and close weaves to keep out the UVR.
- Loose fitting clothing will keep your child cool.
- When swimming use sun suits that offer UVR protection.
- Shade your baby's face with a broad brimmed hat.
- Use sunscreen as an add on to other forms of sun protection.



Figure: