Parents' Valuation of Latent Health Risks to Their Children

--Working Paper*--

BY:
Mark Dickie
and
Shelby Gerking

University of Central Florida

* For presentation at the US Environmental Protection Agency workshop, "Valuing of a Statistical Life: Assessing the State of the Art for Policy Applications," November 6-7, 2001, in Silver Spring, Maryland. The US Environmental Protection Agency partially funded the research described here under xxx to the University of Southern Mississippi. The research has not been subjected to Agency review and therefore does not necessarily reflect the views of the agency, and no official endorsement should be inferred.

1. Introduction

A key aspect of environmental policy in the United States involves reducing hazards faced by children. Children frequently are at greater risk than adults from environmental hazards such as lead poisoning, pesticides, drinking water contaminants, and exposure to solar radiation (USEPA 1996). Additionally, President Clinton's Executive Order #13045 (*Federal Register* 1997) directed federal agencies to address environmental health and safety risks that disproportionately affect children. Appropriate policy aimed at reducing these risks will differ depending on the hazard considered; yet all such policies operate at least partly through adult caregivers who are responsible for children's behavior. For example, parents can be encouraged to take protective actions that will reduce exposure to environmental hazards. Effectiveness of this approach, however, will depend upon parents' beliefs about risks to their children's health, as well as how they make choices between their children's health, their own health and other goods.

This paper extends previous work by Dickie and Gerking (1996, 1997) to look at decisions parents make for themselves and their children to reduce risk of skin cancer from solar radiation exposure (Scotto, Fears, and Fraumeni 1982, MacKie, Fruedenberger and Aitchison 1989, Finkel 1998, American Cancer Society 2001). Skin cancer is the most common type of cancer occurring in the U.S. (American Cancer Society 2001) and solar radiation exposure during childhood is an important determinant of lifetime skin cancer risk (Reynolds *et al.* 1996, Robinson, Rigel, and Amonette 1997, and Creech and Mayer 1998). In fact, as much as 80% of a person's lifetime accumulation of solar radiation exposure occurs before the age of 18 (American Academy of Dermatology 2001) Two questions are addressed using data from a survey of 160 parents of children aged 3-12. (1) What determines parents' (ex ante) subjective

beliefs about their own and their children's risk of getting skin cancer? (2) How do parents' trade off changes in skin cancer risk to themselves against changes in skin cancer risk to their children? Estimation of this tradeoff is important because it can be interpreted as a measure of parents' altruism toward their children. In general, greater altruism inspires greater confidence that informed parents will take action to protect their children from environmental hazards.

These issues seldom have been directly examined in prior research on children's health, although a few studies have estimated parents' willingness to pay to improve the health of children (for a survey of this literature, see Dickie and Nestor 1998). For example, Agee and Crocker (1996), using a similar approach to that developed by Dickie and Gerking (1991), estimate a production function for risk perceived by parents that their child will develop chronic, lead-induced health impairments. Their analysis, however, does not consider how risk perceptions are formed. Risk perceptions have been extensively studied in previous work (Kunreuther 1976, Lichtenstein *et al.* 1978, Grether and Plott 1979, Kahneman and Tversky 1982, Arrow 1982, Slovic, Fischhoff, and Lichtenstein 1985, and Tversky, Slovic, and Kahneman 1990), but not in cases where parents form beliefs about risks to a child.

The remainder of the paper is divided into five sections. Section 2 develops the theoretical model to be applied. Section 3 describes the survey data collected. Section 4 presents evidence on the determinants of beliefs held by parents about skin cancer risks to themselves and their children. Section 5 estimates an indifference map for parents to support calculation of the tradeoff between skin cancer risks to themselves and their children. Section 6 concludes.

2. *Model*

This section develops a simple, one-period household production function model. Extension to a multi-period framework would be more appropriate particularly for modeling timing of occurrence of skin cancer, but this issue is not explicitly considered here. For ease of exposition, the model deals only with perception and valuation of skin cancer risks within a family and altruism of parents toward their children. The issue of altruism toward persons outside the family would not be difficult to incorporate, but would draw attention away from the family decision-making issues that are the main focus here. In any case, the model described below is familiar so the discussion is kept brief.

A parent's lifetime utility (U) function is

$$U = U(X, R^*_{PN}, R^*_{PM}, R^*_{CN}, R^*_{CM}), \qquad (1)$$

where X denotes a composite good, R^*_{ij} denotes perception of lifetime risk of getting skin cancer, P denotes the parent, C denotes the child, M denotes melanoma skin cancer, and N denotes nonmelanoma skin cancer. Thus, for example, R^*_{CM} denotes perceived risk of the child developing melanoma skin cancer at some point during his/her life. This formulation abstracts from consequences of sunlight exposure such as suntanning/sunburning and aging/wrinkling of skin and draws attention to two types of risk comparisons: (1) between illnesses of different severity (melanoma vs. nonmelanoma) faced by either the parent or child and (2) between the parent and child for a particular type of illness. The model assumes that family resources are allocated to maximize utility of an altruistic parent (or the consensus utility function of two altruistic parents), a working hypothesis adopted in most research on economics of the family (Becker 1991, Behrman, Pollak and Taubman 1995). The possibility of divergent interests of

family members is ignored, although it recently has been applied to value environmental risks in a household production framework (see Smith and van Houtven 1998). Also, the intragenerational issue of unequal treatment of siblings, a common theme when analyzing parents' investment in their children (Rosenzweig and Schulz 1982, and Pitt, Rosenzweig, and Hassan 1990), is ignored and only one child is included in the model. This simplification allows later analysis to focus more directly on how parents make tradeoffs in health risks between themselves and their children.

Parent's perceived risk about their own chances of getting skin cancer are formed according to

$$R^*_{Pj}=R^*_{Pj}(R_{Pj},\boldsymbol{q},\boldsymbol{g}) \qquad (2)$$

Where R_{Pj} denotes actual risk of skin cancer $(j=N,M)$, $\boldsymbol{q}$ denotes the parent's attitudes toward and awareness of effects of sunlight exposure, and $\boldsymbol{g}$ denotes family characteristics such as the number of children present in the household and whether a spouse is present. Actual skin cancer risks to parents, in turn, are determined by

$$R_{Pj}=R_{Pj}(G,\boldsymbol{W}_P) \qquad (3)$$

where G denotes a purchased good that both parent and child may use to reduce harmful effects of sunlight exposure, such as a sun protection product, and $\boldsymbol{W}_P$ denotes aspects of the parents' genetic endowment and history of exposure to solar radiation. Genetic factors such as skin type and complexion and, for example, a history of bad sunburns are important to consider in the context of skin cancer.

Additionally, a parent's perceptions about the child's risk of risk of skin cancer is given by

$$R^*_{Cj}=R^*_{Cj}(R^*_{Pj},R_{Cj},\mathbf{q},\mathbf{g}) \quad (4)$$

where R_{Cj} is the actual risk of skin cancer faced by the child and is determined similarly to equation (3) as shown in equation (5)

$$R_{Cj}=R_{Cj}(G,\mathbf{W}_C) \quad (5)$$

and where $\mathbf{W}_C$ denotes genetic endowment and exposure history of the child. Thus, parents are assumed to see risk to their children as a function of perceived risk to themselves, actual risk to their children, attitudes and family history. This formulation allows for the extreme view that parents form risk beliefs about risks to their children using only their own risk as a reference point. Alternatively, it allows for parents to form beliefs about risks to their children by disregarding beliefs about their own risk and considering only risk factors facing their children. These two possibilities are considered in Section 4, which looks at empirical evidence on how parents form beliefs about risks faced by their children.

Parents maximize utility subject to the budget constraint

$$I=X+q_G G \quad (6)$$

where I denotes income, q_G denotes the price per unit of G and where the price of X has been normalized to unity. Under standard assumptions, the utility-maximizing choice of G can be expressed as a function of the exogenous variables in the model $(I,q_G,\mathbf{q},\mathbf{g},\mathbf{W}_P,\mathbf{W}_C)$. Appropriate substitutions show that R^*_{Pj} and R^*_{Cj} can be expressed in terms of these variables as well as shown in equation (7).

$$R^*_{ij}=f(I,q_G,\mathbf{q},\mathbf{g},\mathbf{W}_P,\mathbf{W}_C) \quad (7)$$

Thus, in this model, beliefs about skin cancer risk can be expressed as the outcome of utility maximizing consumption choices. In an earlier study, Dickie and Gerking (1996) examined how adults form perceptions about their own chances of getting skin cancer. This study develops additional evidence on this point; but the main focus is on parents' perceptions of the likelihood that one of their children will get skin cancer.

Additionally, an indifference map can be developed by solving for the change in expenditure on G that holds parents' utility constant:

$$d(q_G G) = \Sigma_{ij}((q_x U_{R^*_{ij}} / U_x) dR^*_{ij}) - WdT. \qquad (8)$$

Equation (8) can be used to calculate the ex ante willingness to pay or option price of reductions in different types of skin cancer risk faced by the parent and the child. These option prices are the coefficients of dR^*_{pj} and dR^*_{cj} $(j=M,N)$ which are monetized marginal rates of substitution between perceived risk and the composite good. Also, by setting $d(q_G G)=0$, the perceived risk-risk tradeoff between the child's health and the parent's health can be calculated as the ratio of the coefficients of dR^*_{pj} and dR^*_{cj}. Risk-risk tradeoffs have been calculated in other studies in the context of one person facing two (or more) hazards (Viscusi, Magat, and Huber 1991). The analysis presented here reformulates this concept in the context of parents trading-off risk to themselves against a similar risk to a child. Moreover, notice that the desired risk-risk tradeoff (the ratio of monetized marginal rates of substitution) reduces to $U_{R^*_{pj}} / U_{R^*_{cj}}$. In the timeless world considered here, this ratio reflects the parent's strength of preference at the margin for reducing his or her own skin cancer risk versus reducing risks faced by the child. Thus, it measures altruism of parents toward their children in the context of an environmental hazard, extending work by Viscusi, Magat and Forrest (1988).

A key aspect of the survey design involves defining a good *G* so that the four risks changes in equation (8) can be varied independently. This feature is important so as to avoid joint production problems that can complicate both estimation of option prices and development of risk-risk tradeoffs (see Hori 1975 and Bockstael and McConnell 1983 for additional details). In the context of the model at hand, the approach taken involves: (1) defining a hypothetical sunscreen lotion as a bundle of attributes offering different levels of melanoma and nonmelanoma skin cancer protection for adults and children and (2) varying these attributes independently. Product labels would convey information about attributes of the sunscreen products to survey respondents. Thus, this approach builds on earlier studies that have used labels to convey risk information and to elicit preferences for risk reduction (see, for example, Viscusi, Magat, and Huber 1986 and Dickie and Gerking 1996).

3. Data

To implement the model, data were collected during summer of 2000 in an in-person survey of 160 parents of children aged 3-12. All survey respondents lived in Hattiesburg, MS metropolitan statistical area. The location, climate and racial composition of this community make it a desirable setting for a study of risk beliefs about skin cancer. Hattiesburg lies near the coast of the Gulf of Mexico and has a subtropical climate with a great deal of sunshine. Also, African-Americans comprise 26% of the population; thus, risk beliefs between groups with widely divergent skin cancer rates can be examined. Melanoma incidence among whites is about 16 times the incidence among blacks (Ries, *et al.* 1999). Approximately 70% of respondents had participated ina survey focused on acute respiratory illness experienced by adults and children. These respondents originally had been recruited by dialing telephone numbers in the Hattiesburg area at random during daytime and evening hours on both weekdays and weekends. At the

conclusion of the earlier survey, conducted at the University of Southern Mississippi during June-July 2000, respondents indicated whether they were willing to participate in a second survey to be conducted later that summer. Those who indicated a willingness to participate were contacted by telephone during the recruitment of subjects for the skin cancer survey. A fresh round of random digit dialing was used to recruit the remaining 30% of the sample. As telephone calls were made, those contacted were given a brief introduction in which the general idea of the survey was explained, and people were added to the sample if they agreed to participate and if they had at least one biological child between the ages of 3-12 living at their home. Respondents were told that they would receive $30 for participating and were asked to choose a convenient time to come to the University of Southern Mississippi for the interview.

The interview began by ascertaining the race and age of the respondent, the age and gender of all biological children living in the respondent's home, and the number of the respondent's other children who may live elsewhere. Of the 160 sample parents, 51 (32%) were African-American, 110 (69%) were women, and 84% had either one or two biological children living with them. From among the children between the ages of 3-12, one child was randomly selected (if there was more than one) and designated the sample child. The remainder of the survey then obtained information about the parent/respondent and the sample child. Information was not obtained about other children to limit the length of the interview, to avoid repetitive questioning, and because in the model described above, parents treat each child equally. The interview then turned to a brief series of general questions about experiences with skin cancer, such as whether the respondent had ever been diagnosed with this disease or had known of anyone (relatives, friends, or public figures) who had it and/or died from it. Respondents also

were asked if they ever had thought about the possibility of getting skin cancer as well as the possibility that their children might get it.

After these preliminary questions, respondents were shown two posters (one for melanoma and another for non-melanoma). As shown in the example in Figure 1, each poster had two risk ladders. The ladder on the left hand side had 51 numbered steps going from zero to 100 in increments of two and the risk ladder on the right hand side broke down the interval between the first and second rung (i.e., between zero and two chances in 100) into 10 smaller steps. Interviewers explained the concept of chances in 100, pointed out the reference risks shown beside some of the steps on the two ladders, and then showed respondents how to use the two ladders to represent a risk estimate. They then asked respondents to place a pin on the steps that best reflected their own chances of getting both melanoma and non-melanoma skin cancer at some point later in life (or getting it again if the respondent had already had it). After respondents completed this task, attention was directed to the sample child. Interviewers first asked whether the respondent believed that the other natural parent's future risk of skin cancer was higher, lower or about the same as their own and reminded respondents that there may be other factors leading the sample child's risk to be different as well. Then respondents were asked to estimate the lifetime risk of melanoma and non-melanoma skin cancer faced by the sample child using two risk ladders that were identical to the one shown in Figure 1. In answering for both themselves and the sample child, respondents were instructed not to consider the severity of the diseases and to focus only on the chances of occurrence. Interviewers also emphasized that the ladders were to help respondents collect their thoughts about skin cancer risk and did not represent "quiz questions" with right or wrong answers.

Table 1 shows means of initial risk assessments for both types skin cancer risk made by white and black parents for themselves and their sample children. On average, white parents placed their own lifetime risk of getting melanoma and non-melanoma skin cancer at steps 17.3 and 27.7, respectively, while black parents placed the corresponding risk estimates at steps 6.2 and 7.6. These estimates are larger than actual lifetime skin cancer risks estimates reported in Ries *et al.* (1999), which place lifetime melanoma and non-melanoma risks for whites at about steps 1.5 and 20, and for blacks at about steps 0.2 and 0.3. Thus, people in the lowest risk categories appear to have overestimated their own risk by the greatest amount. This outcome is consistent with observations by other investigators that people tend to overestimate small risks. Or, it may imply that some respondents did not understand the difference between the two types of skin cancer as melanoma risks were overestimated by a greater amount than non-melanoma risks. Yet, 16% of respondents represented their risk of non-melanoma skin cancer on the small (right-hand) ladder (see Figure 1) and 32% of respondents did the same to represent their risk of melanoma skin cancer. Additionally, the fact that the survey introduced the possibility of getting skin cancer again if the respondent already had had it does not appear to be a significant complicating factor. Sample members were relatively young (recall that all were parents of a child aged 3-12); their average age was 36 years, 96% were less than 50 years old, and only one reported personal experience with either form of this disease.

Also, Table 1 shows that risk estimates for sample children tended to be lower than those provided for the parent/respondents. For example, white parents placed their sample child's non-melanoma risk at step 21.9 (on average), while placing their own risk at step 27.7. The only exception in this regard is that African-American parents placed melanoma skin cancer risk faced by their children at step 6.6, while placing their own risk at step 6.2. This outcome

conflicts with the possible hypothesis that parents will estimate higher risks for their children than for themselves because children have more years of life remaining in which to get skin cancer. However, it may reflect parents' beliefs that they take greater precautions regarding skin cancer risks with their own children than their parents did in an era when less information was available about consequences of solar radiation exposure. Also, it may reflect a broader desire on the part of some parents to see harm come to themselves before coming to their children and/or an expectation that medical science will find ways to reduce future risks below the levels faced today. In any case, this finding together with the speculative explanations, points to an opportunity for more theoretical work as well as additional empirical estimates to see whether it emerges in related settings.

In the next segment of the survey, interviewers provided information to respondents about skin cancer risks and asked questions about skin cancer risk factors. To begin, respondents were told that the average person has an 18 percent chance of getting non-melanoma skin cancer and a 1.4 percent chance of getting melanoma skin cancer. Interviewers identified these points on the two sets of risk ladders using different colored pins, further indicated that skin cancer risk is higher for some demographic groups than others, and then moved the pins to show the applicable risks for the respondent's and sample child's race/gender group. Lifetime non-melanoma and melanoma risks shown were 28 percent and 1.8 percent for white males, 0.4 percent and 0.2 percent for black males, 12 percent and 1.4 percent for white females, and 0.2 percent and 0.2 percent for black females.

Then, interviewers collected information regarding genetic and lifestyle risk factors for both the respondent and the sample child. Data collected about genetic risk factors included natural skin color, sensitivity of skin to direct sunlight, eye color, natural hair color, freckles, and

moles as well as whether an immediate relative ever had been diagnosed with skin cancer. Information obtained about lifestyle risk factors included time spent outdoors between 11 a.m. and 3 p.m. in a typical week during the summer months, a judgment as to whether lifetime exposure to sunlight had been more or less time than average, experience with bad sunburns, protective clothing (i.e., hats and long sleeve shirts) worn while in direct sunlight, and use of sun protection products.

After providing (and receiving) information about genetic and lifestyle risk factors, respondents were asked to make a second estimate of lifetime melanoma and non-melanoma skin cancer risk for themselves and their sample children. Respondents made these estimates using the same risk ladders as before, so their own initial estimates and average risk estimates provided by the interviewers were in view. As shown in Table 1, mean revised risk estimates are lower than initial risk estimates in all cases considered. Yet, even after receiving information about the two types of skin cancer, demographic group, African-Americans continued to provide apparent overestimates of risk for themselves as well as their children and all respondents continued to substantially overestimate the lifetime risk of developing melanoma skin cancer. For example, white parents, on average, placed their own risk of melanoma at step 10.1 on the ladder, reflecting a risk estimate about 5 times higher than the actual risk they were shown. Also, respondents generally continued to estimate greater skin cancer risks for themselves than for their children.

The final part of the survey assessed willingness to pay for a hypothetical sun protection product. Respondents were shown one of four labels describing the hypothetical sunscreen and were given time to read it as if they were thinking of buying the product for the first time. Labels were randomly assigned to respondents and each label was presented to 40 respondents.

Each of the labels (see Figure 2 for an example) indicated that the new sunscreen would be similar in some respects to currently marketed products (available in a variety of SPFs, non-comedogenic, oil-free, and unscented); but that it would be more water-resistant and offer greater levels of skin cancer protection. The four labels differed in the amount of skin cancer protection offered. One label (the label shown in Figure 2) offered "clinically proven maximal protection against exposures that increase chances of both melanoma and non-melanoma." A second label offered limited protection against these exposures, while the third and fourth labels offered maximal protection against one type of skin cancer, but limited protection against the other.

Interviewers reviewed the features of the sunscreen label shown and then asked how much it would reduce both melanoma and non-melanoma skin cancer risks for both respondents and their sample children if they began using it right away according to the directions. Respondents then had an opportunity to make new estimates of lifetime skin cancer risk on each ladder which, when compared to the revised risk estimate discussed previously, reflected the perceived effectiveness of the product. Also, respondents were asked whether they would buy enough of the product to last one year for themselves and their sample children at one of eight prices. Interviewers instructed respondents not to consider buying the sunscreen for other people, such as other household members. Prices were randomly assigned to respondents, did not depend on the label shown, and each price was presented to 20 respondents. If respondents said that they would buy (not buy) at the stated price, they were asked if their decision would be the same at a higher (lower) price. Table 2 shows the resulting frequency distribution of initial prices for the sunscreen offered. Among white respondents, 70% indicated that they would buy the sunscreen at the initial price offered, whereas 29% of blacks chose to buy at the initial price.

The survey then concluded by ascertaining marital status, schooling completed, occupation, and household income for each respondent.

4. Determinants of Risk Beliefs

This section estimates determinants of parents' beliefs about skin cancer risk faced by their sample child. Data described in the previous section are applied to estimate equation (4) developed in Section 2. Estimates of this equation are useful in showing the extent to which parents use their own risk as a reference point in assessing a similar risk to their children. To obtain the equation estimated, equation (5) was substituted into equation (4) to obtain

$$R^{*}_{Cj}=g(R^{*}_{Pj},G,\boldsymbol{W}_{C},\boldsymbol{g}\,\boldsymbol{q}) \qquad j=M,N \qquad (9)$$

Two regressions are estimated, one for melanoma risk and another for non-melanoma risk, and estimation accounts for endogeneity of parent perceptions of their own skin cancer risk (R^{*}_{Pj}) and use of the sun protection product, G.

Table 3 reports results of estimating equation (9) along with means and definitions of all variables used. In both regressions shown, the dependent variable is the initial step number from the risk ladder chosen by the parent/respondent to estimate perceived lifetime skin cancer risk to the sample child, measured as chances in 100. Instruments for parent's own perceived risk of skin cancer (both melanoma and non-melaoma) and for the sample child's use of sun protection products were constructed using predicted values from regressions of these variables on measures of ($I,q_G,\boldsymbol{q},\boldsymbol{g},\boldsymbol{W}_P,\boldsymbol{W}_C$), as discussed in connection with equation (7) in Section 2. Results of these regressions are reported in Appendix A. Also, in Table 3, the regressions reported were jointly estimated because medical and epidemiological evidence suggests that melanoma and non-melanoma risk factors are somewhat different. Whereas particular types of "dangerous"

moles (large, irregularly shaped, with shades of varying colors, and/or having a flat portion) and irregular but intense exposure to solar radiation are thought factors leading to greater risk of melanoma, non-melanoma risk has not been associated with these factors.

Results presented in Table 3 show that parents appear to have relied heavily on their estimate of skin cancer risk to themselves in making estimates of skin cancer risk to their sample child. In the survey, parents made risk estimates for themselves before being asked to make risk estimates for their sample child. Thus, a possible interpretation of this outcome is that parents recognized genetic similarities between themselves and their children and that some skin cancer risk factors are inherited characteristics. In any case, the coefficients of the parent perceived risk variable in both the melanoma and non-melanoma equations equation were positive fractions that differed from zero at conventional significance levels. Both coefficients also were significantly less than unity, reflecting the previously discussed tendency for parents to make lower estimates of skin cancer risk for their children than they made for themselves.

In contrast, parent/respondents appear to have disregarded information about the sample child's skin color and complexion type as well as whether the child had freckles and/or particular types of moles in forming beliefs about both melanoma and non-melanoma skin cancer risk. Effects of these factors on skin cancer risks, however, may already have been picked up in the parent risk variable just discussed if it can be interpreted as a marker for transmission of genetic characteristics from parent to child. In this same vein, the child's gender has no effect on the parent's risk assessment even though females tend to have lower risk than males in the general population. This result also supports the notion that parents form beliefs about the child's risk through the lens of their own risk and do not explicitly the child's own risk factors.

Additionally, results from both the melanoma and non-melanoma equations indicate that respondents took account of perceived skin cancer risks faced by the other biological parent in making the risk assessment for the sample child. If parent/respondents believed that the other biological parents' risk was higher (lower) than their own, a higher (lower) risk estimate was made for the sample child. These effects were significant in both regressions at less than the 5% level under a one-tail test. This outcome is not surprising because, as discussed in Section 2, respondents were reminded that the other biological parent's risk should be considered just prior to asking for a risk assessment for the child. Yet, it does reinforce the interpretation above that parents make skin cancer risk assessments for their children partly on the basis of inherited characteristics.

Parents also based their sample child's risk assessment of both melanoma and non-melanoma on prior exposure to solar radiation and ethnicity. On the one hand, if the child had ever used sunscreen, parents lowered their risk estimate by 12.1 percentage points in the case of non-melanoma and 10.6 percentage points in the case of melanoma. On the other hand, if the child had experienced three or more bad sunburns over his/her lifetime, parents increased their risk assessment by about 9.8 percentage points in the case of non-melanoma and 5.7 percentage points in the case of melanoma. Also, African-American respondents provided lower risk assessments for their children by 11.4 percentage points in the case of non-melanoma and by 7.6 percentage points in the case of melanoma. These results are noteworthy in that the survey elicited initial risk assessments *before* focusing on solar radiation exposure history and socioeconomic/demographic measures. Thus, these results again suggest that parents are at least broadly familiar with skin cancer risk factors and take them into account when making risk assessments for their children.

5. *Tradeoffs Between Parent and Child Health*

Empirical estimates showing how parents make tradeoffs between their own health and the health of their children are based on equation (7) from Section 2 together with data described in Section 3. As previously discussed, equation (7) shows how parents vary expenditures on G in the face of perceived skin cancer risk changes to themselves and their children, holding utility constant. Expenditure data were obtained from responses about intentions to buy the hypothetical sun protection product. More specifically, dG is measured as the amount that respondents said they would pay for one year's supply of the sunscreen for themselves and their sample children. Perceived risk changes were measured by the difference between the revised and final steps chosen on the risk ladder, with the expectation that greater differences would be associated with higher intended expenditures.

The intended expenditure data are analyzed using the double-bound model described by Hanemann (1991), Cameron and Quiggen (1994), and Alberini (1995). Three issues warrant further discussion before discussing results. First, respondents intended expenditures for the hypothetical sunscreen may have been influenced not only by its perceived effectiveness in reducing skin cancer risk, but also by its perceived effects on sun tanning, premature aging of skin, and possibly other factors. These joint production issues are ignored in developing the estimates presented below because earlier work (Dickie and Gerking 1996) focused extensively on these issues in a similar context, finding that they were relatively unimportant in determining willingness to pay for reducing skin cancer risk. Second, the expenditure data obtained from the survey pertains to a one-year's supply of sunscreen, rather than the lifetime supply envisioned in the theoretical model. This discrepancy is treated as an errors-in-variables problem in which the always non-negative disturbance imparts a downward bias to the estimate of the constant term,

but has no effect on other estimates. Third, the analysis allows for probable simultaneity between sunscreen expenditure and perceived risk change. Appendix B reports estimates of four equations for perceived risk change (parent and sample child risk of both melanoma and non-melanoma skin cancer) as a function of genetic risk factors, historical behavior, and socioeconomic/demographic characteristics. The estimator for the intended expenditure equation is adapted from methods developed by Amemiya (1978, 1979) for simultaneous probit and tobit models. Amemiya showed that his estimator was more efficient than the more commonly employed two-stage estimator that uses predicted values of jointly determined variables as regressors.

Results from estimating the double-bound model are shown in Table 4. Coefficients presented are marginal effects, interpreted as the change in willingness to pay for the hypothetical sunscreen for a one-unit change in an explanatory variable. As shown, three of the four risk change variables have marginal effects that are not significantly different from zero at conventional levels. The marginal effect of risk change for the sample child, however, is positive and significantly different from zero at less than the 5% level using a two-tailed test. This estimate suggests that parents are willing to pay about $3.18 for a one-percentage point reduction in non-melanoma risk to the child. Table 4 also indicates that willingness to pay for the sunscreen is higher for parents who were shown one of the two labels offering maximum protection from melanoma and who said that their sample child would use it.

An illustrative estimate of the marginal rate of substitution between risk to parents and risk to their children can be calculated simply by taking the ratio of the marginal effects of two risk changes reported in Table 4 (see discussion of equation (8)). Disregarding its low t-statistic, the point estimate of willingness to pay by parents' to reduce their own non-melanoma risk is

$1.29 and the corresponding point estimate for sample children is $3.18, as discussed above. Thus, the marginal rate of substitution in this case would be about 2.47, a result suggesting that parents are willing to accept about a 2.5 percentage point increase in non-melanoma skin cancer risk to themselves in return for lowering this risk to their children by one percentage point. Of course, this calculation only is an illustration in light of the fact that the marginal effect of a change in parent risk on willingness to pay for the sunscreen did not differ significantly from zero. Additionally, a Wald test for equality of the marginal effects of parent non-melanoma risk change and children's non-melanoma risk change yields a p-value of 0.39. Thus, the null hypothesis that the marginal rate of substitution between risk to children and risk to parents equals unity cannot be rejected a conventional levels of significance.

6. Conclusion

This paper has looked into the way in which parents view their children's health using data collected from a survey of risk beliefs about skin cancer. The survey involved an extensive questionnaire administered to 160 parent/respondents living in Hattiesburg, MS with biological children currently aged 3-12. Evidence was presented suggesting that parents form beliefs about risks to their children largely through the lens of their beliefs about risks to themselves. In estimates presented, parents' own risk beliefs were a key determinant of their beliefs about their children's risk, while the children's genetic risk factors appeared to be relatively unimportant. An implication of this outcome is that public information policies about skin cancer risks to children is to make certain that parents understand that they themselves are at risk.

REFERENCES

Agee, Mark D. and Thomas D. Crocker, "Parental Altruism and Child Lead Exposure: Inferences from the Demand for Chelation Therapy," *Journal of Human Resources*, 31 (1996), 677-691.

Alberini, Anna, "Efficiency vs. Bias of Willingness-to-Pay Estimates: Bivariate and Interval-Data Models," *Journal of Environmental Economics and Management,* 29 (1995), 169-80.

American Academy of Dermatology. Who is at Most Risk for Melanoma (2001). (http://www.derm-infonet.com/melanomanet/risk_factors.htm)

American Cancer Society. Cancer Reference Information: All about Skin Cancer (2001). (http://www.cancer.org)

Arrow, Kenneth J., "Risk Perception in Psychology and Economics," *Economic Inquiry*, 20 (January 1982), 1-9.

Becker, Gary, *A Treatise on the Family*. Cambridge: Harvard University Press (1991).

Behrman, Jere R., Robert A. Pollak, and Paul Taubman, *From Parent to Child: Intrahousehold Allocations and Intergenerational Relations in the United States.* Chicago: The University of Chicago Press (1995).

Bockstael, Nancy E. and Kenneth E. McConnell, "Welfare Measurement in the Household Production Framework," *American Economic Review*, 73 (September 1983), 806-14.

Cameron, Trudy A. and John Quiggen, "Estimation Using Contingent Valuation Data from a 'Dichotomous Choice with Follow-up' Questionnaire," *Journal of Environmental Economics and Management,* 27 (1994), 218-34.

Creech, L.L. and J.A. Mayer, "Ultraviolet Radiation Exposure in Children: A Review of Measurement Strategies," *Annals of Behavioral Medicine*, 19 (1998), 399-407.

Dickie, Mark and Shelby Gerking, "Willingness to Pay for Ozone Control: Inferences from the Demand for Medical Care," *Journal of Environmental Economics and Management*, 21 (July 1991b), 1-17.

Dickie, Mark and Shelby Gerking, "Formation of Risk Beliefs, Joint Production and Willingness to Pay to Avoid Skin Cancer," *Review of Economics and Statistics,* 78 (August 1996), 451-63.

Dickie, Mark and Shelby Gerking, "Genetic Risk Factors and Offsetting Behavior: The Case of Skin Cancer," *Journal of Risk and Uncertainty*, 15 (October 1997), 81-97.

Dickie, Mark and Deborah Vaughn Nestor, "Valuation of Environmental Health Risks to Children: A Survey," presented at the World Congress of Environmental and Resource Economists, Venice, Italy (June 1998).

Federal Register. Executive Order 13045—Protection of Children from Environmental Health Risks and Safety Risks (April 21, 1997) 564-566.

Finkel, Elizabeth, "Sorting the Hype from the Facts in Melanoma," *The Lancet* 351 (June 20, 1998), 1866.

Grether, David and Charles Plott, “Economic Theory of Choice and the Preference Reversal Phenomenon,” *American Economic Review*, 69 (September 1979), 623-38.

Hanemann, W. M., J. Loomis, and B. Kanninen, “Statistical Efficiency of Double-Bounded Dichotomous Choice Contingent Valuation,” *American Journal of Agricultural Economics*, 73 (1991), 1255-63.

Hori, Hajime, “Revealed Preferences for Public Goods,” *American Economic Review*, 65 (December 1975), 978-91.

Kahneman, Daniel and Amos Tversky, ”The Psychology of Preferences,” *Scientific American*, 246 (January 1982), 160-73.

Kunreuther, Howard et al., “Limited Knowledge and Insurance Protection,” *Public Policy*, 24 (Spring 1976), 227-61.

Lichtenstein Sarah, Paul Slovic, Baruch Fischhoff, Mark Layman, and Barbara Combs, “Judged Frequency of Lethal Events,” *Journal of Experimental Psychology*, 4 (November 1978), 551-78.

MacKie, Rona M., T. Freudenberger and T.C. Aitchison, “Personal Risk Factor Chart for Cutaneous Melanoma,” *The Lancet* 354, (August 26, 1989), 487-90.

Pitt, Mark M., Rosenzwieg, Mark R., and Hassan, Md. N., “Productivity, Health, and Inequality in the Intrahousehold Distribution of Food in Low-Income Countries,” *American Economic Review*, 80 (December 1990), 1139-58.

Reynolds, K.D., J.M. Blaum, P.M. Jester, H. Weiss, S.J. Soong, R.J. Diclemente, “Predictors of Sun Exposure in Adolescents in a Southeastern U.S. Population,” *Journal of Adolescent Health*, 19 (1996), 409-15.

Ries, L.A.G., Kosary, C.L., Hankey, B.F., Miller, B.A., Clegg, L., and Edwards, B.K. (eds.) *SEER Cancer Statistics Reivew, 1973-96*, National Cancer Institute. Bethesda, MD, 1999.

Robinson, J.K., D.S. Rigel, and R.A. Amonette, “Trends in Sun Exposure, Attitudes, and Behaviors: 1986 to 1996,” *Journal of the American Academy of Dermatology*, 37 (1997), 179-86.

Rosenzweig, Mark R. and Schulz, T. Paul, “Market Opportunities, Genetic Endowmwnts, and Intrafamily Resource Distribution,” *American Economic Review*, 72 (September 1982), 803-815.

Scotto, J., T.R. Fears and J.F. Fraumeni, Jr., “Solar Radiation,” in *Cancer Epidemiology and Prevention* (D. Schottenfeld and J.F. Fraumeni, editors). Philadelphia: W.B. Saunders Co (1982), 254-76.

Slovic, Paul, Baruch Fischhoff, and Sarah Lichtenstein, “Regulation of Risk: A Psychological Perspective,” in Roger Noll (ed.), *Regulatory Policy and the Social Sciences* (Berkeley: University of California Press, 1985).

Smith, V. Kerry and George van Houtven, “Non-Market Valuation and the Household,” presented at the Allied Social Sciences Association annual meeting, January 1998.

Tversky, Amos, Paul Slovik, and Daniel Kahneman, “The Causes of Preference Reversal,” *American Economic Review*, 80 (March 1990), 204-17.

U.S. Environmental Protection Agency, *A National Agenda to Protect Children's Health from Environmental Threats* (1996), Washington, DC.

Viscusi, W. Kip. Wesley Magat and Joel Huber, "Informational Regulation of Consumer Health Risks: An Empirical Evaluation of Hazard Warnings," *Rand Journal of Economics* 17 (Autumn 1986), 351-65.

Viscusi, W. Kip, Wesley Magat, and Joel Huber, "Pricing Environmental Health Risks: Survey Assessments of Risk-Risk and Risk-Dollar Tradeoffs for Chronic Bronchitis," *Journal of Environmental Economics and Management*, 21 (1991), 32-51.

Viscusi, W. Kip, Wesley Magat, and Anne Forrest, "Altruistic and Private Valuations of Risk Reduction," Journal of Policy Analysis and Management, 7 (Winter 1988), 227-45.

Table1: Mean Values of Perceived Risk

	Parent				Child			
	Non-Melanoma		Melanoma		Non-Melanoma		Melanoma	
	Initial Risk	Revised Risk	Initial Risk	Revised Risk	Initial Risk	Revised Risk	Initial Risk	Revised Risk
White	27.67	21.85	17.28	10.09	21.90	15.23	13.93	5.87
Black	7.64	4.33	6.18	3.45	6.78	3.67	6.58	2.51

Table 2. Number of "Yes" and "No" Responses by Initial Price.

	White		Black	
Initial Price	Yes	No	Yes	No
$ 5	14	0	3	3
$10	14	1	1	4
$15	11	1	3	5
$20	15	3	0	2
$30	8	4	2	6
$40	6	6	2	6
$50	5	7	3	5
$60	3	11	1	5
Total	76	33	15	36

Table 3: Parent's Perception of Children's Skin Cancer Risk, 3SLS Estimates[a]

Explanatory Variable	Non-melanoma	Melanoma
Respondent's Own Perceived Risk[c]	0.49 (6.026)	0.645 (10.796)
Child Uses Sunscreen[c]	-12.139 (-2.304)	-10.602 (-2.813)
Child complexion is fair	-0.266 (-0.098)	-1.517 (0.778)
Child skin is type1	1.642 (0.689)	0.668 (0.396)
Child has freckles	2.989 (1.244)	-0.370 (-0.22)
Respondent thinks other parent has higher risk	3.868 (1.824)	3.35 (-2.199)
Respondent thinks other parent has lower risk	-4.3013 (-1.863)	-3.551 (-2.245)
Child has had 3 on more bad sunburns	9.771 (2.954)	5.693 (2.409)
Child is female	-1.504 (-0.901)	-0.515 (-0.433)
Respondent is black	-11.395 (-2.959)	-7.637 (-2.699)
Respondent knows people who have had skin cancer	0.775 (0.369)	0.005 (-0.003)
Child has a "dangerous"mole	-----[b]	-0.829 (-0.61)
Child has had irregular exposure	-----[b]	-0.886 (-1.098)
Constant	16.577 (3.430)	12.775 (3.656)

a.t-statistics in parentheses beneath coefficient
b. Excluded variable
c. Endogenous variable.

Table 4: Parent's Willingness to Pay for Reductions in Skin Cancer Risk

Explanatory Variable	Marginal Effect[a]
Parent's non-melanoma risk change[b]	1.294 (1.211)
Children's non-melanoma risk change[b]	3.188 (2.001)
Parent's melanoma risk change[b]	0.473 (0.362)
Children's melanoma risk change[b]	-2.048 (-1.064)
Respondent is black	-5.186 (-0.764)
Respondent uses sunscreen	4.338 (0.426)
Child uses sunscreen	43.285 (3.451)
Maximum non-melanoma protection label	-4.198 (-0.601)
Maximum melanoma protection label	13.524 (2.146)
Constant	-13.044 (-1.342)

a.t-statistics in parentheses beneath marginal effects
b. Endogenous variable.

Appendix Table A-1. Reduced Form Equations. Estimated Coefficients (*t*-statistics).

Explanatory Variable	Respondent's own Initial Risk Assessment (Non-Melanoma)	Respondent's own Initial Risk Assessment (Melanoma)	Child's use of sun protection products
Respondent complexion is fair	-5.646 (-0.825)	-0.766 (-0.124)	-0.132 (-1.057)
Respondent skin is Type 1	6.841 (1.281)	4.866 (1.010)	0.004 (0.039)
Respondent has freckles	-4.392 (-1.014)	0.457 (0.117)	0.119 (1.509)
Respondent has a "dangerous" mole	10.308 (2.365)	6.538 (1.662)	0.095 (1.199)
Respondent exposure has been irregular	-1.871 (-0.462)	-0.041 (-0.011)	-0.004 (-0.048)
Respondent has had 3 or more bad sunburns (with peeling/blisters)	6.561 (1.325)	5.975 (1.338)	0.057 (0.631)
Respondent had bad sunburn as child or teenager	-5.900 (-1.225)	-4.843 (-1.115)	0.133 (1.511)
Respondent is female	2.926 (0.689)	2.833 (0.739)	0.088 (1.139)
Respondent age in years	0.022 (0.078)	0.226 (0.872)	0.006 (1.159)
Respondent thinks own lifetime exposure is greater than average	-1.540 (-0.354)	-8.457 (-2.153)	-0.034 (-0.432)
Respondent thinks own lifetime exposure is less than average	-1.732 (-0.399)	-7.870 (-2.012)	-0.049 (-0.617)
Child complexion is fair	4.385 (0.683)	-0.271 (-0.047)	-0.001 (-0.009)
Child skin is Type 1	3.323 (0.606)	-1.951 (-0.394)	-0.064 (-0.640)
Child has freckles	-5.415 (-1.037)	-2.886 (-0.612)	0.033 (0.341)
Child has a "dangerous" mole	2.026 (0.320)	1.669 (0.292)	0.137 (1.187)
Respondent thinks other parent has higher risk	2.616 (0.593)	1.054 (0.265)	-0.052 (-0.640)
Respondent thinks other parent has lower risk	8.395 (1.843)	2.669 (0.649)	-0.151 (-1.816)
Child exposure has been irregular	0.428 (0.111)	0.597 (0.172)	0.076 (1.084)
Child has had 3 or more bad sunburns (with peeling/blisters)	10.203 (1.570)	7.830 (1.336)	-0.102 (-0.864)
Child is female	2.899 (0.867)	-0.926 (-0.307)	0.059 (0.964)

Appendix Table A-1 (Continued) Reduced Form Equations. Estimated Coefficients (t-statistics).

Explanatory Variable	Respondent's own Initial Risk Assessment (Non-Melanoma)	Respondent's own Initial Risk Assessment (Melanoma)	Child's use of sun protection products
Child age in years	-1.099 (-1.725)	-0.270 (-0.470)	-0.016 (-1.418)
Race = Black	-13.419 (-2.161)	-11.216 (-2.002)	-0.527 (-4.650)
Respondent knows of relative, friend or public figure diagnosed with skin cancer	3.772 (0.898)	1.350 (0.356)	0.031 (0.411)
Family income	2.362 (0.496)	-1.127 (-0.262)	-0.059 (-0.682)
Family income	2.776 (0.460)	-1.542 (-0.283)	-0.024 (-0.220)
Number of children	-1.233 (-0.649)	0.474 (0.276)	-0.028 (-0.811)
Respondent is married	-2.289 (-0.529)	-4.190 (-1.074)	-0.063 (-0.795)
Respondent is college graduate	2.578 (0.630)	-0.900 (-0.244	0.051 (0.687)
Respondent is employed	2.635 (0.553)	2.001 (0.465)	-0.024 (-0.274)
Respondent has blue-collar occupation	-4.086 (-0.987)	0.741 (0.198)	-0.132 (-1.747)
Respondent looks better with tan	-2.285 (-0.436)	5.461 (1.155)	0.016 (0.168)
Child looks better with tan	6.865 (1.449)	-5.195 (-1.215)	0.026 (0.299)
Constant	22.146 (1.757)	9.892 (0.870)	0.667 (2.901)
R^2	.37	.27	.58
F statistic p-value	<.001	.07	<.001
N	160	160	160

Appendix Table A-2. Reduced Form Equations: Changes in Perceived Risks. Estimated Coefficients (*t*-statistics).

	Changes in Perceived Risk with Use of New Sunscreen			
	Non-Melanoma Risk Change		Melanoma Risk Change	
Explanatory Variable	Respondent	Child	Respondent	Child
Respondent complexion is fair	-3.555 (-1.764)	1.425 (1.010)	-5.124 (-3.074)	0.328 (0.345)
Respondent skin is Type 1	-2.851 (-1.691)	-0.455 (-0.386)	-0.030 (-0.021)	-0.778 (-0.979)
Respondent has freckles	-0.815 (-0.595)	0.371 (0.387)	-0.255 (-0.225)	-0.172 (-0.266)
Respondent has a "dangerous" mole	0.335 (0.256)	1.470 (1.603)	0.094 (0.087)	0.385 (0.623)
Respondent is female	-1.179 (-0.918)	-0.809 (-0.900)	-0.505 (-0.475)	-1.287 (-2.125)
Respondent age in years	-0.076 (-0.850)	0.018 (0.295)	-0.099 (-1.342)	-0.040 (-0.940)
Respondent thinks own lifetime exposure is greater than average	-0.873 (-0.639)	-1.122 (-1.174)	-0.547 (-0.484)	-0.171 (-0.266)
Respondent thinks own lifetime exposure is less than average	1.381 (1.057)	0.643 (0.702)	0.119 (0.110)	0.233 (0.379)
Respondent thinks inherited risk factors give self greater than average chance of skin cancer	2.883 (1.503)	-0.145 (-0.108)	3.845 (2.423)	0.122 (0.135)
Respondent thinks inherited risk factors give self lower than average chance of skin cancer	0.515 (0.257)	0.490 (0.350)	-2.318 (-1.400)	-0.620 (-0.657)
Child complexion is fair	-0.669 (-0.335)	-3.190 (-2.282)	2.758 (1.669)	-1.545 (-1.641)
Child skin is Type 1	2.529 (1.509)	1.878 (1.600)	-0.648 (-0.467)	-0.150 (-0.189)
Child has freckles	1.192 (0.783)	1.030 (0.967)	2.039 (1.620)	0.118 (0.164)
Respondent thinks inherited risk factors give child greater than average chance of skin cancer	-2.909 (-1.455)	-1.822 (-1.301)	-1.696 (-1.025)	1.068 (1.132)
Respondent thinks inherited risk factors give child lower than average chance of skin cancer	-1.944 (-1.019)	-0.629 (-0.471)	1.691 (1.071)	1.178 (1.309)
Respondent thinks other parent has higher risk	-0.127 (-0.094)	0.742 (0.779)	1.950 (1.733)	-0.021 (-0.033)
Respondent thinks other parent has lower risk	2.257 (1.585)	0.343 (0.344)	1.165 (0.988)	-0.983 (-1.464)
Child has had 3 or more bad sunburns (with peeling/blisters)	-0.047 (-0.034)	0.866 (0.900)	0.096 (0.085)	1.452 (2.238)

Appendix Table A-2 (Continued). Reduced Form Equations: Changes in Perceived Risks. Estimated Coefficients (*t*-statistics).

Explanatory Variable	Respondent	Child	Respondent	Child
Child is female	-0.197 (-0.174)	0.460 (0.582)	-1.351 (-1.447)	0.103 (0.193)
Child age in years	-0.087 (-0.458)	-0.139 (-1.048)	0.102 (0.651)	0.029 (0.329)
Race = Black	0.659 (0.366)	0.676 (0.536)	-0.317 (-0.213)	0.122 (0.144)
Family annual income	3.161 (2.150)	0.523 (0.508)	3.341 (2.747)	0.638 (0.920)
Family annual income	0.517 (0.276)	-0.261 (-0.199)	1.459 (0.941)	1.498 (1.695)
Number of children	0.324 (0.549)	-0.538 (-1.301)	0.618 (1.266)	-0.243 (-0.872)
Respondent is married	0.001 (0.001)	-1.703 (-1.764)	-0.618 (-0.542)	-0.487 (-0.749)
Respondent is college graduate	-2.293 (-1.892)	-0.171 (-0.201)	-2.192 (-2.187)	0.361 (0.631)
Respondent is employed	0.480 (0.329)	0.326 (0.319)	-1.250 (-1.035)	-0.925 (-1.344)
Respondent has blue-collar occupation	0.146 (0.117)	-0.648 (-0.744)	1.146 (1.113)	0.326 (0.555)
Respondent would use new sunscreen if purchased	1.750 (0.948)	0.945 (0.731)	0.285 (0.187)	0.647 (0.743)
Child would use new sunscreen if purchased	1.160 (0.572)	1.103 (0.777)	0.114 (0.068)	-0.278 (-0.291)
Label indicates maximum non-melanoma protection	1.109 (1.084)	-0.794 (-1.109)	1.067 (1.261)	-0.623 (-1.291)
Label indicates maximum melanoma protection	-0.901 (-0.919)	0.106 (0.155)	0.639 (0.788)	0.040 (0.087)
Respondent non-melanoma RISK1	0.192 (4.272)	-0.002 (-0.078)	-0.010 (-0.264)	0.007 (0.350)
Child non-melanoma RISK1	-0.170 (-1.992)	0.195 (3.261)	-0.263 (-3.732)	-0.095 (-2.356)
Respondent melanoma RISK1	-0.049 (-0.743)	0.025 (0.536)	0.206 (3.792)	0.136 (4.376)
Child melanoma RISK1	0.287 (2.405)	0.092 (1.096)	0.304 (3.083)	0.329 (5.851)
Constant	2.410 (0.666)	0.814 (0.321)	3.178 (1.062)	2.437 (1.428)
R^2	0.440	0.530	0.570	0.740
F statistic p-value	0.001	0.001	0.001	0.001
N	153	153	153	153

FIGURE 1
PARENT'S LIFETIME CHANCE OF **NON-MELANOMA** SKIN CANCER

100

90

80

70

60

50

Coronary heart disease

40

Auto Accident Injury

30

20

Prostate cancer (men)
Breast cancer (women)

10

Lung cancer
Colon/rectal cancer

0

2 Ovary cancer (women)

1 Leukemia

Testicular cancer (men)

0 ***Struck by lightning***

Sun Protection Lotion

For Adults & Children

Developed with dermatologists to protect skin from harmful effects of sun exposure.

Non-Melanoma Protection

Melanoma Protection

Ultra Waterproof

SPF ___

New SkinSaver® sun protection lotion.

Skin Cancer Protection

Clinically proven maximal protection against long-term skin damage from total exposure to sun	Used regularly, helps reduce chances of Non-Melanoma skin cancer
Clinically proven maximal protection against long-term skin damage from incidents of over-exposure to sun	Used before high exposure, helps reduce chances of Melanoma skin cancer

Parents Note: 80% of lifetime sun exposure occurs before age 18 and even one incident of over-exposure in childhood can increase chances of Melanoma. Protect your child *and* yourself with SkinSaver®.

More Skin Protection

Parsol®1789	Extra protection against premature skin aging
SPF ___	__ times the skin's natural sunburn protection

More Added Features

* Ultra long-lasting waterproof formula – One application lasts all day *
* Non-comedogenic–Won't block pores * Oil-free–Won't feel greasy *
* Gentle enough for faces – even under make-up *
* Hypoallergenic * PABA-free * Unscented *
* Contains Aloe and Vitamin E *

DIRECTIONS: Apply generously and evenly to all exposed areas of skin at least 15 minutes before sun or water exposure.

ACTIVE INGREDIENTS: Oxybenzone, octocrylene, 2-ethylhexyl salicate, homosalate, avobenzone.