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School of Public Health

**CORRELATES OF IN-HOME SMOKING BEHAVIOR OF
PARENTS WITH NEWBORNS**

By

James Kyung Jo

**A Dissertation in Partial Fulfillment of the
Requirements for the
Degree of Doctor of Public Health
in Preventive Care**

April 2005

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James K. Jo

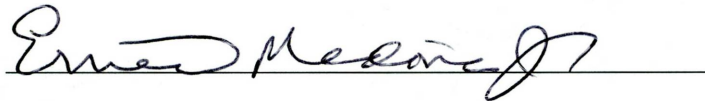
Each person whose signature appears below certifies that this dissertation, in his/her opinion, is adequate in scope and quality as a dissertation for the degree Doctor of Public Health.



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ABSTRACT OF THE DISSERTATION

Correlates of In-Home Smoking Behavior of
Parents With Newborns

By

James K. Jo

Doctor of Public Health in Preventive Care

Loma Linda University, Loma Linda California, 2004

Edward Fujimoto, Chairman

Secondhand smoke has been shown to have adverse health effects on young children. It is associated with various health effects such as respiratory infections, Sudden Infant Death Syndrome (SIDS), and asthma. Because of the dangers secondhand smoke poses to young children, there is a need for educating parents about the dangers of secondhand smoke as well as determining factors associated with secondhand smoke exposure among children. Understanding these factors may be first step toward developing strategies to reduce ETS exposure.

The study examined correlates of in-home smoking behavior of parents with newborns by analyzing 657 respondents who filled out the New Mom Secondhand Smoke Survey collected at the Riverside County Tobacco Free Families Program. These surveys were collected as a part of referral process to recruit eligible clients for the Tobacco Free Families Program. The survey contained 14 questions asking for

demographic and secondhand smoke information on mothers who delivered a baby at five collaborating hospitals.

Only 9.7% of all respondents reported someone smoking in their house. Smoking inside the house was significantly associated with having both mother and father as smokers as compared to having fathers as sole smokers (odds ratio: 4.16; 95% CI: 1.34-12.88). Mothers who believed that secondhand smoke was very dangerous for their baby's health were less likely to report that someone smoked inside the house as compared to those who believed it was somewhat or not very dangerous. (odds ratio: .163; 95% CI: .048-.551). Hispanic ethnicity had a weak negative association with smoking inside the house (odds ratio: .473; 95% CI: 0.22, 1.02).

The results of the study indicate that it may be important to target households where both mother and father smoke and educate them on the dangers of secondhand smoke. Furthermore, when attempting to educate young couples with newborns to reduce or eliminate secondhand smoke exposure, it may be important to incorporate a message on the negative health consequences of secondhand smoke on their baby.

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CHAPTER 1

INTRODUCTION

A. Statement of the Problem

Secondhand smoke, otherwise known as Environmental Tobacco Smoke (ETS), has been shown to have adverse health effects on young children (Gigging et al. 1994). Studies confirmed the association between ETS exposure and increased risk for various illnesses such as respiratory infections, Sudden Infant Death Syndrome (SIDS) and asthma (Wright, Holberg, Martinez, & Taussig, 1989; Weitzman, Gortmaker, Walker, & Sobol, 1990; Klonoff-Cohen et al., 1995; Dwyer, Ponsonby, & Couper., 1999). Furthermore, 150,000 to 300,000 cases of hospitalization per year from bronchitis and pneumonia in infants and young children less than 18 months of age are attributed to ETS (Samet, Lewit, & Warner, 1994). Children exposed to ETS have more days of school absences, more asthma-related ER visits, and increased likelihood of having tonsillectomies or adenoidectomies compared to those children not exposed (Mannino, Siegel, Husten, Rose, & Etzel, 1996).

Clearly, ETS exposure among children is a major public health concern due to the serious health effects it has, especially on young children. Despite the known health effects of ETS among children, it is unfortunate to see an alarming increase in prevalence of secondhand smoke exposure among children. It is estimated that approximately 34% of all children between the ages of 2 months and 5 years in U.S. are exposed to ETS daily (Schuster, Franke, & Pham, 2002).

Studies have shown that the home is the major site of ETS exposure for young children (Leech, Wilby, & McMullen, 1999; Emmons, Abrams, & Marshall, 1992). Because young children spend most of their time inside the home with mothers or caregivers, the smoking behavior of these adult members contributes significantly to the ETS exposure. Given these facts about ETS exposure, there is a clear need for educating parents about the dangers of secondhand smoke and to develop interventions for reducing the ETS exposure among children in their homes. This point is well spelled out by Emmons et al., (2001, p. 329): "Possible solutions to this challenging issue (reducing ETS) is to focus on implementing policies to ensure parent's access to smoking cessation intervention and to educate about the impact of smoking on their children's health."

However, there are many challenges and concerns associated with the regulation of smoking behavior in private homes (Emmons et al., 2001). Some smoking parents are simply reluctant to make changes in their smoking habits around their children because they are unaware of the dangers of secondhand smoke or consider the change too inconvenient. Therefore, it may be important to first determine what factors are associated with secondhand smoke exposure among children at home (Norman, Ribisl, Howard-Pitney, & Howard, 1999). As Norman et al. pointed out, "Understanding these factors is the first step toward developing strategies to increase the prevalence of personal smoking bans." Knowing these factors would then help smoking intervention specialists to direct interventions towards that group of children most likely to be exposed to ETS. Focusing interventions on such "high-risk" children is important especially in an age where fiscal limitations are significant.

Since home is the major site of ETS exposure among children, the majority of studies examining factors related to secondhand smoke exposure among children have used self-reported home smoking restrictions as a measure to assess whether children were exposed to ETS or not (Kegler & Malcoe, 2002; Norman et al., 1999; Okah, Choi, Okuyemi, Ahluwalia, 2002; Pizacani et al. 2003). In these studies, a home-smoking restriction is defined as not allowing smoking inside the house. Pizacani et al. found that household smoking restrictions were highly associated with low levels of self-reported household exposure to ETS. Hence, if parents reported that no one is allowed to smoke inside the house, this was taken that children were exposed to little or no secondhand smoke at home. However, one disadvantage to this methodology of measuring secondhand smoke exposure is that it is assessing whether smoking is allowed in the house not whether people actually smoke inside the house. While parents may report as having home smoking restrictions, they may actually break the rule and smoke occasionally.

This paper will utilize a data set of self-reported home smoking behavior, as defined by mothers reporting whether any smoker smokes inside the house, to assess ETS exposure among children as opposed to home smoking restrictions used in other studies. This method of measuring secondhand smoke exposure assesses smoking inside the house as reported by the mothers. This method may prove to be more accurate over home smoking restrictions because clients are asked on their smoking behavior inside the house not about whether smoking restrictions exist or not. It may be that smokers do break the smoking restriction and smoke despite the restrictions. Previous studies examining the validity of self-reported secondhand smoke exposure indicated that a

general concordance exists between self-reported and either environmental or biological measures of ETS exposure (Hovell, Zakarian, Wahlgren, Matt, & Emmons, 2000; Seifert, Ross, & Norris, 2002).

To date, only a few studies have looked at the factors associated with having home smoking restrictions. Some of the factors that have been associated with having home smoking restrictions (not allowing smoking inside the house) were presence of young children at home (Norman et al., 1999; Pizacani et al., 2003), having families with both parents as compared to a single parent (Jaakkola, Ruotsalainen, & Jaakkola, 1994), parental awareness of the hazards of ETS (Pizacani et al), and whether the sole smoker was other than the mother (Berman et al., 2003).

However, previous studies have left some questions unanswered due to limitations in the studies. One of these questions how the number and age of children relates to secondhand smoke exposure. Norman et al. (1999) and Pizacani et al. (2003) indicated that smoking parents are more likely to have home smoking restrictions if there are children at home. But no studies to date have looked at whether having more children or having younger children has a greater effect on parents not smoking inside the house than having only one child or having older children.

Another question is the role of maternal smoking influence on the children's exposure to ETS. Is there more smoking inside the home when the mother rather than the father is the sole smoker? Berman et al. (2003) showed that more children were exposed to ETS at home when they had a smoking mother as compared to having a smoking father. However, because the sample size was relatively small ($n=27$), the sample was restricted to "low-income, medically underserved communities in Los Angeles", and the

children targeted all had asthma, it is difficult to generalize their results to other populations.

The role of ethnicity in ETS exposure among children is another area that needs further exploration. It is known whether certain ethnic groups such as Hispanics are significantly more or less likely to report that no one is allowed to smoke in the home (US Department of Health and Human Services, 1998). Hispanics overall are more likely to be occasional smokers than non-Hispanics (Palinkas, Pierce, & Rosbrook, 1993). Therefore, Hispanics are more likely to report that no one is allowed to smoke inside the house in comparison to other ethnicities. Do factors associated with secondhand smoke exposure such as presence of children and knowledge of dangers of ETS also apply to different ethnic groups such as Hispanics and African-Americans? These issues will be examined as they relate to secondhand smoke exposure among children at home.

B. Purpose of the Study

The purpose of the study is three fold: The first is to examine factors associated with smoking inside the house. These factors consist of the number and age of children, age of smoking mothers, the duration of smoking history of the parent(s), and the presence of smoking mother at home. It is speculated that the longer the smoking history of parents, the less likely they will either give up smoking or change their smoking behavior around their children. Furthermore, it may be that the younger the mother's age, the less likely she will be to believe that secondhand smoke is dangerous. Hence, more young mothers will smoke inside the house.

The second purpose is to provide a generalizable conclusion as to whether having a mother who is the sole smoker in the house is associated with smoking in the house as

compared to when someone other than mother is the sole smoker at home or both. While a previous study (Berman et al., 2003) examined this factor in relation to implementing home smoking restrictions, it was not generalizable to other population groups due to the size and selection bias of the sample.

The third purpose is to determine whether the factors identified by previous studies as associated with secondhand smoke exposure are also associated with secondhand smoke exposure in this particular group of young parents in Riverside. Previous studies indicated that less secondhand smoke exposure among children was associated with presence of child(ren) at home (Norman et al., 1999; Pizacani et al., 2003), having families with two parents rather than a single parent (Jaakkola et al., 1994), and an awareness of the hazards of ETS (Pizacani et al., 2003). The question of whether these factors are generalizable to this particular group of Riverside County residents will be answered.

C. Theoretical Framework

The theoretical framework used in this study is the Theory of Reasoned Action (TRA) originated by Ajzen & Fishbein (Ajzen & Fishbein, 1980). The TRA is based on a premise that the most important determinant of a person's behavior is behavioral intent for that behavior. However, the person's intention to perform a behavior is a combination of attitudes toward performing the behavior and subjective norm. The attitude is, in turn, influenced by the person's belief that the behavior will result in certain outcomes and the evaluation of those outcomes, while subjective norm is influenced by normative beliefs (what the person believes other people want him or her to do) and the motivation to comply with those persons' wishes.

This theoretical framework was chosen because of its simplicity in predicting home smoking behavior and its ability to provide explanation for all the variables presented in this study. Furthermore, it was chosen because the model took account of behavioral beliefs as well as the normative beliefs when explaining a behavioral intent to perform a behavior. This was important because a smoking parent may believe that smoking around his/her child is dangerous for the health of the child but may smoke around the child anyways because of the subjective norm of the spouse. The TRA also takes into account of a person's traits (personality) in determining a behavior.

Social Cognitive Theory, although being comprehensive, is very complex with constructs making it very difficult to operationalize. On the other hand, the Theory of Planned Behavior was not used because it is most useful when predicting behaviors in which individuals have incomplete volitional control. Because whether a person smoking inside or outside the house is mostly under volitional control, the Theory of Planned Behavior was not chosen.

1. TRA and the Association Between the Study Variables and Home Smoking Behavior

a. Belief in the Danger of Secondhand Smoke. If a person perceives that the outcome of smoking around the children is dangerous, he/she will have a positive attitude toward not smoking inside the house, which, in turn, should lead to increased intention to smoke only outside the house and reduce the ETS exposure to children. However, if the person perceives the outcome in the opposite way, then the person would have a negative attitude toward having home smoking bans. Furthermore, if relevant others, i.e., spouse, see smoking inside the house as positive and the individual is

motivated to meet the expectation of the other, then, a positive subjective norm is expected. However, if the relevant others see smoking inside the house as negative, then a negative subjective norm is expected. The model states that the smoking behavior inside the house depends upon intention to smoke inside the house, which is dependent on the attitude and subjective norm. Attitude and subjective norm in turn are dependent on the sum of the product of the pairs of belief, which underlie them.

Therefore, even if a smoking husband believes that the ETS is harmful to children, this may not result in smoking parent(s) smoking outside the house if his spouse does not have the similar health belief towards the children. When there is a congruity in the attitude of the husband and the subjective norm, which is influenced by his wife, there will be a likelihood of change in behavior (incongruity between the attitudes of husband and wife might lead the non-smoking partner to expect bad outcomes if he or she tried to enforce a smoking ban).

b. Having More Than One Child and Having Younger Children. The TRA posits that outcome expectations influence attitude, which in turn influence intentions and behaviors. Hence, smoking parents may expect much worse outcomes of smoking if several kids were to get sick as compared to only one. Therefore, smoking parents with more than one child may smoke less inside the house to avoid or lessen the outcome of several kids getting sick. By the same token, smoking parents may expect worse outcomes of smoking if there were more health complications for younger children as compared to older children. Since younger children may be more vulnerable to sickness, smoking parents may smoke less inside the house with younger children than older children. Such outcome expectations may influence smoking behavior of the parents.

c. Duration of Smoking History. The theory states that the most important determinant of a person's behavior is behavioral intent, which is a combination of attitude toward performing the behavior and subjective norm. If a person has been smoking for a longer period inside the house, the person is more likely to hold on to an attitude that smoking inside the house is not a "big deal". This may in turn influence if not strengthen his/her behavioral intent to smoke inside the house. He or she might be less influenced by the normative beliefs since the behavior has been carried out for longer periods.

d. Smoking Behavior Among Different Ethnic Groups. The TRA posits that a person's intention to perform a behavior is a combination of attitudes toward performing the behavior and subjective norm. Different cultures may regard smoking differently. For example, in some Asian Countries, smoking is considered a social norm and males are expected to smoke to validate their adulthood. Such normative beliefs placed by the society may influence the smoking behavior both at home and other places. Different cultural beliefs may influence normative beliefs, which in turn affect a person's behavioral intent.

e. Having a Mother Who is the Sole Smoker in the House. In many houses with young children, mothers usually spend majority of time with children at home while fathers spend most of time at work away from the family. Being alone with children at home, the mother's subjective norm is less influenced by the father's normative beliefs as compared to being with the father and other family members. Furthermore, there may be less motivation to comply with her husband's wishes (smoking outside the house) when her husband is away from the house. Hence, it is expected that having a mother who is

the sole smoker in the house will be associated with increased smoking in the house as compared to when someone other than mother is the sole smoker at home.

f. Belief in the Dangers of Secondhand Smoke and Desire to Obtain Secondhand Smoke Information and to Learn How To Quit Smoking. The TRA posits that a person's intention to perform a behavior is a combination of attitudes toward performing the behavior and subjective norm. The attitude in turn is influenced by the person's behavioral belief as indicated by the TRA. Therefore, if a smoker perceives the negative outcomes (kids getting sick) associated with smoking around their children, there is a greater likelihood that the person will either try to quit smoking or obtain more information on the secondhand smoke in an effort to eliminate the negative outcomes of smoking. Hence, according to the theory, those who believe in the dangers of secondhand smoke will be more likely to either obtain secondhand smoke information or want to learn how to quit smoking if he/she is a smoker.

D. Research Questions

This study will attempt to answer the following set of research questions (regular secondhand smoke exposure is defined by whether other people smoked in the house or not):

- 1. *Other Children in the House***
 - a. Is having two or more children associated with decreased smoking inside the house as compared to having only one child (besides the newborn)?
 - b. Is having younger children (5 years or less) associated with decreased smoking inside the house as compared to having older children (6 years and older)?

c. Does the presence of younger children 5 years or less) influence smoking inside the house differently in ethnic group of Hispanics as compared to Caucasians and Afro-Americans?

2. *Smoking of the Mother*

a. Is having a mother who is the sole smoker in the family associated with increased smoking inside the house as compared to when someone other than mother is the sole smoker in the family?

b. Is having a younger mother (< or = to 18 years old) associated with increased smoking inside the house compared to having an older mother (> than 18 years old)?

3. *Belief in Dangers of Secondhand Smoke*

a. Is belief in the dangers of secondhand smoke associated with decreased smoking inside the house?

b. Does the parental belief in the dangers of secondhand smoke for their children influence parent's desire to obtain secondhand smoke information from the local county health department?

c. Does the belief in the dangers of secondhand smoke influence parents desire to learn how to quit smoking through the local county health department?

4. *Smoking History*

a. Is the duration of smoking history of a parent associated with smoking inside the house?

CHAPTER 2

LITERATURE REVIEW

A. Overview

Many children are reported to be exposed to secondhand smoke, causing adverse health effects especially on young children. Clearly, there is a need for educating parents about the dangers of secondhand smoke and to develop interventions for reducing the secondhand smoke exposure among children in their homes.

Unfortunately, much work is needed to reduce the prevalence of secondhand smoke exposure among children. Norman et al. (1999) point out that one of the first steps towards reducing the exposure of secondhand smoke among children is to understand factors associated with secondhand smoke exposure among children at home. Knowing these factors would then help educators and health professionals to direct interventions towards that group of children most likely to be exposed to secondhand smoke.

In this chapter the contemporary literature regarding health implications of and factors associated with secondhand smoke exposure among children is critically reviewed. Additionally, this literature review will show that there is a need to further examine factors associated with secondhand smoke exposure among children.

The first section will cover health effects and prevalence of secondhand smoke in the presence of children. Since various methods of assessing secondhand smoke have been used in past studies, the next section will examine literature on methods and validity of assessing secondhand smoke exposure. Then studies of the determinants of secondhand smoke exposure will be examined. This section will outline the factors that

have been associated with secondhand smoke exposure among children and point out other factors that need further examination. The chapter will conclude with a summary and critique of the review.

B. Health Effects of ETS in Young Children

Environmental Tobacco Smoke (ETS), also known as secondhand smoke (SS), is associated with a significant increase in morbidity and mortality among children especially for ages 5 years and younger (US Department of Health and Human Services, 1986; Gigging et al., 1994; National Cancer Institute, 1999). ETS consists of a complex mixture of exhaled mainstream smoke and non-inhaled, side stream smoke from cigarettes (Guerin, Jenkins, & Tomkins, 1992). It is now very clear that ETS poses serious health effects especially to young children living with smoking adults at home.

1. ETS and Respiratory illnesses

One of the health effects associated with ETS is increased respiratory infection seen in children. Several studies showed that risk of respiratory illness is increased in infants and children whose parents smoked (Colley, Holland, & Corkhill, 1974; Leeder, Corkhill, Irwig, Holland, & Colley, 1976; Pullan & Hey, 1982; Ogston, Florey, & Walker, 1987). Infants exposed to maternal smoking had an increased incidence of lower respiratory tract infection (Ferguson, Horwood, Shannon, & Taylor, 1981). Interestingly, a dose-response effect was demonstrated for maternal smoking during the first year of life. Infants with bronchiolitis before the age of 2 years were 2.4 times more likely to have been exposed to maternal smoking than infants who did not develop a lower respiratory tract infection (McConnochie & Roghmann, 1986). In a study by Wright et al. (1991), infants whose mothers smoked at least one pack per day

had 2.8 times the risk of developing a lower respiratory infection. Considering the increased risk for respiratory illnesses in children exposed to secondhand smoke, ETS clearly poses as a serious pediatric health problem.

2. ETS and Asthma

Another health effect associated with ETS is an increased incidence of asthma among children exposed to ETS. Currently, asthma is a leading chronic childhood illness in the United States and morbidity and mortality to asthma have increased in recent years, particularly in children (Burney, 1992; Bloomberg & Stunk, 1992). Weitzman et al. (1990) have concluded that children aged 0 to 5 years who are exposed to maternal smoking were 2.1 times more likely to develop asthma compared to those who were free from the ETS exposure. In another study, Martinez, Cline, & Burrows (1992) found the risk of asthma was 2.5 times higher in children exposed to maternal smoking when the mother had less than 12 years of education. However, in another study (Morgan & Martinez 1992), researchers did not find any correlation between asthma risks with maternal smoking. Similar to respiratory illnesses, risk of developing asthma is found to be dose respondent to the level of ETS exposure when other risk factors such as low socioeconomic status were present (Gigging et al, 1994).

Although the mechanism for the ETS/asthma connection is unclear, studies involving Italian schoolchildren have linked the development of asthma through immune mechanisms (Ronchetti et al, 1990; Martinez et al, 1998). It is thought that ETS increases bronchial reactivity, IgE levels, eosinophilia, and sensitization to aeroallergens and augments the exposed child's level of atopy and risk for asthma (Gigging et al, 1994).

Exposure to ETS has also been associated with increased asthma-related trips to the emergency room and related costs (Evans et al, 1987; Ehrlich et al., 1992). Children who are exposed to secondhand smoke have more visits to the emergency room than those who are not exposed.

Based on the findings of mentioned studies, the recent Environmental Protection Agency (EPA) report concluded, "There is now sufficient evidence to conclude that passive smoking is associated with additional episodes and increased severity of asthma in children who already have the disease" (US Environmental Protection Agency, 1992, pg. 15).

3. ETS and Sudden Infant Death Syndrome (SIDS)

Klonoff-Cohen and colleagues (1995) concluded that the risk for SIDS increased three-fold when infants were exposed to passive smoking from a combination of father, mother, live-in-adults, or day care provider. An important finding to this study was the fact that the effect was independent of maternal smoking during pregnancy. Furthermore, the authors found that during the first month of the infants' lives, the risk for SIDS increased in a dose response manner to the amount of smoking of the mother. In addition, the ETS exposure increased the risk of SIDS when the infants were in the same room as the adult smokers. This increase was eight-fold when the father smoked in the same room as the mother.

A prospective cohort study was conducted in Australia to identify sources of postnatal exposure to ETS at 1 month of age and to examine the relationship between ETS and SIDS (Dwyer, et al., 1999). In the study, participants at six hospitals were asked questions about maternal and other household member's smoking habits. Overall,

the findings demonstrated that the strongest predictor of infant urinary cotinine levels and of SIDS was maternal smoking. Smoking by others and smoking in proximity to infants were related to urinary cotinine levels but not SIDS risk.

In a study by Haglund & Cnattingius (1990), it was found that the relation of postnatal maternal smoking to SIDS was dose-dependent. However, Schoendorf and Kiely (1992) found that the risk of SIDS was greater in infants exposed to ETS both in utero and postnatally (three fold increase) than those exposed to ETS only postnatally.

4. ETS and Recurrent Otitis Media (ROM)

Ey et al. (1995) studied the effect of parental smoking on the risk for recurrent otitis media (ROM) while controlling for other known risk factors such as day care participation, sex, and number of siblings. The result indicated that there was an almost two-fold increase in the rate of ROM among infants whose mothers smoked 20 or more cigarettes per day compared to those who smoked less than 20 cigarettes. An interesting finding was that the risk was more than three-fold among infants when their birth weight was less than 3.5 kg. No significant associations were found with paternal smoking. The study pointed out the importance of maternal smoking and the risk of developing ROM for young children.

5. ETS and Infant Colic

Reijneveld, Brugman, and Hirasing (2000) examined maternal smoking and infant colic from a national sample of parents of infants in the Netherlands. The study utilized the interviews of participants over a 2-year period and the results indicated a two-fold increase in the incidence of colic among infants of mother who were smokers.

Although, the causal relationship could not be established, the authors concluded that maternal smoking was a possible risk factor for infant colic.

The above findings show the serious nature of ETS exposure among infants and children. The studies consistently indicate that infants and young children are at greatest health risk from ETS exposure if their mothers smoke. The intimate nature of the maternal-infant relationship is an important characteristic of development that crosses all cultures (Gaffey, 2001). Infants thrive physically due to intimate contact with their mothers during the early part of their lives. The health effects seen in young children exposed to ETS indicate a need for helping and assisting family members, especially mothers, to quit smoking or smoke away from the children.

C. Prevalence and Patterns of ETS in Pediatric Populations

Exposure to secondhand smoke for adults may occur in any place where smoking is allowed. However, when it comes to the pediatric population, the story is quite different. For young children, the major site of ETS exposure is at home where parents smoke inside the home or around the children (Leech et al., 1999).

1. Prevalence of Pediatric ETS Exposure

The review of literature revealed that the prevalence of pediatric ETS exposure varied from study to study. In a study conducted by Pirkle et al. (1996), it was found that 43% of the children in the U.S. were exposed to ETS at home. This study was based on the Third National Health and Nutrition examination Survey (NHANES III) collected from October 25, 1988 to October 21, 1991, a representative sample of the civilian, non-institutionalized US population. The NHANES III included questions on tobacco use and on exposure to ETS at home and at work.

In a study conducted by Schuster et al. (2002), the reported percentage of children in the same age range was only 34%, which is 9% less than the NHANES III study. The data for this study comes from the 1994 National Health Interview Survey (NHIS) and the 1994 NHIS Year 2000 Objectives supplement. A total of 19,734 families were randomly selected and the tobacco questions were administered to 1 randomly selected adult per family. The data were then analyzed using univariate and bivariate logistic regression analyses. Similar to the NHANES III, the NHIS survey was conducted at home by trained survey administrators from the US Bureau of the Census.

What could possibly cause such a difference in statistics? A reason why the ETS exposure was lower in the study conducted by Schuster and colleagues may be that NHANES III measured whether smokers lived in the home, not whether they actually smoked there (Schuster et al., 2002). Another reason might be that the differences may reflect an overall decrease in smoking since 1988, an increase in awareness of ETS effects, or a combination of the two. Henceforth, the statistics on prevalence of ETS exposure will be based on the 1994 NHIS because it is from a nationally representative household-based interview survey. Unless mentioned otherwise, statistical findings on prevalence will be from the 1994 NHIS.

2. Smoking in Homes With Children

Regular smoking (≥ 1 day/week) occurred in 32% of homes in which children (0 to 17 years old) lived. However, when the visitors were included, the percentage of homes where smoking occurred increased to 36%, in more than 11 million households with more than 21 million children. Sixteen percent of nonsmoking

respondents with children in the home reported other residents or visitors smoking there. In 6% of homes, visitors regularly smoked.

Homes with more than two adults had less regular smoking than single-parent families even if both were smokers. Smoking occurred in 33% of homes with at least two adults while 43% smoked in father-only homes and 46% in mother-only homes. The amount of regular smoking in the home was highest for African American (41%) and White (38%) respondents while Hispanics and other respondents comprised 25% each.

An interesting observation was that the reported racial/ethnic smoking rates differed considerably, with African American and Hispanic/Latino respondents reporting regular smoking much less than Whites. Furthermore, the respondents from the West reported less regular smoking in the home than the East or the South.

3. Frequency of Smoking in Home of Those With and Without Children

Regular smoking by residents or visitors was less common in homes with children compared to homes without children. The prevalence of regular smoking without children was 36% as compared to 32% in homes with children ($P = .22$).

4. Do Smokers Disallow Smoking in the Home?

It was evident from the NHIS that most smokers who lived with children do not prevent all smoking in their homes. Eighty five percent of respondents reported that regular smoking occurred in their homes where respondents were smokers and had children.

5. Sources of Secondhand Smoke for Children

A couple of studies indicated that the major site of ETS exposure for younger children was the home (Leech et al., 1999; Gergen, Fowler, Maurer, Davis, &

Overpeck, 2001). In a study conducted by Leech and colleagues, the authors analyzed a 24-hour recall time-activity diary for 2,381 random respondents from Toronto, Vancouver, Edmonton, and Saint John. The authors concluded that children experienced the most exposure at home, primarily between 4 p.m. and midnight. Specifically, the living room (22%) and the bedroom (13%) were the most common location where the exposure occurred.

D. Use of Parental Reports of Their Children's Exposure to ETS

1. Methods of Assessing ETS in Children

To determine the levels of ETS exposure by children, various methods have been utilized, including parental reports, environmental measures (e.g. nicotine monitors at home), or biomarkers of ETS (e.g. urinary or hair cotinine levels) (Hovell et al., 2000). However, the use of ETS biomarkers can be costly making this method a limiting factor when it comes to a large cohort of children (Seifert et al., 2002). On the other hand, researchers have concerns about parents' ability or willingness to accurately report the level of their children's ETS exposure in the home (Wahlgren, Hovell, & Meltzer, 1997; Nafstad, Botten, & Hagen, 1995; Emmons, Abrams, & Marshall, 1994). These issues pointed to the need for studies to determine if simpler parental reporting can accurately and consistently assess level of ETS exposure among children (Berman et al., 2003). Therefore, studies looking at the validity of parental reports about their children's ETS exposure have been performed to assess the validity of this method of measuring the extent of ETS exposure (Seifert et al., 2002; Berman et al., 2003). The results from these studies showed general concordance of reported and biological measures of ETS exposure.

2. Studies Confirming the Validity of Parental Reports

In a study done by Wong and et al. (2002), the authors examined the relationship between parent-reported estimates of children's exposure to ETS in the homes and children's urinary cotinine levels. The authors analyzed the data obtained from a randomized controlled trial of an educational intervention aimed at decreasing the household ETS exposure among children with asthma and who live in households with at least one smoker. The participants were given an interview which comprised of questions designed to assess the number of household members who smoked; frequency and time of smoking; the extent to which the child with asthma was exposed to the smoking and; particular practices or household regulations regarding smoking within the home. In addition to the interview, the urine samples were collected from all children ages 7 or above to assess the level of urinary cotinine. The data were then analyzed using multiple linear regressions.

The results of the study indicated that the parental reports remain a reasonably reliable indicator of children's ETS exposure in the home (the univariate linear-regression analyses of level of smoking restrictions and children's urine cotinine concentrations revealed R^2 of .221 and $p=.000$). Furthermore, in this particular study, the results suggested that questionnaires that collect detailed information on smoking habits and ETS exposure would do no better than simpler surveys, which ascertain smoking restriction at home, parental smoking status, and number of cigarettes smoked at home per day. One interesting finding was that the maternal smoking was linked significantly to urine cotinine concentration in the child. The strength of the association for the maternal smoking was stronger than the paternal smoking (β for maternal smoking

= .331, β for paternal smoking = -.228). This may occur because young children spend more of their time with their mothers/female caregivers than with their fathers/male caregivers. This variable of maternal versus paternal smoking may prove to be an important determinant of children's exposure to ETS when it comes to secondhand smoke.

In another study, Seifert et al. (2002) examined the validation of a five-question survey to assess a child's exposure to secondhand smoke. The survey contained five simple *Yes* or *No* questions, which inquired about the smoking status of the mother and the father and the child's exposure to secondhand smoke. The questions were: (1) Does "___'s" mother currently smoke? (2) In the home? (3) Does "___'s" father currently smoke? (4) In the home? (5) Is your child exposed to cigarette smoke on a regular basis from anyone other than the parents?

The participants of the study came from a group of children enrolled in a study examining the etiology of type I diabetes, and were comprised of a total of 1,114 participants. The average age of the participants was 3, with a range of 3 months to 14 years of age. Approximately 48% were females while 52% were males with a majority (78%) being non-Hispanic Whites. In order to validate the questionnaire data, the authors selected two groups of children from 1114 participants for urinary cotinine analysis. Twenty-six children were randomly selected from the 306 children who reported to being exposed to ETS and twenty-four children were randomly selected from 808 children who reported having no exposure to ETS for urinary cotinine analysis. They were then administered the questionnaires and urine specimens were collected from each of the participants. Analysis of variance was then used for the statistical analysis.

The results revealed 80% agreement between what was reported by the parents as indicated on the five-question survey and urinary cotinine levels in the children. For those cases where there was no agreement between the reported and the analysis, greater misclassification (38.33, 45.45, and 46.04 ng/mg compared to >30ng/mg indicating some exposure to tobacco smoke) was observed when the questionnaire indicated exposure, yet the urinary cotinine level did not. An interesting observation was that among those children whose urinary cotinine level was high, their parents indicated smoking within the home versus smoking outside the home, which may indicate that the in home smoking is an important source of ETS exposure for young children. The authors concluded that the use of a five-question survey was predictive of ETS exposure and was also a valid and cost-effective source for assessing a child's exposure to ETS.

3. Acute Versus Cumulative Exposure

Reported environmental or biological measures of ETS exposure provided information about only acute exposure, defined as exposure to ETS in a particular point in time, to secondhand smoke (Hovell et al., 2000). Although acute exposure may provide information about ETS exposure at a specific time in child's life, it does not paint the complete picture on the extent of their exposure. It may be that a child's exposure varies on daily basis. Therefore, in future studies, methods utilizing cumulative exposure to ETS may provide additional information about the patterns of parents smoking behavior around their children. Use of Dosimeter in home may provide sampling of air over a longer period of time and has been used in studies measuring secondhand smoke exposure. However, dosimeters may be "falsified" by smoking in a different room or tampering with the instruments.

E. Determinants of ETS Exposure Among Children

With much work already done on secondhand smoke pointing to the dangers of ETS to young children, studies examining the factors related to children's exposure to secondhand smoke as estimated by presence of home smoking restrictions have been done. Such studies shed useful insight about protective factors for children when it comes to secondhand smoke exposure. Furthermore, knowing these factors will help to identify which groups of children are at greater risk for ETS exposure at home.

Although some work has been done on identifying variables related to children's exposure at home, more research is needed to better understand the determinants of ETS and to confirm the known variables in a different setting with a different group of population. Still, little is known about these determinants and the ways they affect smoking behavior of parents (Jaakkola et al., 1994). Below is a series of studies examining these factors associated with secondhand smoke exposure among children.

1. Studies Examining Variables Predicting ETS Exposure Among Children

In a study examining the determinant of children's exposure to ETS at home was done in an urban-suburban municipality in Helsinki, Finland (Jaakkola et al., 1994). The objective of the study was to assess the role of smoking parents' educational background, socioeconomic status and knowledge of the child's health as determinants of the child's exposure to environmental tobacco smoke at home.

The study population consisted of 2,568 children whose parents were randomly selected from the city of Espoo. The parents of these children were given a questionnaire to fill out regarding their smoking habits and child's exposure to ETS. From this group of children, 1,003 children whose parents (either one or both parents or guardians) were

currently regular smokers were chosen. Participants were classified as a regular smoker if he/she answered, *Yes* to the question, which stated, "Do you smoke?"

The dependent variable, exposed or non-exposed children, was determined by asking, "Have you or anyone else smoked regularly indoors during the past 12 months?" The independent variables of interest were the parents' education, socioeconomic status, single parenthood and knowledge of the child's health. The child's age and gender, and the type of building were considered as potential confounders of the relation of ETS exposure and the mentioned determinants of interest. Logistic regression, prevalence ratios and odds ratios were used to analyze the data.

The results indicated that approximately 25% of the children were reported to be exposed to ETS at home. In the exposed group of children, 42% of the children had both parents who smoked regularly. The exposed children were on average older with the mean of 3.9 years (SD = .1) than the children not exposed with the mean of 3.6 years (SD = .07). This difference was statistically significant ($p < .05$, t-test). While the risk of exposure to ETS was significantly higher when the parents had no professional education, socioeconomic status was not associated with exposure. The risk of exposure to ETS was also significantly higher than a single parent compared to families with both parents but not where both smoked. This finding confirms the NHIS data (1994), in which ETS exposure was greater in homes with single-parent families than two parent families.

Because the study was a part of the Children's Indoor Environment and Health Project, there was no special emphasis on questions concerning smoking habits. This might have decreased the systematic error due to awareness of the passive smoking issue

in the reporting of exposure. However, due to the nature of the study, only limited ETS determinants were studied, leaving room for additional research on issues such as effect of having more/fewer children, having a smoking mother versus a smoking father or both on the exposure of the ETS among children.

2. Studies on Home Smoking Restrictions

In a study by Pizacani et al. (2003), the authors examined characteristics associated with smoking bans at home and measured the association between self-reported indoor smoking and the presence or absence of household bans. The study analyzed the data obtained from a large population-based cross-sectional telephone survey conducted by the Oregon Department of Human Services in the autumn of 1997.

Eligible participants were non-institutionalized, English speaking Oregonians age 18 or over who lived in a household with a telephone. An eligible household was then asked a series of standardized questions on topics of health insurance, diabetes, and tobacco. The response rate for the survey was 61% with a total of 6,199 completed interviews.

The primary outcome was household smoking restriction status, which was based on the following question:

“Which of the following statements best describes the rules about smoking inside your home?”

- (a) No one is allowed to smoke anywhere inside your home
- (b) Smoking is allowed in some places or at some time
- (c) Smoking is permitted anywhere inside your home (Pizacani et al., 2003, pg.100)

The independent variables of interest were smoking status of the respondent, presence of another smoker in the household (yes/no), annual household income, region of the state, presence of children in the home, smoking status of household members (smoker, mixed or non-smoker), sex of household members, and respondent's awareness of the harm of ETS.

The prevalence of a smoking household with at least one current adult smoker was 30%. In households with nonsmokers only, the factors significantly associated with smoking bans were knowledge of ETS harm (OR = 12.8, 95% CI: 7.3 -22.3) and the presence of children under 18 years old (OR = 4.6, 95% CI: 2.8 -7.9). Households in the urban, western region of the state were more likely to have either full (OR = 1.7, 95% CI: 1.2 – 2.3) or partial bans (OR = 1.4, 95% CI: .9 – 2.1). In households with one or more smokers, the factors significantly associated with smoking bans were awareness of the hazards of ETS (OR = 6.6, 95% CI: 3.6 – 12.3) and the presence of children (OR = 3.0 95% CI: 2.1 – 4.4) as was the case with nonsmokers only households. Households with full bans were higher income than those with no bans (32.8% <\$35,000/year and 48% ≥\$35,000/year). However, there were only slight and non-significant regional differences for households after adjustment for all other variables in the model. Furthermore, the mixed households were more likely to have either partial or full ban than smoker only households.

An interesting observation was that report of ban status was somewhat dependent on respondent's smoking status. For example, if the respondents in the mixed household were nonsmokers, the odds of reporting a full ban were 4.3 (95% CI 2.5-7.3) and if the respondent was a smoker, the odds were only 2.8 (95% CI 1.5 -5.1). Thus, smokers were

less likely to report a full ban. However, this study did not examine the effect of having a smoking mom versus someone other than mom smoking on household smoking bans.

Although the study examined the factors associated with smoking bans, there were areas that needed further exploration. One area has to do with the number of children. Does having more than one child have a greater effect on having a household smoking ban? Do households with younger children have a greater prevalence of smoking bans than households with older children? Lastly, do households with smoking mothers more likely to adopt or have smoking bans than households with smoking fathers? Further exploration of these questions may provide useful information in designing public health interventions to protect nonsmokers from exposure to ETS.

Berman et al. (2003) examined the ETS exposure among asthmatic children who lived in homes where at least one person smoked. Similar to the other studies mentioned, the authors examined factors associated with household smoking restrictions and children's exposure to secondhand smoke in homes in low-income minority households in Los Angeles. However, unlike the other two previous studies, this study addressed the issue of the maternal smoking influence on the child's exposure to ETS. Although the aim of the study was not to examine this relationship, the authors pointed out that children's urine cotinine readings were significantly higher in homes where the sole smoker was the mother (log transformed cotinine concentration = .3 for household with mothers smoking and -.3 for households with fathers smoking) indicating the particular importance of maternal smoking on a child's ETS exposure as seen in other studies (Ehrlich et al., 1992; Infante-Rivard, 1993; Martinez et al., 1992; & Oddoze et al., 1999).

For this study, 242 children with asthma were identified through clinics, schools, community agencies, and hospitals serving low-income, medically underserved communities in Los Angeles from 1996 to 1999. For each parent/child pair, a baseline Spanish/English survey was administered to the parent at the time of recruitment into the study. The survey contained questions on household demographics, child's asthma severity, smoking behaviors in the household, estimates of the child's ETS exposure, and attitudes toward smoking and household smoking behavior change. In addition to the baseline surveys, urine samples were also obtained from children aged 7 years and older for ETS exposure.

All households had at least one smoker in the home due to the study design. About 30% of the households had more than one smoker residing in the home with the father (80.2%) as the predominant smoker. Among households, 47% reported a complete smoking ban in the home, 42% had conditional smoking ban (smoking allowed in certain places at home) and only 10% had no smoking ban.

Of 242 children, those living with mothers who were sole smokers (n=27) had significantly higher urine cotinine levels (log transformed cotinine concentration mean of .3 vs. -.3 respectively) as compared to those children in which the sole smoker was someone (father or other relatives) other than the mother (n=67). As suggested by other studies (Cook et al., 1994; Oddoze et al., 1999), this may be due to closer proximity between the smoking mother and child as compared with others.

One limitation to this conclusion was that the sample of 27 mothers who were sole smokers at home was too small to characterize the smoking behavior in these households in general. Furthermore, the sample size represented a group of children

with asthma. It may be that asthmatic children were given closer attention and more time was spent with their mothers/care-givers as compared with those who were non-asthmatic. A further examination with larger sample size and with non-asthmatic children will determine whether this finding is supported.

An interesting observation was that among the Latino population, the percentage of reported smoking bans at home was much more pronounced than Whites or Blacks (Berman et al, 2003). In addition, Latino respondents reported fewer cigarettes per day and fewer hours of smoking per week than the Whites or Blacks. This finding was not contrary to the findings in other studies (US Department of Health and Human Services, 1998; Gilpin, Cavin, & Pierce, 1997) where the reported home smoking ban rates were higher among Hispanic populations and/or smoking prevalence was less than Whites, Blacks and Asians.

Several factors may account for this pattern. There may be a protective cultural factor, which both male and female Hispanics are more likely to be occasional smokers than non-Hispanics (Gilpin et al., 1997). Smoking prevalence is lower in Latinas (US Department of Health and Human Services, 1998) and maternal smoking has been found to be less common in Mexican American Latino households (Castro, Azen, Hobel, & Platt, 1993; Wiemann, Berenson, & San Miguel, 1994). Furthermore Hispanics are less likely to report that no one is allowed to smoke anywhere inside the home (US Department of Health and Human Services, 1998).

3. Limitation of Studies on Home Smoking Restrictions

In previous studies, complete home-smoking bans is defined as not allowing smoking inside the house. Pizacani et al. (2003) found that having household

smoking restrictions was highly associated with low levels of self-reported household exposure to ETS. Hence, if parents reported that no one is allowed to smoke inside the house, this was taken that children were exposed to little or no secondhand smoke at home. However, one disadvantage to this methodology of measuring secondhand smoke exposure may be that it is assessing whether smoking is allowed in the house not whether people actually smoke inside the house. Although, no evidence exists to support this claim, it may be possible that while parents report as having home smoking restrictions, they break the rule and actually smoke inside the home.

This paper will utilize self-reported home smoking behavior, as defined by mothers reporting whether any smoking occurs in the house, to assess ETS exposure among children, as opposed to home smoking restrictions used in other studies. As mentioned previously, this method of measuring secondhand smoke exposure assesses smoking in the house as reported by the mothers and may be more accurate over home smoking restrictions. Previous studies examining the validity of self-reported secondhand smoke exposure indicated that a general concordance exists between self-reported and either environmental or biological measures of ETS exposure (Hovell et al., 2000; Seifert et al., 2002).

F. Summary and Critique

From this literature review it is clear that exposure to secondhand smoke is related to various disease conditions. ETS has been linked with increased respiratory infections in children (Wright et al., 1991), increased asthma prevalence and susceptibility to develop asthma (Weitzman et al., 1990; Martinez et al., 1992), increased SIDS risk

among newborns (Klonoff-Cohen et al., 1995; Dwyer et al., 1999), and recurrent otitis media (Ey et al., 1995).

Despite the known harmful effects of secondhand smoke on young children, it is distressing to know that many children in the U.S. are regularly exposed to ETS at home (Pirkle et al., 1996). The 1994 NHIS showed that regular smoking occurred in 32% of U.S. homes on a daily basis. Since the major site of ETS exposure for young children under 5 years old is the home (Leech et al., 1999), efforts to reduce secondhand smoke exposure among young children are clearly called. Reducing secondhand smoke exposure is indeed a public health challenge that remains in the coming decades.

To reduce the ETS exposure among children, there is a need to educate parents about dangers of secondhand smoke for their children and to increase efforts to reduce the ETS exposure among children. Emmons et al. (2001) indicate that there is a need to “implement policies to ensure parent’s access to smoking cessation interventions and to educate about the impact of smoking on their children’s health.” (P. 329)

However, to develop strategies to reduce ETS among children, it is important to first determine the factors associated with secondhand smoke exposure among children at home. Norman et al. (1999) pointed out that the first step toward developing strategies for adopting personal smoking bans at home is to understand the factors associated with secondhand smoke exposure. Furthermore, knowing these factors would help identify the group of children most likely to be exposed to ETS and thus channel the efforts to reduce the exposure to secondhand smoke among “high-risk” children.

Emmons et al. (2001) pointed out, “There is an urgent need for more research focused on children’s exposure to ETS in their homes” (P. 329). To date, only a few

studies have examined the factors related to secondhand smoke exposure among children at home. Most of these studies used self-reported household smoking restrictions as a method to assess ETS exposure among children (Kegler et al., 2002; Norman et al., 1999; Okah et al., 2002; Pizacani et al., 2003). If there were reported smoking restrictions at home, it was assumed that there was little or no exposure to ETS for children. Pizacani et al. found that household smoking restrictions were highly associated with low levels of self-reported household exposure to ETS.

However, using the reported home smoking restrictions may have a disadvantage in assessing secondhand smoke exposure in that it relies on the report of whether smoking is allowed in the house and not whether smoking actually occurs inside the house. Furthermore, several previous studies indicated that a general concordance existed between self-reported ETS exposure and either biological or environmental measure of ETS (Hovell et al., 2000; Seifert et al., 2002). This study will examine secondhand smoke exposure measured by self-reports of mothers on whether any smoking occurred in the house.

In the research reviewed above some of the factors that have been associated with having home smoking restrictions were presence of children at home (Norman et al., 1999; Pizacani et al., 2003), presence of both parents rather than a single parent (Jaakkola et al., 1994), parental awareness of the hazards of ETS (Pizacani et al., 2003), and the sole smoker in the home being someone (e.g. father, uncle, or other relatives) other than the mother (Berman et al., 2003).

However, the studies done so far on factors associated with secondhand smoke exposure leave some areas needing further exploration. Although several studies

(Norman et al., 1999; Pizacani et al., 2003; Norman et al., 1999) indicated that having home smoking bans was related to the presence of children in the home, no study has examined whether people living in homes having more than one child or younger children (5 years or younger) are more likely to adopt home smoking bans than people living in homes having only one child or older children (6 years or older). As Emmons et al. (2001) indicated, "Little is known about the housing quality and household size on exposure" (P. 329).

Another area that needs further exploration is of the influence of maternal smoking on the child's exposure to ETS. Berman et al. (2003) concluded that children in homes where the sole smoker was the mother had greater exposure to ETS than children in homes where the sole smoker was someone other than the mother (log transformed cotinine concentration mean of .3 vs. -.3 respectively). However, the sample size, for those households where the sole smoker was the mother, was too small ($n=27$) to make any generalization to other households. A study with a bigger sample size is needed to confirm this finding.

It is known that secondhand smoke exposure of children varies among different ethnic groups. For example, it was shown in the 1988 NHIS data that Hispanic children were less likely to be exposed to secondhand smoke than Whites or Blacks. Furthermore, Hispanics were also significantly more likely to report that no one is allowed to smoke in the home (US Department of Health and Human Services, 1998).

It may be that there are protective cultural factors that play a role when it comes to secondhand smoke exposure for certain ethnic groups such as Hispanics? If there are these protective cultural factors, future studies may examine and analyze them for

possibility of applying to other ethnic groups in an effort to reduce the secondhand smoke exposure. If the prevalence of secondhand smoke exposure differs from one ethnic group to another, health professionals should focus educational and program efforts on those ethnic groups that have higher prevalence of secondhand smoke exposure. Norman et al. (1999) highlights the importance of this point when they state, "identifying subgroups that have a low prevalence of personal smoking policies can highlight where program efforts need to be focused." (Norman et al., pg. 588)

To date, no studies have examined whether parental knowledge of the dangers of secondhand smoke has any influence on parent's desire to obtain additional secondhand smoke information including ways to reduce secondhand smoke exposure from a local public health department. It may be that some would request secondhand smoke information to learn more on secondhand smoke even if they knew the dangers of it. Furthermore, no studies have examined whether parental knowledge of the dangers of secondhand smoke has any influence on parent's desire to learn about how to quit smoking through a local public health department. The proposed study is designed to answer some of questions posed in the last two pages.

CHAPTER 3

METHODOLOGY

A. Respondents

The respondents for this study consisted of mothers who completed a Mom/Mom-to-be Secondhand Smoke Survey, referred to as the MMSS hereafter, at five hospitals in Riverside County. The surveys were given out and collected by nurses at respective hospitals following labor. The dates of collection were from June 2002 to July 2003. The participating hospitals were the Riverside County Regional Medical Center, Corona Regional Medical Center, Hemet Valley Medical Center, JFK Memorial Hospital, and Parkview Hospital.

3109 completed surveys were collected during this time period. From this total of 3109 surveys, inclusion and exclusion criteria were used to further select a sample of population for the study analysis. The inclusion criteria included having a smoker in the household, completing the survey by a respondent mom, delivering a baby at a collaborating hospital, and residing in Riverside County. Those who filled out the survey but had no smoker in the household were excluded from the study analysis. Only households with at least one smoker in the home were selected for the study analysis.

Data for this study were selected from the pool of respondents who had completed the MMSS surveys, which were collected as a part of the referral process to generate eligible clients for the Tobacco Free Families (TFF) program at the County of Riverside Department of Public Health. The referral process consisted of giving out and collecting MMSS surveys to all the mothers who gave birth at one of the five hospitals mentioned. The MMSS surveys were then collected bi-monthly by designated staff at the TFF

program. If a respondent indicated on the survey that she was interested in receiving secondhand smoke information (question 13) and/or interested in quitting smoking (question 14), then she was contacted by the TFF staff and provided service(s). The program coordinator at the TFF program developed the MMSS survey in August of 2000, when the program started. The surveys have been used at all five hospitals since 2000.

The TFF program is funded by the California State Proposition (Prop 10) monies, which come from the tobacco tax levied on cigarettes sold in the U.S. The TFF program was created in August of 2000 in an effort to educate mothers and fathers about the dangers of secondhand smoke and to help smoking parents quit smoking.

All mothers who gave birth to a new baby were given a Mom/Mom-to-be Secondhand Smoke Survey along with a gift bag. The gift bag contained information on the TFF programs and other programs offered through the County of Riverside Department of Public Health. The TFF program is offered free to mothers and fathers with a child under 5 years old and who reside in the Riverside County. Eligible respondents were Riverside County residents who gave birth to a baby at one of the participating hospitals. The respondents were either English or Spanish speaking Riverside County residents.

Designated staffs at the hospitals administer the MMSS surveys and give out gift bags to eligible mothers. All eligible mothers were simply asked to fill out the MMSS survey. However approximately 80% of eligible moms completed surveys. They were informed that the survey was voluntary and that any information would be kept confidential.

B. Measures

The measures used to assess factors associated with the exposure of ETS among children were based on the questions on the Mom/Mom-to-be Secondhand Smoke Survey (See Appendix) given at the five hospitals. The measures include demographic information of the respondents, independent variables, and dependent variables. The independent variables include the number of children, ages of children, smoking status of the parents, belief in the dangers of secondhand smoke for their children, duration of smoking history of each parent, and ethnicity. The dependent variables consist of smoking behavior inside the house, desire to obtain secondhand smoke information, and desire to learn how to quit smoking through the local county health department.

1. Measures of Subject Characteristics

The MMSS survey contained questions on general demographic information. Information collected was participant's age, gender, and race/ethnicity. The participants were asked to simply fill out the MMSS surveys and return them to a nurse at the maternity ward.

2. Measures of Independent Variables

The independent variables of interest in this study included number of children, age of children, smoking status of mother/father who live with the child (ren), belief in the dangers of secondhand smoke on their children's health, number of years of smoking, and the ethnicity of the participants.

The questions on the MMSS survey used to assess the independent variables included the following set of questions:

- (a) How many children do you have under 5 years old (including new infant)?

It's difficult to determine if baby/infant is the first one.

- (b) How many children do you have ages 5 through 18?
- (c) What are the ages of your children?
- (d) Who is the individual who smokes at home? (Me, Father of the baby, Friend, Others). (More than one answer was accepted).
- (e) In your opinion, how dangerous is secondhand smoke to your health?
(Somewhat dangerous, not dangerous at all, very dangerous, don't know)
- (f) In your opinion, how dangerous is secondhand smoke to your children's health? (Somewhat dangerous, Not dangerous at all, Very dangerous, Don't know)
- (g) How many years have you been smoking? (Less than 1 year, 1 year, 2 years, 3 years, 4 or more years)
- (h) What is your ethnicity? (Afro-American, Asian, American Indian, Caucasian, Hispanic, Others).

3. Measures of Dependent Variables

The dependent variables for this study included the status of home smoking behavior, the subject's desire to obtain secondhand smoke information from the local county health department, and the subject's desire to learn how to quit smoking through the local county health department. As previously mentioned, the home is the major place of ETS exposure among children. Hence, several studies used 'self-reported home smoking restrictions' as a means to measure the secondhand smoke exposure among children (Kegler et al., 2002; Norman et al., 1999; Okah et al., 2002; Pizacani et al., 2003). However, this study will utilize home smoking behavior to assess the level of

secondhand smoke exposure among children as mentioned previously. The questions on the MMSS survey used to assess the independent variable included the following set of questions:

- (a) If you have a smoker in your home, does he/she smoke inside the house?
(Yes or no)
- (b) How likely are you to get rid of secondhand smoke in your house? (Not very likely, somewhat likely, very likely, nobody smokes inside my house).
- (c) Would you like more information about secondhand smoke? (Yes or No)
- (d) Would you or the baby's father want to learn about how to quit smoking?
(Yes or No)

C. Procedures

1. Respondent Recruitment

The respondents for the study group were selected from the pool of 3109 moms who filled out the MMSS surveys at the maternity wards of five collaborating hospitals in Riverside County from June 2002 to July 2003. The inclusion criteria used to screen out the study group consisted of having a smoker at home, filling out the MMSS survey by respondent mom, delivering baby at one of the collaborating hospitals, and residing in Riverside County. Those respondents who indicated no smoker at home were excluded from the study group.

All mothers who gave birth at each of the five hospitals were asked by a nursing staff to fill out the MMSS survey. Upon the completion of the survey, each mother received a gift bag that contained useful information for her new baby. The completed

surveys were collected and entered in the data in the Microsoft Access database by a TFF staff member.

Staff in-service training sessions have been conducted for all OB staff members at the hospitals. The purposes of the training sessions were to instruct the nurses on how to administer and collect the MMSS surveys and to inform them of the TFF program goals and services offered. The in-service training was conducted when the partnership was established with each of the hospitals. The in-service consisted of a 30-minute presentation instructing nurses and clerks about the TFF program, services offered, and the referral process. The staffs were instructed to hand out a Mom/Mom-to-be Second Hand Smoke Survey to all mothers who give birth at their hospital before they were discharged. They were instructed that surveys have to be filled out completely by answering all questions. Once the surveys were completed, they were collected and given to the TFF staff. In appreciation for completion of the survey, each mother received a gift bag, which contained useful information for her new baby.

Key personnel responsible for handling all surveys were selected at each of the hospitals. They were responsible for contacting TFF staff for supplies and collecting the completed surveys. The TFF staff visited the hospitals once every two weeks to collect the completed surveys and to ensure smooth operation of the referral process. The information on all returned surveys was entered into the Microsoft Access Data-Base for further evaluation.

2. Ethical Issues

All information collected from the surveys was kept strictly anonymous. Individuals were not identified by their name but specified by an identification number.

Only statistical summaries of the information were shared with collaborating hospital administrators, nurses, and the TFF staff. The ethical issues were described and submitted to the Loma Linda University Institutional Review Board (IRB) for approval and in turn were approved.

D. Analysis

The Statistical Package for Social Sciences (SPSS) Version 1.0 software was used to conduct all analyses. The statistical tests that were utilized for this study to assess factors associated with smoking behaviors of smoking parents at home were χ^2 tests of independence and logistic regression. Such factors included having one child vs. two or more children, having a mother who is the sole smoker vs. someone other than the mother as the sole smoker, belief in the dangers of secondhand smoke. Furthermore, analysis were conducted to measure association among parental belief in the dangers of secondhand smoke and desire to obtain secondhand smoke information and desire to learn how to quit smoking from the local county health department.

657 surveys were selected for the analyses from the pool of 3,109 MMSS surveys collected between June 2002 and July 2003. Previously mentioned inclusion and exclusion criteria were used to screen out the study group. The following statistical tests were used to analyze the research questions:

1. *Other Children in the House*

a. Is having two or more children associated with decreased smoking inside the house as compared to having only one child (besides the newborn)? 2x2 Chi square test

b. Is having younger children (5 years or less) associated with decreased smoking inside the house as compared to having older children (6 years and older)?

Logistic Regression

c. Does the presence of younger children (5 years or less) influence smoking inside the house differently in ethnic group of Hispanics as compared to Caucasians and Afro-Americans? Logistic Regression

2. *Smoking of the Mother*

a. Is having a mother who is the sole smoker in the family associated with increased smoking inside the house as compared to when someone other than mother is the sole smoker in the family? Logistic Regression

b. Is having a younger mother (< or = to 18 years old) associated with increased smoking inside the house compared to having an older mother (> than 18 years old)? Logistic Regression

3. *Belief in Dangers of Secondhand Smoke*

a. Is belief in the dangers of secondhand smoke associated with decreased smoking inside the house? Logistic Regression

b. Does the parental belief in the dangers of secondhand smoke for their children influence parent's desire to obtain secondhand smoke information from the local county health department? Logistic Regression

c. Does the belief in the dangers of secondhand smoke influence parents desire to learn how to quit smoking through the local county health department? Logistic Regression

4. *Smoking History*

a. Is the duration of smoking history of a parent associated with smoking inside the house? Logistic Regression

To control for possible confounding effects of age, the above analyses were performed again using logistic regression with the age of the mother included as a covariate.

E. Power Analysis

The power analysis was done using Sample Power version 1.0 (Borenstein, Rothstein, & Cohen, 1997). The most common analysis were a bivariate logistic regression comparing households with smokers smoking inside the house and households with smokers not smoking inside the house with regards to the proportion of the homes which have some characteristic (e.g., mother's belief in the dangers of secondhand smoke). The calculated sample size required for each group (households with smokers smoking inside the house and households *not* smoking inside the house) was 369 with alpha of .05 and the power of .80. This was based on 38% of houses with smokers allowing smoking inside the house (Pizacani et al., 2003) and assuming that the characteristic in question would decrease the proportion of homes with no one smoking inside the house by 10%. A power of 80% would be preserved even if sample size in the two groups were unequally split, e.g. 300 households did not smoke inside and 500 did. If we assume that 30% of homes have at least one smoker (the percent of homes with one smoker would be higher than the percent of smokers since having even one smoker in the home would qualify the home) then with the number of available questionnaires being at least 3,400 there should be at least 1,020 homes that qualify for the study. Thus, sample size should be adequate.

CHAPTER 4
PUBLISHABLE PAPER

**CORRELATES OF IN-HOME SMOKING BEHAVIOR OF PARENTS
WITH NEWBORNS**

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Abstract

Objective. Secondhand smoke exposure or environmental tobacco smoke (ETS) is known to have adverse health effects especially on children. It is estimated that as many as one in three children in the U.S. are exposed to secondhand smoke daily. This paper examines correlates of secondhand smoke exposure for children living in households with a smoker(s).

Methods. A cross-sectional survey of 657 mothers who gave births at area hospitals and who smoked or lived in house with a smoker was examined. Binary logistic regression was used to analyze correlates of ETS exposure among children.

Results. Of the 657 respondents, only 64 (9.7% of all households) reported that someone smoked in the house. Smoking inside the house was significantly associated with having both mother and father as smokers (odds ratio: 4.16; 95% CI: 1.34-12.88) as compared to having fathers as sole smokers. Mothers who believed that secondhand smoke was very dangerous for their baby's health were less likely to report that someone smoked inside the house (odds ratio: .163; 95% CI: .048-.551) as compared to those who believed it was somewhat dangerous. Hispanic ethnicity had a weak negative association with smoking inside the house (odds ratio: .473; 95% CI: 0.22, 1.02).

Conclusions. It may be important to target households where both mother and father smoke and educate them on the dangers of secondhand smoke. When attempting to educate young couples with newborns to reduce/eliminate secondhand smoke exposure, it may be important to incorporate a message on negative health consequences of secondhand smoke on their baby.

INTRODUCTION

Within the last few years, many research studies have shown that secondhand smoke, otherwise known as Environmental Tobacco Smoke (ETS), causes serious health consequences in healthy nonsmokers including young children. (1-3) Children who are exposed to ETS have increased prevalence and severity of symptomatic asthma, respiratory tract infections, and middle ear infections. (4-5) Smoking parents in the United States expose approximately 15 million children and adolescents daily to this carcinogen in their home. (6)

Clearly, ETS exposure among children is a major public health concern due to the serious health effects, especially on young children. It is estimated that approximately 34% of all children between the ages of 2 months and 5 years in U.S. are exposed to ETS daily. (7)

Studies have shown that the home is the major site of ETS exposure for young children. (8-9) Because young children spend most of their time inside the home with mothers or caregivers, the smoking behavior of these adult members contributes significantly to the ETS exposure. Since the home is the major site of ETS exposure among children, the majority of studies examining correlates of secondhand smoke exposure among children have measured such exposure by using self-reported home smoking restrictions. (10-13) Pizacani et al. (13) found that households reporting smoking restrictions also reported lower levels of household exposure to ETS.

This study will utilize a data set that includes reports by mothers of whether any smoker smokes inside the house, to assess ETS exposure among children rather than the reports of home smoking restrictions used in previous studies. This was the first study to

our knowledge that examined the secondhand smoke exposure using self-reported smoking status of home residents. This method may prove to be more accurate over reporting of home smoking restrictions because clients are asked about smoking behavior inside the house not about whether smoking restrictions exist or not. Previous studies examining the validity of self-reported secondhand smoke exposure indicated that a general concordance exists between self-reported and either environmental or biological measures of ETS exposure. (14-15) It has been shown that people are usually accurate when reporting smoking status. (16)

To date, only a few studies have looked at the correlates of home ETS. Some of the factors that have been associated with having home smoking restrictions were presence of young children at home (11,13), having families with both parents present in the home as compared to a single parent (17), parental awareness of the hazards of ETS (13), and whether the sole smoker was other than the mother. (18)

However, previous studies have left some questions unanswered. For example, how does the number and age of children relate to secondhand smoke exposure? How does maternal smoking influence the children's exposure to ETS? Is there more smoking inside the home when the mother rather than the father is the sole smoker?

The aim of this study is to identify additional correlates of in-home smoking behavior and to contribute to the understanding of secondhand smoke exposure among children residing with mothers who had just given births at Riverside County.

METHODS

A. Respondents

The respondents for this study consisted of mothers who completed a Mom/Mom-to-be Secondhand Smoke Survey, referred to as the MMSS hereafter, at five hospitals in Riverside County, California from June 2002 to July 2003. The surveys were given out and collected by nurses at the hospitals following labor. A total of 3,109 mothers who were pregnant or had just given birth to a child completed the survey initially. Of these, 657 were selected for this study. The inclusion criteria were having a smoker in the household, having a newborn at participating hospitals, and being a Riverside county resident.

The questionnaires were part of the referral process to generate eligible clients for the Tobacco Free Families (TFF) program at the County of Riverside Department of Public Health. The accumulated MMSS questionnaires were collected bi-monthly by designated staff at the TFF program. If a respondent indicated on the survey that she was interested in receiving secondhand smoke information and/or interested in quitting smoking then a phone contact was made by the TFF staff and services were provided.

B. Measures

The questions on the MMSS included demographic information, number of children, ages of children, smoking status of the parents, belief in the dangers of secondhand smoke for their children, duration of smoking history of each parent, ethnicity, smoking behavior inside the house, desire to obtain secondhand smoke information, and desire to learn how to quit smoking through the local county health department.

Children under the age of five were classified as *young* whereas children ages five and older were classified as *old* based on our survey. Belief in the dangers of secondhand smoke was assessed by asking, "Do you believe secondhand smoke is dangerous to your health?" and "Do you believe secondhand smoke is dangerous to your baby's health?" The responses included: *not very dangerous*, *somewhat dangerous*, *very dangerous*, or *don't know*.

The dependent variables for this study included smoking behavior of members of the household, the respondent's desire to obtain secondhand smoke information from the local county health department, and the respondent's desire to learn how to quit smoking through the local county health department. These were assessed with the following questions: "If you have a smoker in your home, does he/she smoke inside the house?", "Would you like more information about secondhand smoke?", and "Would you or the baby's father want to learn about how to quit smoking?" Available responses for all three questions were *yes* or *no*.

C. Analysis

Analysis was done using the Statistical Package for Social Sciences (SPSS) Version 10. The statistical tests used were χ^2 tests of independence and logistic regression. Variables examined included having one child vs. two or more children, having a mother who is the sole smoker vs. someone other than the mother as the sole smoker, and belief in the dangers of secondhand smoke. Furthermore, associations among parental belief in the dangers of secondhand smoke, desire to obtain secondhand smoke information and desire to learn how to quit smoking from the local county health

department were examined. In the logistic regression age of the mother was used as a covariate.

The analyses were performed by logistic regression analysis and chi square test of independence. A total of 3,109 respondents filled out the survey from June 2002 to July 2003. However, only the respondents ($n=657$) who had at least one smoker in their household were used for the analysis.

RESULTS

Description of study participants

Because of eligibility criteria for the larger study, all respondents ($n=657$) had at least one child aged 1-5 living with them. The majority of the respondents had only one child (52.1%) under 6 year's old living at home as compared to others having more than one child.

Of the 657 respondents, most of them (91.6%) were under 35 years of age. The majority of the respondents were Hispanics (58.1%) followed by Whites (21.9%), Afro-Americans (4.9%), and Asians (4.0%). Sixty two percent of the respondents spoke English while 38% spoke Spanish.

Most of those respondents (45.5%) had a father who was the sole smoker at home. Only 7.2% of the total households had a mother as the sole smoker at home. The majority of the respondents indicated that they have a smoker(s) who have been smoking for more than four years (68.8%). Only 5.2% indicated that they have a smoker(s) with less than one year of smoking history. Most of respondents (85.1%) believed secondhand smoke was very dangerous to their health, 52.4% of the respondents requested

secondhand smoke information packet, and 40.8% requested help in quitting smoking from the local county public health department.

Association between number and age of children and secondhand smoke exposure

Having two or more children under 6 years old did not have any significant association with smoking less inside the home (Table 1). Furthermore, there was no difference in smoking prevalence rate inside the house for those households having only young children (less than 6 years old) versus having both young and old children (6 years and older).

Effect of having sole smoking mother at home versus sole smoking father in home

Of the 657 respondents, the sample population ($n=386$) included households having either mother and/or father as smoker(s) living at home (Table 2). The remaining 271 respondents included households having someone other than mother and/or father as smoker(s) and were excluded from this analysis. Although not significant at $p=.05 \alpha$ level, households with mothers as sole smokers were more than 2 times as likely to expose their children to secondhand smoke than households where the father was the sole smoker. However, there was a significant association between having both mother and father as smokers and smoking inside the house. Those households that had both mother and father as smokers were more than four times more likely to smoke inside the house than households with fathers as the sole smokers.

Association between belief in the dangers of secondhand smoke and smoking inside the house

The sample populations included households having either mother and/or father as smoker(s) living at home and answering the belief in the dangers of secondhand smoke

as either *not very dangerous*, *somewhat dangerous*, or *very dangerous* to themselves ($n=372$) or to their infant ($n=377$). (Table 2) The remaining respondents who had someone other than mother and/or father as smoker(s) living at home and answered the belief in the dangers of secondhand smoke question as *don't know* were excluded from this analysis. There was a significant association between the mother's belief in the dangers of secondhand smoke for her baby's health and smoking inside the home. Those mothers who believed that the secondhand smoke was very dangerous to her health were more than five times less likely to report smoking inside the house than those who believed it was somewhat dangerous.

Effect of having an additional child under 6 years old on smoking inside the house among different ethnicities

There was no significant difference in home smoking status among the ethnic groups of Whites, Blacks, and Hispanics with having other child (other than the newborn) under six years old (Table 3). The sample population of 556 represents Whites, Blacks, and Hispanics. The remaining 101 represent other ethnic groups and were excluded from this analysis. Although not significant at the .05 level, the odds ratio showed that Hispanics were more than two times less likely to smoke inside the house as compared with Whites.

Association between years of smoking and smoking inside the house

Table 3 shows that no significant association of years of smoking and lack of smoking inside the house.

Age of mother and secondhand smoke exposure

Although not significant at $p = .05$ α level, the age of mothers was weakly associated with secondhand smoke exposure among children of the study participants (Table 3). The smoking status inside the house was compared among three different age categories. It was found that the smoking prevalence inside the house was lowest for the 35 years and older group and highest for the 18 years old and under group.

Beliefs in the dangers of secondhand smoke and desire to obtain secondhand smoke information or wanting help to quit smoking

Table 4 and 5 show the association between belief in the dangers of secondhand smoke and desire to obtain secondhand smoke information or wanting help to quit smoking from a local county health department. The sample populations of 100 and 101 represent those respondents who are smoking mothers and the remaining non-smoking respondents were excluded from this analysis. There was no statistically significant association between belief in the dangers of secondhand smoke and desire to obtain secondhand smoke information. There was no association between belief in the dangers of secondhand smoke and wanting help from a local county health department to quit smoking.

DISCUSSION

The current study is unique in that it is the first to examine factors associated with smoking inside the house for group of respondents who have just given a birth to a new baby. Previous studies suggest that a large number of the U.S. children are exposed to ETS on a regular basis. (16, 7) The prevalence of ETS exposure among children in the 1994 National Health Interview Survey (NHIS) showed that as high as 34% of the

children were exposed to secondhand smoke. Not many studies have focused their secondhand smoke research on households with young children.

The study population ($n=657$) represents 21.1% of the 3,109 respondents who filled out the survey initially and had at least one smoker living in their home. This is a considerably lower rate than the 34% reported from the 1994 NHIS study. Furthermore, only 9.7% (64) of the 657 respondents who had a smoker in the house reported that someone actually smoked inside the house. We found this to be encouraging because it suggests that the residents of households in this study are making conscious efforts to minimize the amount of ETS exposure in their home. However, this may be under reported due to bias. One bias may simply be an evaluation apprehension whereby mothers filling out the survey may be more inclined to report that no one smokes inside the house for the fear of their answers being evaluated by health care professionals. Another bias maybe due to the fact that this is based on self reports and may require doing biomarkers for confirmation. Future study may be necessary to compare in home smoking rates to see if the finding is similar across others groups of mothers with newborns.

It is important to note that the 34% secondhand smoke exposure rate reported on the NHIS study is from households of both smokers and non-smokers. Given the fact that our study examined the ETS exposure rate in only smoking households, we are somewhat surprised at the finding. The low levels may reflect the nature of our sample. This group represents households with newborn children. We speculate that new parents may be more likely to adopt smoking restrictions to protect the health of their newborns. It is possible that these parents may be particularly aware of the importance of trying to

minimize their children's exposure to secondhand smoke a point supported by the very high percentage of mothers who believed secondhand smoke was very dangerous to their baby. If so, this may imply a need for future research to determine if parents with newborns are more prone to changing their smoking behavior as compared to parents with no newborns. The findings may suggest this is particularly important time to intervene with smokers.

Unlike other studies where smoking restriction status was used to assess secondhand smoke exposure among children, our study used reported smoking status inside the house to ascertain ETS exposure. We believe this may be a better way to assess the secondhand smoke exposure among children. Although, no evidence exists to support this claim, it is possible that while parents report having home smoking restrictions, they may break the rule and actually smoke inside the home. Therefore, it may be that the smoking restriction status may underestimate the secondhand smoke exposure among children as reported in the study by Hopper and Craig (19) or it maybe that individuals are restricting their smoking in the house even in the absence of formal restrictions.

One of the major purposes of our study was to assess whether having younger children (less than 6 years old) and/or more children (2 or more) were associated with less smoking inside the house compared with having older children and/or less children. Previous studies have shown that the presence of children in the home is an important factor that influences home smoking restrictions. (12, 20, 21) But no study has examined the number and age of the children and their association with smoking inside the house. The current study found that neither the number nor age of the children is associated with

smoking inside the house. The prevalence rates of smoking inside the house were similar across the board for households with older children versus younger children and for households with one child versus more than one child.

We hypothesized that having more children or younger children would lead parents to be more concerned about their children's health and would lead to less prevalence of smoking inside the house. However, the hypothesized relationship did not appear. A close look at the nature of our respondents may provide clues as to why. Our respondents were near unanimous in their belief that secondhand smoke is dangerous for their children (94%+) and their health (85%). Furthermore, all the households had a newborn, which may significantly influence any behaviors affecting the health of the baby. It is possible that more smoking restrictions came into play as soon as the mother-to-be found she was pregnant. This could then have eliminated any impact of age and number of other children.

Several studies found an association between maternal smoking and children's ETS exposure. (22-25) It has been shown that children with mothers who are sole smokers ($n=27$) are at greater risk of ETS exposure than those children with smokers other than mothers. (18) This may be due to closer proximity between the smoking mother and child compared with other smokers in the households or due to more time spent with the smoking mother. (25, 26) Although the size of the effect was not sufficient to be statistically significant in our sample, we found that our study supports the finding of Berman et al. (18). Having a mother who is the sole smoker at home increased the risk of secondhand smoke exposure by more than two times compared to those households where the sole smoker at home is the father.

In addition, households having both mother and father as smokers were positively associated with smoking inside the house. Households where both parent smoked were 4.1 times more likely to have smoking inside the house as compared to households where the father was the sole smoker. This finding supports the findings of Okah et al. (12) This may be due to the fact that there is a greater resistance to smoking inside the house by a non-smoking spouse in households with either mother or father as a sole smoker. This may be of an importance to health professionals especially as it relates to screening households with greatest secondhand smoke exposure for children.

The beliefs in the dangers of secondhand smoke for the baby were significantly associated with parental smoking inside the house. For households where mothers believed that secondhand smoke was very dangerous for the health of their baby, smoking occurred more than 5 times less inside the house than those households where mother believed it was somewhat dangerous. Of the 377 households with smoking parents, smoking occurred inside the house for only 3.9% of those households where mothers believed that secondhand smoke was very dangerous for their baby as compared to 20% of households where mother believed it was somewhat dangerous. Although these results do not indicate a cause and effect relationship, they clearly point out the association between the mother's belief in the dangers of secondhand smoke and smoking inside the house. As such, when designing a program to reduce secondhand smoke exposure for couples with newborn babies, it may be important to educate parents on the dangers of secondhand smoke as it relates to the health of their newborns.

It's important to distinguish that this significant finding was for 377 households in which the smokers were only parents (either mom as smoker, dad as smoker, or both as

smokers) and not for 280 households in which the smokers were other than parents (friends, grandparents, and others). This may be due to the fact that mothers may feel less comfortable telling others (other than spouse) to smoke outside the house. Or even if mothers do tell them to smoke outside, they are less likely to heed the instruction. Further study may be necessary to ascertain the exact nature of this relationship.

Berman et al (18) found that Latino respondents were more likely than White or African Americans to report absolute restrictions against smoking inside their homes. They pointed out that protective cultural factors might contribute to the low levels of household smoking. Overpeck & Moss (27) also showed that Hispanic children were least likely to be exposed to secondhand smoke. Our data showed a similar pattern though the size of the effect was not sufficient to be statistically significant in our sample ($p = .055$ for Whites vs. Hispanics).

Unfortunately, we did not find an association between the belief in the dangers of secondhand smoke and a desire to obtain secondhand smoke information from a local county health department. We proposed that those mothers who believed that secondhand smoke is dangerous to their baby's health would request more information compared to those who believed otherwise since such a health concern would influence them to make a proactive choice (i.e., learn more about it by requesting information). The majority of the households (where mothers smoked) indicated that secondhand smoke is very dangerous for their children. No association existed between the belief in the dangers of secondhand smoke and a desire to learn how to quit smoking from a local county health department. Possibly, this may explain the addictive nature of cigarette for smokers. Those mothers who believe that secondhand smoke is dangerous to their

newborn may take their smoking outside the house to eliminate the exposure of secondhand smoke for their baby but may believe it's not worth going through the hassles of smoking cessation. As shown in this study, fewer mothers who believed that secondhand smoke is dangerous to their baby smoked inside the house.

As indicated by Poureslami et al (28), knowledge, beliefs, and attitudes do not necessarily influence a behavior. Merely providing secondhand smoke information would not necessarily have any impact in reducing/eliminating secondhand smoke. As health care professionals, perhaps, it may be more effective to make health knowledge, i.e., dangers of secondhand smoke personal by sharing how it can affect the health of their loved ones. In our study mothers who believed that second hand smoke is dangerous for their baby's health reported less smoking in their household than did mothers who believed it less dangerous. Although inconclusive at this point, the finding may suggest that in efforts to reduce or eliminate secondhand smoke exposure it may be important to convince mothers that secondhand smoke is dangerous to their babies.

Our study is not without limitations. First, the cross-sectional nature of the study makes it impossible to draw any cause and effect conclusions. Second, we assumed that the responses of new mothers represent what actually goes on in the individual households. This might not be the case. Third, the Mom/Mom-to-be Secondhand Smoke Survey was designed as a part of the referral process for the Tobacco Free Families Program. Thus, it contained only a limited number of secondhand smoke questions.

Despite the limitations, this study offers valuable information. This study supports the finding from other studies (18, 27) that Hispanics are less likely to expose their children to secondhand smoke. It is unclear from our study why Hispanics are less

inclined to expose their children than other ethnic groups. Future studies looking at attitudes and health beliefs of Hispanic smokers may reveal valuable information that may be useful in designing appropriate interventions. The findings from our study also indicated that having both mother and father as a smoker increased smoking inside the house by more than four times compared to having the father as the sole smoker. Targeting households where both mothers and fathers smoke for intervention may be a key for health care professionals in an effort to reduce or eliminate secondhand smoke exposure for children. In addition, secondhand smoke curriculum should include education on the dangers of secondhand smoke as it relates to the health of their newborn since mothers who believed second-hand smoke very dangerous were less likely to report anyone smoking in their home.

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Human Participant Protection

The institutional review board of the Loma Linda University approved this research as exempt from review.

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Table 1

Smoking Status Inside the House by Number and Age of Children (N=657) ^a

Characteristic	Smoking status inside the house		<i>p</i> value ^b
	Smoking Inside <i>N</i> (%)	No Smoking Inside <i>N</i> (%)	
Number of children 5 years and younger			.937
1 child	32 (50%)	310 (52%)	
2 children	20 (31%)	189 (32%)	
3 children	10 (16%)	76 (13%)	
4 children	2 (3%)	18 (3%)	
Total	64	593	
Having older and younger children ^c			.490
Only younger children	27 (42%)	224 (38%)	
Both older and younger children	37 (58%)	369 (62%)	
Total	64	593	

^a Households with at least one smoker residing at home.

^b Based on χ^2 test of association.

^c Younger children refer to ages 0 to 5 years old and older children refer to ages 6 and 18 years old.

Table 2

Crude and Adjusted Odds Ratios of Smoking Inside the House in Relation to the Identity of the Smoker, and the Mother's Beliefs in the Danger of Secondhand Smoke for Herself and Baby

Variables	Crude OR (95% C.I.)	OR ^a (95% C.I.)	P value
Status of smoker(s) living in the house (N=386) ^b			
Father as sole smoker (n=299)	1.00	1.00	
Mother as sole smoker (n=47)	2.69 (.81, 8.95)	2.71 (.81, 9.04)	.11
Father and mother as smokers (n=40)	4.13 (1.34, 12.77)	4.16 (1.34, 12.88)	.01
Mother's belief in dangers of secondhand smoke to herself (N=372) ^b			
Not very and somewhat dangerous (n=55)	1.00	1.00	
Very dangerous (n=317)	.43 (.15, 1.25)	.43 (.15, 1.27)	.13
Mother's belief in dangers of secondhand smoke to baby (N=377) ^b			
Somewhat dangerous (n=20)	1.00	1.00	
Very dangerous (n=357)	.16 (.05, .55)	.16 (.05, .55)	.004

^a Adjusted for age. ^b Includes households in which only mothers and/or fathers smoke.

Table 3

Crude and Adjusted Odds Ratios of Smoking Inside the House in Relation to Different Ethnic Groups Having Children (Other Than the Newborn) Less Than 6 Years Old and Years of Smoking

Variables of interest	Crude OR (95% C.I.)	Odds ratio (Adjusted)	P value
Ethnicity (N=556) ^a		OR (95% Confidence Interval) ^b	
White (n=144)	1.00	1.00	
Black (n=30)	.78 (.18, 2.34)	.68 (.14, 3.28)	.635
Hispanic (n=382)	.48 (.29, 1.12)	.47 (.22, 1.02)	.055
Years of smoking (N=657)			
Less than 1 year (n=34)	1.00	1.00	1.00
1 to 2 years (n=70)	.73 (.13, 2.97)	.61(.13, 2.90)	.532
3 to 4 years (n=101)	.46 (.09, 2.01)	.43 (.09, 2.04)	.289
More than 4 years (n=452)	.31 (.41, 4.65)	1.51 (.44, 5.15)	.510
Age of the mother (N=657)			
Lowest through 18 years old (n=81)	1.00		
19 to 34 years old (n=522)	.69 (.34, 1.39)		.296
35 and older (n=54)	.25 (.05, 1.16)		.076

^a Remaining sample (101) not included because there were insufficient numbers of other ethnic groups to

include in the analysis ^b Age adjusted

Table 4

Desire of Smoking Mothers to Obtain Secondhand Smoke Information in Relation to her Beliefs in the Dangers of Secondhand Smoke

Variables of interest	Crude OR	Desire to secondhand smoke information	
	<i>OR (95% C.I.)</i>	<i>OR (95% C.I.)^a</i>	<i>p</i>
Belief in the dangers of secondhand smoke for their health (<i>N</i> =100) ^b			
Not very and somewhat dangerous (<i>n</i> =21)	1.0	1.0	
Very dangerous (<i>n</i> =79)	1.12 (.42, 3.03)	1.06 (.39, 2.90)	.91
Belief in the dangers of secondhand smoke for their children's health (<i>N</i> =101) ^b			
Somewhat dangerous (<i>n</i> =11)	1.0	1.0	
Very dangerous (<i>n</i> =90)	1.04 (.28, 3.81)	.968(.90, 1.04)	.38

^a Age adjusted

^b Includes households with mother as a smoker.

Table 5

Desire of Smoking Mothers To Learn How to Quit Smoking in Relation to Her Belief in the Danger of Secondhand Smoke

Variables of interest	Desire to learn how to quit smoking		
	Crude OR (95% C.I.)	OR (95% C.I.) ^a	<i>p</i> value
Belief of danger of secondhand smoke for their health (<i>n</i> =100) ^b			
Not very and somewhat dangerous (<i>n</i> =21)	1.0	1.0	
Very dangerous (<i>n</i> =79)	.73 (.28, 1.93)	.74 (.28, 1.96)	.54
Belief in the danger of secondhand smoke for their children's health (<i>n</i> =101) ^b			
Somewhat dangerous (<i>n</i> =11)	1.0	1.0	
Very dangerous (<i>n</i> =90)	.83 (.24, 2.93)	.85 (.24, 2.99)	.79

^a age adjusted ^b Includes households with mother as a smoker.

CHAPTER 5

SUMMARY AND CONCLUSION

A. Outcomes of the Research Questions

The outcomes of the research questions were as follows:

1. *Other children in the House*

a. Is having two or more children associated with decreased smoking inside the house as compared to having only one child (besides the newborn)?

There was no association between the number of children and decreased smoking inside the house.

b. Is having younger children (5 years or less) associated with decreased smoking inside the house as compared to having older children (6 years and older)?

There were no associations between having older children other than the newborn and decreased smoking in the house.

c. Does the presence of younger children (5 years or less) influence smoking inside the house differently in ethnic group of Hispanics as compared to Caucasians and Afro-Americans?

The presence of young children other than the newborn was not significantly associated with decreased smoking for ethnic groups of Hispanic, Afro-American, and Caucasian.

However, smoking inside the house had a weak negative association among the Hispanics. Smoking inside the house was more than two times lower among Hispanic population compared to the Caucasian population.

2. Smoking of the Mother

a. Is having a mother who is the sole smoker in the family associated with increased smoking inside the house as compared to when someone other than mother is the sole smoker in the family?

Having a mother as a sole smoker in the house was not significantly associated with increased smoking in the house as compared to when a father is the sole smoker in the house. However, households having both mother and father as smokers were positively associated with smoking inside the house. Households where both parent smoked were 4.1 times more likely to report smoking inside the house as compared to households where the father was the sole smoker.

b. Is having a younger mother (< or = to 18 years old) associated with increased smoking inside the house compared to having an older mother (> than 18 years old)?

There was no significant association between the age of the mother and smoking inside the house.

3. Belief in Dangers of Secondhand Smoke

a. Is belief in the dangers of secondhand smoke associated with decreased smoking inside the house?

Mother's belief in the dangers of secondhand smoke for her children was significantly associated with decreased smoking inside the house for households with only mother and/or father as smoker(s). Mothers who believed that secondhand smoke was very dangerous to the health of her baby were five times less likely to report smoking inside the house than mothers who believed it was somewhat dangerous. However, no

significant association was found between the mother's belief in the dangers of secondhand smoke for her health and smoking inside the house.

b. Does the parental belief in the dangers of secondhand smoke for their children influence parent's desire to obtain secondhand smoke information from the local county health department?

Mother's belief in the dangers of secondhand smoke for their children was not significantly associated with desire to obtain secondhand smoke information from the local county health department

c. Does the belief in the dangers of secondhand smoke influence parents desire to learn how to quit smoking through the local county health department?

The mother's belief in the dangers of secondhand smoke was not significantly associated with smoking parent's desire to learn how to quit smoking through the local county health department.

4. Smoking History

a. Is the duration of smoking history of a parent associated with smoking inside the house?

The duration of smoking history of a parent was not significantly associated with smoking inside the house

B. Strengths and Limitations

One of the limitations for this study is in selection bias of the sample population. The 3,109 respondents who completed the surveys at five hospitals do not include all the mothers who delivered a baby at the hospitals. All mothers were instructed to complete and return the survey before their discharge. However, roughly 80% of the mothers who

were given the MMSS surveys completed and turned them in. However, this is much better rate than the Behavioral Risk Factor Surveillance System, the monthly state based telephone survey used by the Centers for Disease Control (Centers for Disease Control and Prevention, 1998). It is difficult to know why those 20% of them did not turn in their surveys but it may be possible that those 20% consist of mothers who are smokers and are not interested in any smoking cessation interventions. It may be possible that those 20% of the mothers may be non-smokers who have no concern or worries about secondhand smoke since no one is a smoker in their households. However, this may pose as a selection bias in the analysis of the sample population.

Another limitation has to do with whether self-reported ETS exposure (measured as if anyone smokes inside the house) reflects exposure levels measured in a more objective way such as urine cotinine level or other biomarkers. However, a number of reports (Wong et al., 2002; Sifert et al., 2002) have shown a good correlation between biomarkers and self-reports of ETS exposure.

The questions used on the surveys were based on the household level characteristics rather than respondent characteristics to assess outcome of smoking behavior of parents. It is important to utilize household level characteristics when considering secondhand smoke exposure. For example, a respondent who does not smoke may live in a family of nonsmokers or may live with a smoker. Hence, measuring smoking behavior solely by respondent smoking status would provide misleading results. Mothers were asked whether anyone in the family smoked inside the house to eliminate respondent level characteristic.

One of the strength for this study is that smoking behavior is used rather than the household smoking restrictions status to assess the ETS exposure among children. Although, most of the studies utilized the smoking restriction status, this method of measuring ETS exposure may present a bias in that smoking restriction status or policy may not accurately represent smoking behavior at home due to compliance issue (Pizacani et al., 2003). For example, smokers not strictly complying with a full ban might report that a full ban existed even though they did not comply with the ban. Thus, what was in reality a partial ban or no ban would be reported as a full ban. Or it may be that someone visiting the house, such as aunt, uncle, or friends, may break the rule and smoke. However, in this study, a smoking behavior was rather used to assess if anyone smoked inside the house. By utilizing this method, compliance issues do not present as a bias in assessing secondhand smoking exposure.

C. Future Studies

The current study indicated that those households with mothers who reported that the secondhand smoke was dangerous for her baby smoked less inside the house than those households with mothers indicating otherwise. Since this is a cross-sectional study examining association between variables such as belief in the dangers of secondhand smoke and smoking inside the house, it is difficult to ascertain whether there is any cause and effect between the two variables. A future study may explore this issue further by experimentally testing whether a change in a mother's belief of dangers of secondhand smoke has an effect on the smoking behavior of household members. .

It was surprising to see the overall high levels of response (88%+) indicating mother's belief in the dangers of secondhand smoke for their health and their baby's

health. Berman et al (2003) indicated a similar finding; however, it is not known whether the prevalence rate applies to general population of smokers. All of participants for this study had a newborn, which may significantly impact their views on health behaviors. Would this hold for population of households with no newborns or children? Further exploration may also be necessary to answer this question.

It would be useful to examine whether changing mother's belief in the dangers of secondhand smoke for her baby's health is more effective in changing the smoking behavior of the household members compared to changing mother's belief in the dangers of secondhand smoke for herself. This information would prove helpful for preventive care specialist and other health care professionals in designing health education classes/lessons in an effort to reduce secondhand smoke exposure for their household members. Such studies would shed information as to the efficacy of a program designed to reduce secondhand smoke exposure for children. It may be important to utilize health education curriculums that are proven effective especially for health care professionals with limited time and resources on hand.

As indicated in the previous chapter, Hispanics are less inclined to expose their children to secondhand smoke than their counterparts, Caucasians and Blacks. Although some studies (Berman et al, 2003; Norman et al, 1999) indicated that it might be related to cultural factors, no formal studies have examined the reasons for such association. What may be some of the attitudes or beliefs that tend Hispanic households to expose secondhand smoke less compared to other ethnic groups of Whites or Blacks? Qualitative studies that implore focus groups and key informant interviews may be warranted to further explore this relationship. Identifying these cultural factors may

provide additional information in developing interventions/educations to effectively reduce/eliminate secondhand smoke exposure for children in other ethnic groups of Whites and Afro-Americans. It maybe that Hispanics smoke at a lower rate than other ethnicities anyway or it maybe due to cultural practices, smokers are expected to smoke outside the house to keep the inside of the house smelling less like cigarette smoke.

Although the association was not significant, this study revealed that older the age of the mother (35 years old and above), less household members smoked inside the house. In the case of the Norman et al (1999), younger smokers between the ages of 18 and 34 years old were less likely to have home smoking bans than older smokers. Further study may be necessary to examine the association between age and the smoking behavior inside the house. It may be that as mothers' age increases, their education and/or views on their health may change for better as reflected in the mother's reporting of less smoking inside the house. A further understanding of older moms' reasons for not smoking inside the house may help in developing effective messages for reducing/eliminating secondhand smoke exposure.

D. Relevance of findings (Implications to Preventive Care)

Preventive Care Specialists (PCS) are concerned with lifestyle factors that influence the health of the individuals. Such lifestyle factors include nutrition, exercise, water, sunshine, temperance, air, rest, and spirituality. Smoking and secondhand smoke are modifiable lifestyle factors that concern PCS because of its harm to an individual for which an individual has much control over.

Okah et al. (2002) showed that more children are exposed to secondhand smoke in households where both parents smoked as compared to households where only one

parent smoked. This may be due to the fact that there is a greater resistance to smoking inside the house by a non-smoking spouse in households with either mother or father as a sole smoker. This may be of an importance to health professionals especially as it relates to screening households with a greater risk for secondhand smoke exposure for children. The results suggested that health professionals need to target especially those households with both smoking parents and educate them on the dangers of secondhand smoke exposure for their children. Even if smoking fathers and mothers are unwilling to quit smoking, counseling them to take smoking outside of the house for their children's sake might greatly reduce ETS exposure.

Another finding that may be of importance to preventive care specialist has to do with the mother's belief in the dangers of secondhand smoke. This study indicated that the extent to which mother's belief in the dangers of secondhand smoke for her baby's health had a significant association with the self-reported in-home smoking behavior. Those mothers who indicated that secondhand smoke was very dangerous for their baby were five times less likely to smoke inside the house than those who believed it was somewhat dangerous. Although, further studies are needed to confirm a cause and effect relationship, nevertheless, it may be a good idea to incorporate an education that address the dangers of secondhand smoke for children's health in creating a health message to smokers.

Norman et al (1999) pointed out that public health programs are faced with the challenge of emphasizing to smokers the health risks of ETS, especially the risks to children. As such, public health messages should encourage smokers to smoke outside the house on a patio or porch in the absence of their children. Secondhand smoke

exposure is a serious health threat to young children. The current study indicated a few corresponding sets of attitudes and correlates that tend to allow greater/lesser smoking in the home around the children. Identifying and/or confirming these correlates may represent an important step in shaping appropriate interventions and utilizing appropriate health implications of ETS to educate smokers to reduce/eliminate secondhand smoke exposure for young children.

Health education, "information giving", is theoretically supposed to increase knowledge and in that way influence attitudes and behaviors. In reality, there is a large gap between knowledge and behavior. On the other note, health education may be a seed that will later develop into the intended behavior.

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Appendix B: Institutional Review Board Approval Letter

INSTITUTIONAL REVIEW BOARD
Exempt Notice

OSR # 53266

Printed: 10/24/200
James Jo, 358-714

OFFICE OF SPONSORED RESEARCH • 11188 Anderson Street • Loma Linda, CA 92350
(909) 558-4531 (voice) • (909) 558-0131 (fax)

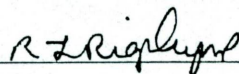
To: **Fujimoto, Edward K**
Department: **Health Promotion & Education**
Protocol: *Factors associated with environmental tobacco smoke exposure among Riverside County children as measured by home smoking behavior of smoking parents*

Your application for the research protocol indicated above was reviewed administratively on behalf of the IRB. This protocol is determined to be exempt from IRB approval as outlined in federal regulations for protection of human subjects, 45 CFR Part 46.101(b)(4).

Please note the PI's name and the OSR number assigned to this IRB protocol (as indicated above) on any future communications with the IRB. Direct all communications to the IRB c/o the Office of Sponsored Research.

Although this protocol is exempt from further IRB review as submitted, it is understood that all research conducted under the auspices of Loma Linda University will be guided by the highest standards of ethical conduct.

Signature of IRB Chair/Designee: _____



Date: _____

10/24/03

The Institutional Review Board holds Multiple Project Assurance (MPA) No. M-1295 with the U.S. Office for Human Research Protections and is assigned ID#01NR. This Assurance applies to the following institutions: Loma Linda University (and its affiliated medical practice groups), Loma Linda University Medical Center (including Loma Linda University Children's Hospital, LLU Community Medical Center), Loma Linda University Behavioral Medicine Center, and the Blood Bank of San Bernardino and Riverside Counties.

IRB Chair:

Rhodes L. Rigsby, M.D.
Department of Medicine
(909) 558-2341, rrigsby@ahs.llumc.edu

IRB Administrator:

Linda G. Halstead, M.A., Director
Office of Sponsored Research
Ext. 43570, Fax 80131, lhalstead@univ.llu.edu

IRB Specialist:

Anuradha Job, MPH
Office of Sponsored Research
Ext 87130, Fax 80131, ajob@univ.llu.edu

Appendix C: Riverside County Department of Public Health Approval Letter



Susan Harrington, M.S., R.D.
Director

Health Education Branch

Sept 23, 2003

Ms. Linda Halstead, Administrative Director
Office of Sponsored Research
Loma Linda University
Loma Linda, CA 92350

Re: Permission to Conduct Student Research Project

Dear Ms. Halstead:

Riverside County Department of Public Health, Health Education Branch (RCDPH) acting through the authorized official signing this letter hereby grants permission for researchers (listed in Exhibit A) to use the completed Mom/Mom-to-be Secondhand Smoke Surveys as a part of the Research Study described on Exhibit "A".

Only the individual researchers and the research adviser listed on Exhibit "A." may utilize the survey data. They are required to abide by the rules and policies in force at RCDPH while on premises. They must respect the confidentiality of all personally identifiable student and employee educational and medical information gathered in compliance with the Family Educational Rights and Privacy Act and all applicable federal and state laws and regulations and RCDPH policies relating to such records.

The data collected in the Research Study shall be used solely for meeting the academic course requirements of the individual researchers described in Exhibit "A" and for publication of the study. Any intellectual property developed as a result of the Research Study shall belong to Loma Linda University and shall be administered according to its policies.

By the counter-signature of the authorized Loma Linda University Officer below, Loma Linda University agrees to defend, indemnify and hold harmless RCDPH, its governing board, administrators, employees, students and agents harmless from and against any liability or damages suffered as a result of claims, costs, or judgments against them resulting from the negligent acts or omissions of Loma Linda University, its trustees, officers, faculty, employees, students or patients in performance of the Research Study. RCDPH shall give Loma Linda University thirty (30) day notice in writing of any claim made against it resulting from the Research Study. This obligation of indemnification shall survive the termination of this agreement.

4065 County Circle Drive, Riverside, California 92503
phone: 909-358-4977; fax 909-358-4920; tdd 909-358-5124

RCDPH reserves the right to immediately withdraw the permission to conduct the Research Study if the terms and conditions of that permission as set forth in this letter are not adhered to by Loma Linda University or the researchers or research adviser, or if the presence of researchers at RCDPH involves a threat to the safety of researchers or students and employees or the disruption of the orderly operation of RCDPH.

Sincerely,

Florence Neglia, M.B.A.
Director of Health Education

NEUTECH
25% COTTON

4045 Energy Center Drive, Suite 100, Loma Linda, CA 92350
Phone: (909) 791-1111 Fax: (909) 791-1112

EXHIBIT "A"

STUDENT RESEARCH STUDY DESCRIPTION

This study will analyze the factors associated with secondhand smoke exposure among Riverside County children by utilizing already collected data set of Mom/Mom-to-be Secondhand Smoke Surveys from the Tobacco Free Families Program. This study will utilize a data set of self-reported home smoking behavior, as defined by mothers reporting whether any smoker smokes inside the house, to assess ETS exposure among children. Variables of interest for this study include number and age of children, younger mother (< 21 years old) versus older mother (> or = 21 years old), duration of smoking history of parent, having mothers as the sole smoker versus someone other than mother as the sole smoker, and ethnicity as they relate to secondhand smoke exposure for children. The study will utilize the Statistical Packages for Social Sciences (SPSS) to analyze the relationship among variables mentioned above.

STUDY TITLE:

Factors associated with environmental tobacco smoke exposure among Riverside County children as measured by home smoking behavior of smoking parents.

SUMMARY OF STUDY OBJECTIVES:

The first objective is to examine factors associated with smoking inside the house, which has not been examined in previous studies. These factors will consist of the number and age of children, age of smoking mothers, the duration of smoking history of the parent(s), ethnicity, belief in the dangers of secondhand smoke, and the presence of smoking mother at home.

The second objective is to provide a generalizable conclusion as to whether having a mother who is the sole smoker in the house is associated with smoking in the house as compared to when someone other than mother is the sole smoker at home or both.

The third objective is to determine whether the factors identified by previous studies as associated with secondhand smoke exposure are also associated with secondhand smoke exposure in this particular group of young parents in Riverside. Previous studies indicate that less secondhand smoke exposure among children was associated with presence of child(ren) at home (Norman et al., 1999; Pizacani et al., 2003), having families with two parents rather than a single parent (Jaakkola et al., 1994), and an awareness of the hazards of ETS (Pizacani et al., 2003). The question of whether these factors are generalizable to this particular group of Riverside County residents will be answered.

COURSE TITLE AND NUMBER FOR WHICH STUDY IS PERFORMED:

Research – Dissertation, Health Education

STUDENT RESEARCHERS CONDUCTING STUDY: (Name and contact information)

James Jo, DrPH candidate

LOMA LINDA UNIVERSITY RESEARCH ADVISOR FOR STUDY: (Name, title and extension)

Ed Fujimoto, DrPH, Professor and Dissertation committee chair

UNIVERSITY LIBRARY
LOMA LINDA, CALIFORNIA

SITE(S) WHERE RESEARCH STUDY IS TO BE PERFORMED AND DATA IS TO BE COLLECTED: (Name and address)

Data Analysis to be done at Loma Linda University.
Use of collected Mom/Mom-to-be Secondhand Smoke Surveys with permission of the TFF Program at the Riverside County Department of Public Health.

ENTITY OR AGENCY RESPONSIBLE FOR SITE: (Name and address and telephone number)

Loma Linda University School of Public Health (909) 558-4546

SITE CONTACT: (Name, title and phone number)

Ed Fujimoto, DrPH
Professor
558-4546 ext.47234

DATES OF STUDY AND DATA COLLECTION:

October 2003 to June 2004

PERMUTED HOURS DURING WHICH STUDY OR DATA COLLECTION MAY OCCUR: N/A

OTHER SITE CONDITIONS: N/A