RESPIRATORY SYMPTOMS IN INFANTS OF PARENTS WHO SMOKE CIGARETTES

by

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DEDICATION

To Scott

whose love, support, and understanding

sustained me and made it all worthwhile

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CHAPTER I

INTRODUCTION

The involuntary breathing of smoke-containing air from cigarettes, or so called passive smoking, has become a controversial issue in recent times. Passive smoking involves both the breathing of mainstream smoke, that is, the air exhaled from a cigarette smoker, as well as side-stream smoke, which is the smoke leaving the end of a burning cigarette. The quantity of smoke inhaled by the nonsmoker is obviously less than that inhaled by the smoker, and the quality is quite different. Because of this, the effect of cigarette smoke on the nonsmoker is likely to be different from that on the smoker.

The effect of sidestream smoke, or second-hand smoke, includes predominately symptoms of eye and nose irritation; but throat irritation, headache, fatigue, and dizziness are all thought to occur. Few studies have related the effects of passive smoking on infants to the incidence of upper respiratory symptoms in those infants.

Adults, when subjected to tobacco smoke may have the option of leaving the area when the air becomes unpleasant. Infants, on the other hand, are at the mercy of their caretakers and have no choice as to the air they breathe.

This study was designed to investigate the incidence of upper respiratory symptoms in infants of smoking parents.

Health professionals dealing with children and their parents are in a position to discuss the effects of smoking with the adults and to counsel them in regard to curtailing this habit if indeed a harmful influence is exerted on their children. Because of the wide variety of health related facilities which utilize the services of nurses and because of the extensive contact which nurses have with the general public, they are in a favorable position to teach parents concerning this health problem.

Review of the Literature

Extensive research is available dealing with the effects of cigarette smoke on the smoker. Because of the focus of this study, the literature review includes only studies concerned with the effects of second-hand smoke and its effect on healthy adults and children. Studies discussing the effects of second-hand smoke on persons with dysfunctional conditions, that is, cardiovascular disease, lung disease, and allergies are not included.

The review of the literature includes: the composition of second-hand smoke, the effects of cigarette smoke on the respiratory tract, the effects of passive smoking on adults, and the effects of passive smoking on children.

Composition of Second-hand Smoke

Epstein, et al. in a government publication, Health Consequences, Education, Cessation Activities, and Social

Action, (1975), discusses the composition of second-hand smoke. Second-hand smoke is composed of both side-stream smoke, that is smoke drifting directly into the air from the burning end of the cigarette, and main-stream smoke, or that which is inhaled and exhaled by the smoker. Side-stream smoke has a higher concentration of noxious compounds than smoke which is inhaled by the smoker. The report summarizes studies which show the tar and nicotine content in sidestream smoke to be twice as great as in mainstream smoke, the ammonia content is fifty times greater, and the carbon monoxide content five times greater. Moreover, sidestream smoke containes more 3,4-benzpyrene, which is a suspected cancer causing agent. Tobacco smoke contains hundreds of chemical compounds, some of which can act as a direct irritant to the respiratory tract.

Effects of Cigarette Smoke on the Respiratory Tract

The effects of cigarette smoke on airways have been the subject of extensive research. Most of the studies have dealt with the pathological changes in the airways of smokers. Sidestream smoke has a higher concentration of some irritants, but is not inhaled in the same way. The findings from these reports are summarized. Little research has focused on the influence of second-hand smoke on non-smokers. Animal models have been utilized to determine effects of cigarette smoke. Changes in the respiratory tract of individuals may predispose them to an increase in

respiratory illnesses or symptoms.

In smokers, Auerbach, Hammond, and Garfinkel (1979) studied changes in the bronchial epithelium of smokers. Normal bronchial epithelium, as seen in cross section, consists of 2 rows of cells, one row of basal cells lying on the basement membrane and a single outer row consisting of ciliated columnar and goblet cells. No cells with atypical nuclei are present. In smokers, on autopsy, the researchers found increased basal cell hyperplasia. Lesions with an absence of cilia were characteristic with atypical nuclei found in the cells. Loss of cilia is harmful in that it destroys one of the mechanisms responsible for removal of foreign material from the lungs.

Cosio, Hale, and Niewoehner (1980) investigated the effects of prolonged cigarette smoking on the small airways. They detected histopathologic changes in small airways. There was an increase in goblet cells, smooth muscle hypertrophy, inflammation in the walls of bronchioles, and respiratory bronchiolitis. Coles, Levine, and Reid (1979) also confirmed the finding of hypertrophied glands with an increase in mucous production in an animal model using rats. These researchers produced chronic bronchitis in rats by exposing them to tobacco smoke for 6 weeks. Laryngeal and tracheal glands were discovered to be hypertrophied and glycoprotein secretion was increased. Structural and physiologic similarities were shown between rat tracheal/laryngeal glands and human bronchial glands which made the 2

tissues suitable for comparison. The mechanism for gland hypertrophy and mucous hypersecretion is unknown.

Martin and Warr (1977) performed bronchial lavage on a total of 400 asymptomatic smokers and nonsmokers. Four times as many free cells, particularly pulmonary alveolar macrophages were recovered from smokers than nonsmokers. These cells displayed altered surface morphology, increased lysosomal enzymes, fewer complement receptors, decreased phagocytic activity against some bacteria, and unresponsiveness to migration inhibitory factor. According to the researchers, these factors may indicate a defect in cell-mediated immunity.

If sidestream smoke with its higher concentration of noxious substances produces pathological changes similar to those reported for the smoker, then these changes may inhibit the body's defenses for ridding itself of viral and/or bacterial invaders from the lungs. Further studies need to be undertaken which would relate anatomical or physiological changes due to second-hand smoke to the occurrence of respiratory illnesses.

Passive Smoking and Respiratory Symptoms in Adults

The effects of second-hand smoke on the respiratory tract of adults has appeared in the literature recently. Pimm, Silverman, and Shephard (1978) studied the physiological effects of second-hand smoke on adults. Ten men and 10 women were exposed to a quantity of cigarette smoke normally

encountered in public buildings. All were life-long non-smokers and had no history of allergic disease. On 2 subsequent days, the subjects sat for 2 hours in a special room filled with either ambient air or cigarette smoke, according to a random sequence. It is unclear if subjects were randomly assigned to a room with either ambient air or smoke-filled air for 2 days, or if the subjects were randomly assigned each day to either of the rooms. Smoke concentration in the room was kept constant. Following exposure, values were collected on carboxyhemoglobin level, lung volume, flow-volume curve, closing volume, heart rate, and exercise response. The subjects were asked at that time to select from a list of symptoms those they had experienced during the previous 2 hours. Although the magnitude of physiological responses to the smoke experienced by the subjects was not statistically significant, subjective complaints of eye irritation, nasal discharge and/or stuffiness, and cough were common. The authors theorized that the irritant effects of the smoke were due to exposure to strong irritants and unpleasant odors, including phenols, aldehydes, and organic acids.

Weber, Fischer, and Grandjean (1979) also researched the physiologic and irritant effects of second-hand smoke on healthy adults as well. Forty-three adults, both male and female were exposed for 1 hour to a controlled concentration of cigarette smoke. As in the previous study, the physiologic status as measured by heart and respiratory rate did

not change. However, the subjects reported eye, nose, and throat irritations. These symptoms tended to increase as the duration of time spent in the smoke-filled room increased. The level of annoyance was determined by a short questionnaire. The results showed an increase of annoyance during the first 10 minutes which remained constant for the remainder of the hour.

Although Speer (1968) studied subjects complaining of smoke allergy as well as individuals with no allergy, this review is focused on the healthy control group. Two hundred and fifty men, women and children (under 16 years) in Kansas were asked to complete a questionnaire reporting symptoms experienced when they were exposed to cigarette smoke in the past. Many subjects reported symptoms. Eye irritation and nasal symptoms were experienced most often. Other symptoms included were headache, cough, wheezing, sore throat, nausea, hoarseness, and dizziness.

Respiratory symptoms are related to incidence of respiratory disease as well as the irritant effects of the smoke. Shilling, Letae, Hue, Beck, Schoenberg, and Bouhuys (1977) studied lung function, respiratory symptoms and respiratory disease in families having at least one smoker. This investigation surveyed the population of three towns, Lebanon and Ansonia, Connecticut, and Winsboro, South Carolina. Three hundred and seventy-six families were studied. These families included a total of 915 children. Parents and children were asked to recall episodes of

pneumonia, bronchitis, cough, wheeze, and asthma. Children answered questions regarding their own incidence of respiratory illnesses. Parents also answered questions concerning the occurrence of wheezing if the child was less than 16 years of age. As expected, parents who smoked cigarettes reported an increase in cough, phlegm production and wheezing. However, prevalence of these symptoms in nonsmokers was unrelated to whether or not their spouses smoked. The men who never smoked but whose wives smoked did not deviate significantly from those men not exposed to smoke. In families in which only the father smoked, the mothers' lung functions were similar to the lung function of mothers in families where neither parent smoked. The researchers therefore concluded that passive smoking was not an important factor affecting adult lung function of respiratory illness. Socioeconomic status of the families did not relate to the incidence of respiratory symptoms. Results concerning symptoms in children are presented in the following section.

Passive Smoking and Respiratory Symptoms in Children

The question of whether illness is caused by the presence of smoke in the air or cross-infection from phlegm produced by the parents was addressed in the literature. The effect of smoke on children with allergies is not included in this review because this study does not generalize to these children.

Tager, Weiss, Rosner, and Speizer (1979) conducted a 2 year study in East Boston, Massachusetts. They followed 404 families to determine the effects of parental smoking patterns on the pulmonary function and respiratory illnesses of their children, 5 to 9 years of age. Households were divided into those where neither parent smoked, one parent smoked, and both parents smoked. Spirometry was performed on the children to determine lung function. At the time of entry into the study, parents were questioned about diagnosed episodes of acute bronchitis, pneumonia, croup, or bronchiolitis in themselves and their children. A cumulative two-year history of respiratory illness frequency was kept; however it is unclear if these respiratory illnesses were diagnosed by a physician. Differences in the lung function values between the 3 classes of households were not statistically significant. There was a consistent trend toward a decreasing level of lung function in the children as parental smoking increased. No trend toward increasing respiratory illnesses was found with increasing number of parents who smoked. The investigators stated that socio-economic status played no major role in explaining the results. They did not consider proximity of smoke to the children.

The effect of cigarette smoke on children was the subject of research by Cameron, Kostin, Zaks, Wolfe, Tighe, Oselett, Stocker, and Winton (1969). They selected a systematic, randomized sample of Denver residents from the

telephone directory, and surveyed the incidence of illnesses in the children of 727 households. An acute illness questionnaire was administered by telephone asking adults to recall the illnesses of both their children and themselves during the preceding 7 days. A smoking history was taken which included questions about the number of cigarettes smoked and where they were smoked. The data collected from these families showed that children of smokers were ill more frequently than children of nonsmokers. There are major weaknesses in this study. It did not assess socioeconomic status. People of lower socioeconomic classes are thought to have poorer standards of nutrition and hygiene, and to experience greater overcrowding in their homes, and therefore to have a higher incidence of illness regardless of smoking habits. Further recall information was elicited by telephone, thereby casting doubt as to its accuracy. Self diagnosis of illnesses was relied upon. The number of episodes recalled decreases as the length of time from the illness increases; this effect varies according to the relative severity of the illnesses (Mooney, 1962). Lastly, 2% of the 13 to 16 year olds in the study were reported as smokers themselves. This finding may have affected the final analysis.

In a subsequent study, Cameron and Robertson (1973), using the same research methods, investigated the incidence of respiratory infection in children when they were exposed to smoke. This project involved 2,625 households in Detroit,

Longbeach, and Pasadena. The increased illnesses in smokers' children reported by Cameron, et al. (1969) was substatiated in this study dealing specifically with respiratory illnesses. Acute illness rates in children in all 3 cities showed an increase when smoke was present in the environment. The results were statistically significant in children less than 16 years of age, except for 0 to 5 year old children in Longbeach and 0 to 9 year old children in Pasadena.

Smokers are more likely to manifest symptoms of chronic cough and phlegm production than nonsmokers. Cross-infection because of colonization of microorganisms in the phlegm in smokers' airways may be the cause of their children's respiratory illnesses rather than the second-hand smoke per se. In an attempt to determine the influence of phlegm production on respiratory illnesses, Colley, Holland, and Corkhill (1974) in London, England, included this variable in their study. In a longitudinal study involving 2,149 infants during their first five years of life, the incidence of bronchitis and pneumonia was recorded. Initially, a trained health visitor administered a questionnaire to the infants' parents eliciting information on parental smoking habits and phlegm production. Infant birthweight was also recorded. The parents responded to an annual postal questionnaire for each of the following 4 years. Information from the survey showed that during the first year of life a consistent relationship was seen in the incidence of

pneumonia and bronchitis and parental smoking habits. The incidence was lowest in infants of nonsmoking parents and highest when both parents smoked. The incidence fell between these values when only one parent smoked. This relationship was statistically significant for the first year of life. When infants were categorized according to birthweight and smoking parents with phlegm production, the increase in pneumonia and bronchitis was statistically significant only in the first year of life. The number of nonsmoking parents included in the sample who produced phlegm was not large enough for statistical analysis.

Colley (1974) investigating the influence of parental smoking on the respiratory symptoms in children also included the variable of parental phlegm production. This sample consisted of 2,598 children aged 6 to 14 years living in England. The parents answered questions regarding their own and their children's health using a self-administered questionnaire. Social class was determined by the father's occupation. The findings indicated a statistically significant association between parental smoking habits and the occurrence of respiratory symptoms. Children of nonsmoking parents had the fewest symptoms while children with 2 smoking parents had the greatest number of symptoms. However, when the phlegm production of adults was analysed, it was found that the children of those parents reporting no phlegm production had the fewest number of symptoms, while those children of both parents reporting phlegm

production had the greatest. The researchers were not able to determine whether the increase in symptoms was caused by second-hand smoke, or phlegm production by parents, because most reports of phlegm production were from smokers. In the 1,582 children whose parents reported no phlegm production, there was a tendency toward more respiratory symptoms in children of smokers though the findings were not statistically significant.

Lebowitz and Burrows (1976) in Tucson, Arizona, questioned whether an increase in respiratory symptoms in the children of smokers was the result of second-hand smoke or an increase of respiratory symptoms in their parents. In a sample of 1,665 households, information regarding symptoms of persistent cough, persistent phlegm, wheezing, physician-confirmed asthma or bronchial trouble, and emphysema was collected for both children and parents by means of a self-administered questionnaire. Data were collected concerning parental smoking habits, age of children, social status, and family size. Children in households with smokers present had a higher overall rate of respiratory symptoms. The only symptom with an occurrence that was statistically significant was persistent cough. Children's respiratory symptoms were also compared to symptoms reported by adults in the household. Children in households containing adults with respiratory symptoms had a higher occurrence of those respiratory symptoms which were exhibited in their parents, regardless of the family smoking habits. Based on these

findings, the authors concluded that respiratory symptoms in children were related to both the presence of adults with respiratory infections and to the presence of smoking parents.

Shilling et al. (1977) in the study previously cited relating to lung function and incidence of respiratory disease also looked at the relationship between parental report of symptoms and their children's incidence of respiratory symptoms. This was done to determine whether second-hand smoke influenced the symptoms in children more than the presence of symptoms in their parents. Members of the 376 households were asked to complete a questionnaire eliciting information of cough and/or phlegm production and wheezing. The children reported on their own respiratory symptoms in an attempt to control for parental over or under-reporting. Parents answered questions dealing with their smoking history. The results showed that occurrences of cough and phlegm production were highest in children of parents who also reported these symptoms. The investigators found no differences in respiratory symptoms in children whether their parents smoked or not. To determine the effect of passive smoke on the children's lung function, forced expiratory volume during 1 second was determined. The researchers found no significant relationship between parental smoking history and children's lung function. Family socioeconomic status and lung function had no relationship to the final results.

In addition to parental production of phlegm and its relationship to respiratory illnesses, socioeconomic status and family size are variables that have been examined as well. Colley, Holland, and Corkhill (1974) in their study of 2,149 infants reported that, within social classes, the incidence of respiratory illnesses increased as exposure to cigarette smoke increased The authors did not discuss how social classes were derived. This trend held within families of the same size.

In contrast, Holland, Kasap, Colley, and Cormack (1969) reported an absence of social class variability when looking at respiratory symptoms in children. Their study was conducted in a suburb of London, England and included 2,205 families. Parents of newborn infants answered 3 questionnaires which were administered by trained interviewers. The questionnaires sought information about the parents' smoking history and respiratory symptoms of the newborn, parents, and other children in the family. Information on the social and environmental conditions of the family were recorded. Ventilatory function tests on all members of the family were performed. This study was not concerned with the effects of second-hand smoke specifically on children, but examined environmental factors and their influence on respiratory symptoms. There were no statistically significant differences in respiratory symptoms or lung function between social classes. The effect of family size on the incidence of respiratory symptoms was not reported.

Social class and family size were examined in relationship to the respiratory illnesses of eight hundred and nineteen 5-year old children in Sheffield, England (Lunn, Knowelden, & Handyside, 1967). Although the investigation dealt with the influence of air pollution on respiratory symptoms in children, the study was reviewed to illustrate the effect of socioeconomic status and family size on these symptoms. The researchers reported that the prevalence of muco-purulent nasal discharge, scarred or perforated ear drums, 3 or more colds per year, and "colds going to the chest" appeared to be unaffected by social class. However, a history of persistent or frequent cough was more common in lower social classes. This finding was statistically significant. As the number of household members increased, the incidence of respiratory symptoms did not increase.

The number of cigarettes smoked by parents and the proximity of smoke to their children are important variables determining the effects of that smoke. Only the studies of Cameron, et al. (1969) and of Cameron and Robertson (1973) elicited information about smoke proximity. Both investigations collected information concerning respiratory symptoms and smoking history via the telephone. The study by Cameron and Robertson (1973) was an attempt to replicate the study of Cameron, et al. (1969) using 2 different geographic locations. Proximity of smoke was determined by asking how many cigarettes were smoked in the home as opposed to the total number of cigarettes smoked. The amount of smoke in

the environment was indexed by number of cigarettes smoked at home by all members of the household. The researchers concluded that children in "smoky" environments tended to be ill more than those in "not smoky" environments.

Harlap and Davies (1974) conducted a survey in Jerusalem of 10,672 infants during the first year of life. Information about maternal smoking habits was recorded. The infants of mothers who smoked had more hospital admissions for bronchitis and pneumonia than infants of non-smokers, 13.1 versus 9.5 admissions per 100 infants. This finding was statistically significant. Admissions for bronchitis or pneumonia increased in frequency as the number of cigarettes smoked by the mother increased. This increase occured within subgroups of birth-weight, social class, and birth order. The age of the infant was related to hospital admissions. It was found that, for infants younger than 5 months and older than 10 months, hospital admissions were no greater than for infants of nonsmoking mothers; but, between 5 and 10 months of age, there was a significant increase in admissions. This study did not determine paternal smoking habits or phlegm production by the parents. Colley, et al. (1974) reported that 8% of infants with nonsmoking parents had an attack of bronchitis or pneumonia in the first year of life, whereas 15% of infants whose parents smoked a total of 25 cigarettes or more a day, contracted pneumonia or bronchitis.

Norman-Taylor and Dickinson (1972) studied 1,119

school age children in England. They discovered that as the smoking level of parents increased, the percentage of children with respiratory infections tended to increase. While 33.5 percent of nonsmoking families had children with respiratory symptoms, 44.5 percent of heavy smoking families (20 or more cigarettes smoked/day) had children with symptoms. They did not consider socioeconomic status or parental phlegm production.

Fergusson, Horwood, and Shannon (1980) examined smoking and respiratory illnesses in 1,180 infants from 4 months to 1 year of age in New Zealand. The mothers were interveiwed when the infants were newborns, 4 months and 1 year of age. Information on health and development, diet, social, and economic background was elicited. Complete medical data based on history of medical diagnoses and answers to questions concerned with the incidence of respiratory symptoms were available for the period of 4 months to 1 year. Upper respiratory symptoms or illnesses included were nasal discharge, pharyngitis, otitis media, colds, and sore throat. Lower respiratory illnesses or symptoms included bronchitis, bronchiolitis, pneumonia, and maternal reports of a "wheezy chest". Variables used in the analysis for purposes of control were birthweight, gestational age, maternal education, maternal race, number of children in the family, family living standards, and duration of breast feeding. Parents were classified as either "smokers", or "nonsmokers".

It was found that the risk of upper respiratory

illnesses in the infants of smokers was no greater than that of nonsmokers. However, when both parents smoked, the infants had over twice the incidence of medical consultation for lower respiratory tract illnesses and five times the maternal reporting of "wheezy chest". This relationship held when all the other variables were controlled for. The authors postulated that prolonged exposure to cigarette smoke predisposes infants to develop lower respiratory symptoms when they contract a respiratory infection. Phlegm production and proximity of smoke as variables were not evaluated. Because the data were collected retrospectively, some respiratory illnesses may not have been recalled. Eight-eight of the sample of 1180 were families with only one parent present in the home.

The preceding studies have dealt mainly with the incidence of respiratory illness and have not considered the irritating effects of cigarette smoke on the respiratory airways of children. These studies have not attempted to determine whether all the symptoms were caused by bacteria or viruses or from the irritant effects of the smoke.

By reviewing the literature presented above, it is evident that discrepancies between studies exist. This investigator considered smoking habits of both parents and general proximity of the smoke to the infant. Measures related to parental phlegm production, socieconomic status, and infant weight were included. This study deals specifically with respiratory symptoms of cough, runny nose,

stuffed up nose and wheeze.

Conceptual Framework

The conceptual framework for this study is derived from documentation of the effects of cigarette smoke on the respiratory tract of individuals. Cigarette smoke has been reported in the literature to effect certain anatomic structures and physiological processes in the respiratory tract of smokers. The effects of second-hand smoke, which is composed of hundreds of chemical compounds, on the respiratory tract of nonsmokers is largely unknown.

According to the literature reviewed, a relationship between second-hand smoke and respiratory illness and symptoms in both adults and children may occur. This relationship, if it exists, may be due to second-hand smoke per se in the environment, or to some other variable that is not readily apparent, such as parental phlegm production or socioeconomic status. Age of the individual may influence the relationship between second-hand smoke and respiratory illnesses in that individual.

The purpose, therefore, of this study is to determine if a relationship between second-hand smoke and respiratory symptoms in infants exists, regardless of parental phlegm production, socioeconomic status, and infant weight. This study deals specifically with respiratory symptoms of cough, runny nose, stuffed up nose and wheezing.

Hypothesis

Infants between 5½ months and 9½ months of age, whose parents smoke cigarettes in the home, will have a higher incidence of cough, runny nose, stuffed up nose, and wheeze than infants of the same age whose parents do not smoke cigarettes.

CHAPTER II

METHODS

The purpose of this study was to determine if relationships exist between second hand smoke and upper respiratory symptoms of infants between the ages of $5\frac{1}{2}$ and $9\frac{1}{2}$ months.

Design

The design of this study is longitudinal, correlational, and prospective. Correlation is a measure of the extent to which the independent and dependent variables are related although one cannot show causality between them. By identifying presumed causes, one can look ahead in time with a prospective study to the presumed effects.

The participants were divided into two groups according to parental smoking habits. Those families containing one or more smokers were in the first group entitled "smokers". Nonsmoking families were in the control group entitled "nonsmokers". Data were collected over a period of 7 months, June 1980 through January 1981.

Sample and Setting

A nonprobability convenience sample of infants was drawn from 2 private clinics in the Portland metropolitan area offering general pediatric services. These subjects received their health care from 3 cooperating pediatricians working within these clinics.

Infants between the ages of 5½ and 9½ months were selected, since Harlap and Davies (1974) indicated that a statistically significant increase in pneumonia and bronchitis occurred in infants during these months when their mothers smoked. A 6 month well-child examination is provided by the aforementioned pediatricians as part of routine well-child care during the first year of life. Subjects were drawn from those who made appointments for the 6 month examination. The target population is then all infants who meet the criteria of the study whose parents utilize private pediatricians for the care of their infant. The following criteria were used for selection of the families.

The parents:

1. were both living in the home with the infant
2. were willing to record respiratory symptoms of their infant in the manner prescribed
3. were able to read and understand English
4. had only one infant living in the home during the time of the study
5. did not smoke marijuana or a pipe in the home.

The infant:

1. was between the age of 5 months 2 weeks and 9 months 2 weeks during the time of his/her participation in the study
2. was 38 to 42 weeks gestation at birth with no known congenital anomalies
3. was not in the care of anyone other than the

parents who smoked cigarettes.

If anyone lived in the home, besides the parents, and smoked cigarettes, the family was not included in the study.

Variables and Measurements

Independent Variable

The independent variable of this study is cigarette smoke produced by parental smoking. To ascertain this information, parents were asked, using the "Parental Information and Health Questionnaire" (PIHQ), whether they smoked cigarettes, and, if so, the number that were smoked in the home per day. This gave information in a general way regarding proximity of smoke to the infant. This tool was compiled by the researcher for this study and consisted of 15 questions (see Appendix A). In addition to eliciting information about smoking habits and phlegm production by the parents, the questionnaire gathered demographic data on family size, occupation, approximate gross yearly income, and education of the parents. These data were gathered as a way to compare the study sample with the more general population. Four questions were included to determine if the subjects met the criteria for admission to the study. The questionnaire was reviewed by three faculty members for clarity and validity.

Parents were divided into two groups according to smoking history: "smokers" and "nonsmokers". A smoker was

classified as any person who smoked one or more filtered or unfiltered cigarettes per day for at least one year prior to the study and was currently smoking. Because of the possibility that smoking habits could change during participation in the study, parents were asked to record daily on the "Infant Respiratory Symptom Diary" (IRSD) the approximate number of cigarettes smoked (see Appendix B).

Dependent Variable

The dependent variable of this study is respiratory symptoms in infants. Cough, runny nose, stuffed up nose, and wheeze are most often cited in the literature as respiratory symptoms and are easily observed in infants. The "Infant Respiratory Symptom Diary" was compiled by the researcher as a method for parents to record daily symptoms. Mooney (1962) found that health diaries elicited more illness episodes than did monthly recall interviews. The diary covered a period of thirty days and contained a box for each day in which to record exhibited symptoms of cough, runny nose, stuffed up nose, or wheeze. A box was included in which to record approximate numbers of cigarettes smoked during the day. Directions for use of the diary were included. The IRSD was reviewed by 3 faculty members to assure clarity. Daily, for 30 days, parents recorded on the IRSD the occurrence of these symptoms, as well as indicated days on which they did not observe the infant. All symptoms recorded during the month for each infant were

summed and divided by the number of days the infant was observed to yield the mean number of symptoms per month.

Extraneous Variables

According to the literature, variables other than second-hand smoke influence respiratory symptoms. These variables include: parental phlegm production, socio-economic status, and infant weight.

Infant weight was recorded on the "Infant Health Information Card" (IHIC) at the beginning of the study (see Appendix C). This infant health card was organized by the researcher to record basic health information and included: birth date, sex, birth weight, present weight, gestational age, illnesses and operations since birth, and current medications taken. This information was used to determine if an infant had any particular health problems that could influence the results of the study. The IHIC was reviewed by three faculty members to determine clarity. It is well known that babies of mothers who smoke tend to be smaller than babies born to nonsmokers. Weight was included in this study to 1) rule out the possibility that smaller babies may have more respiratory symptoms and 2) determine if the mean weight of the infants in the study were representative of the average weight of infants of this age.

In addition to recording the smoking history, the "Parental Information and Health Questionnaire" was used

by the investigator to gather information dealing with parental phlegm production, family size, socioeconomic status and education. Phlegm production is defined for this study as sputum produced by a deep chronic cough during the day for at least 3 months prior to the study. It is suggested that phlegm production by parents and therefore cross-infection to their children may be responsible for respiratory illnesses and not the influence of second-hand smoke (Colley et al. (1974) and Colley (1974). Phlegm production was classified as either absent or present depending on the parent's response to the question on the PIHQ.

Data on socioeconomic status have been included in several studies (Tager et al. (1979), Schilling et al. (1979), Colley et al. (1974), Holland et al. (1969), Lunn et al. (1967), Harlap & Davies (1974), and Fergusson (1980). It is felt that an increase in respiratory illnesses may be due to poorer standards of hygiene and nutrition. Family socioeconomic status was determined by placing the families in 5 categories based on income. The mean family income level of the sample was compared to the mean income level for families in the western United States as determined in the Statistical Abstract of the United States (1980). This gave an indication of the representativeness of the sample to the more general population insofar as income is concerned.

Family size has been cited as a factor contributing

to the incidence of respiratory illnesses in children (Lynn et al., 1967). Therefore, only families with one infant and both parents living in the home were included in the study.

No attempt was made to quantify the amount of smoke to which the infant was exposed, that is, size and ventilation of the house and location of parental smoking in relation to the infant. Only the number of cigarettes smoked in the home was used as a measure. Families in which a parent smoked marijuana cigarettes or pipes in the home were not included in the study to eliminate further extraneous variables.

Procedure

Approximately once a week, for 7 months, the researcher collected names of all 6 month old infants with appointments to be seen the following week for their 6 month well-child examination. Age of the infant and telephone number were recorded in the appointment books of both clinics. These families were then contacted by telephone a few days before the infant's appointment. The parents were given a brief description of the study and asked if they would participate. If they agreed, it was determined if the family met the criteria for the study. The researcher then met one or both parents at the clinic shortly before the infant's scheduled appointment. A few subjects were met in their home near the time of the appointment. The study was explained further

and the PIHQ and the IHIC were filled out by the researcher. The IRSD was explained and given to the parent/parents. Families were asked to collect data for only one month to reduce dropout. Responsibility for filling out the diary was delegated to one parent, usually the mother. If both parents were not present at the time of the initial interview, the informed consent was given to the parent present. Both parents were asked to sign the informed consent. The completed diary and the signed informed consent were mailed back to the researcher at the end of one month. Weekly during data collection, the parents received a follow-up telephone call from the researcher to answer any questions and to remind the participants to record respiratory symptoms.

If sample distribution became unequal, that is, more nonsmokers than smokers, the researcher selected clients as was needed until the distribution became more equal.

Subject anonymity was maintained by assigning all participants a code number. The code number was recorded on all participant questionnaires, data cards, and diaries. The informed consents were kept separately in a locked drawer.

CHAPTER III

RESULTS AND DISCUSSION

Description of the Sample

Twenty-eight of 161 families screened met the intake criteria and agreed to participate in the study. One family did not complete the requirements and are not included in the study. Of the 27 families who completed the study, 10 families were classified as "smokers" and 17 as "nonsmokers".

Parental Characteristics

Selected characteristics of parents in both groups are summarized in Table 1. The majority of fathers in both groups were employed. Only one of the "nonsmokers" and 2 of the "smokers" were unemployed. Both groups were also similar with respect to employment status of mothers. Twelve (70%) of the nonsmoking mothers and 6 (60%) of the smoking mothers were unemployed. Mothers in both groups may have elected to stay at home to care for their young infants. The researcher did not gather information on the reason for the mothers' employment status.

In both groups, the estimated gross yearly income was high. Five families (50%) of "smokers" and 10 families (58%) of "nonsmokers" had incomes greater than $25,000 per year. No family in either group had a yearly income less than $6,000. These families have incomes above the

TABLE 1

Selected Characteristics of Parents by Smoking Status

Parental Characteristics	"Smokers" (N=10) N	%	"Nonsmokers" (N=17) N	%
Employment status (father)				
Yes	8	(80)	16	(94)
No	2	(20)	1	(6)
Employment status (mother)				
Yes	4	(40)	5	(30)
No	6	(60)	12	(70)
Gross yearly family income				
$ 3,000 to 9,999	2	(20)	1	(6)
$10,000 to 14,999	2	(20	2	(12)
$15,000 to 24,999	1	(10)	4	(24)
$25,000 and above	5	(50)	10	(58)
Education (father)				
Median	14		16	
Range	12 - 16+		12 - 16+	
Education (mother)				
Median	13.6		14	
Range	12 - 16+		12 - 16+	

median income for families in the western United States as published in Statistical Abstract of the United States (1980) is $16,512. All subjects utilized private pediatricians which require fee for service. Well-child examinations are normally not covered under insurance policies. Families with greater incomes per year may utilize this service more often than those with a lesser income.

Years of education completed in both groups were high as well. The range of years of school completed in both groups was from 12 years to more than 16 years. Fathers in the "nonsmokers" group tended to have 2 additional years of education than the smokers, while there was little difference in the mother' educational preparation between the 2 groups. This trend of better education in nonsmokers is substantiated by a report published by the U.S. Department of Health, Education and Welfare from a national health survey (Bonham, 1976). The investigators found that people who are better educated are less likely to smoke cigarettes than those with fewer years of education. As can be seen by the preceding discussion, parents in both groups were very similar with respect to socioeconomic level and education.

Infant Characteristics

Characteristics of the infants are compared in Table 2. All met the criteria of gestation between 38 and 42 weeks at birth. Of the infants of the smoking parents, 5 were female and 5 were male. In those with nonsmoking parents,

10 were female and 7 were male. All infants had no significant illnesses prior to their participation in the study and were on no chronic medications other than vitamins and fluoride.

There was some difference between birthweights in the 2 groups. It is well known that infants of mothers who smoke tend to be smaller than those of nonsmoking mothers. It should be noted that in this study, not all mothers in the "smokers" group smoked. They may have qualified for the classification because the fathers smoked. Nevertheless, the average birth weight of babies of the "smokers" group was less than that of "nonsmokers", 2.94 kg. (6 lbs. 7 oz.) as compared to 3.89 kg. (8 lbs. 8 oz.). By the time the infants were near 6 months of age, weights between the 2 groups were similar. Mean weights for infants in both groups were well within the weights expected for 6 month old infants as determined by the National Center for Health Statistics Growth Charts (Hammill, 1977).

Descriptive Findings Regarding Major Variables

The data were analyzed with respected to the relationship between the independent variable, that is, the presence or absence of cigarette smoke in the home on the dependent variable, that is, respiratory symptoms of infants. Subsequently, the effects of extraneous variables of parental phlegm production, family socioeconomic status, and infant weight were examined.

TABLE 2

Infant Characteristics in Smoking and Nonsmoking Groups

	"Smokers" (N=10)	"Nonsmokers" (N=17)
Sex		
Male	5	7
Female	5	10
Age		
Range	6 mo. to 9 mo.	5 mo. 2 wks. to 7 mo. 1 wk.
Mean	6 mo. 2 wks.	6 mo. 1 wk.
Birthweight		
Range	2.1 kg. to 4.46 kg.	2.91 kg. to 4.43 kg.
Mean	2.94 kg.	3.89 kg.
Median	2.97 kg.	3.57 kg.
Intake weight		
Range	6.57 kg. to 9.14 kg.	6.8 kg. to 10.32 kg.
Mean	7.34 kg.	7.86 kg.
Median	7.4 kg.	7.37 kg.

Respiratory Symptoms

No individuals responsible for the Infant Respiratory Symptom Diary expressed difficulty in using the tool, and no days were marked out, indicating babies were observed each day of the study period by their parents. While it is conceivable that one could arbitrarily mark the diary and mail it back to the researcher at the end of the study, there was no indication that this occurred. Many IRSD tools had unsolicited remarks in the margins concerning the health of the infant.

A summary of infants' symptoms is displayed in Table 3. The two groups showed a difference between frequency of each observed symptom. Infants of smokers exhibited a proportionately higher incidence of cough ($\bar{X}$=7.6) than infants of nonsmokers ($\bar{X}$=2.1). The other symptoms in order of decreasing frequency in infants of smokers were runny nose ($\bar{X}$=5.8), stuffed up nose ($\bar{X}$=4.7), and wheeze ($\bar{X}$=.8). Infants in the nonsmoking group, again in order of decreasing frequency, had runny nose ($\bar{X}$=4.8), stuffed up nose ($\bar{X}$=2.8), and wheeze ($\bar{X}$=.2).

The total number of symptoms recorded per month for infants of smoking parents (N=10) ranged from 0 to 44, with a mean of 18.9 The range of symptoms per month recorded for infants of nonsmoking parents (N=17) was 0 to 35 with a mean of 9.71. Because interval data were collected on the 2 unrelated groups, the Students t-test was used for statistical analysis. Although the sample was not

TABLE 3

Mean Number of Symptoms Reported in Infants in Both the "Smoker" and "Nonsmoker" Groups for the Period of 1 Month

	Smokers (N=10)		Nonsmokers (N=17)	
Symptoms	$\bar{X}$	Range	$\bar{X}$	Range
Total	18.9	0-44	9.71	0-35
Cough	7.6	0-20	2.1	0-11
Runny nose	5.8	0-13	4.8	0-13
Stuffed up nose	4.7	0-16	2.8	0-15
Wheeze	.8	0-6	.2	0-4

S.D. of $\bar{X}$ number of symptoms in infants of smokers is 13.84, S.D. of $\bar{X}$ number of symptoms in infants of nonsmokers is 8.20, t-test = 1.82, df - 25, $p < .05$

randomly selected, this statistical test was used heuristically to show whether a difference of the magnitude observed would be significant in a probability sample. Because the hypothesis is directional, a one-tailed test was used.

The standard deviation (SD) of the mean number of symptoms recorded per month in infants of smokers is 13.84. With respect to the mean number of symptoms recorded in infants of nonsmokers, the standard deviation is 8.20. The t value of 1.82, with 25 degrees of freedom, is significant at the .05 level. Therefore, the null hypothesis that infants in smoking families would have the same number as or fewer respiratory symptoms than infants in smoking families is rejected. This is consistent with two of the studies completed on this topic. Cameron et al. (1969) found an increase in respiratory illnesses in families with smokers present as did Cameron and Robertson (1972). However, it is inconsistent with the report of Lebowitz and Burrows (1976) who studied symptoms and found no significant increase in symptoms when smoke was present. Ferguson et al. (1980) also found that the risk of upper respiratory illnesses in infants of smokers was no greater than in children of nonsmokers.

Cigarettes smoked in the home ranged from .5 to 23 in the smoking group. A correlational table displaying the number of cigarettes smoked by smokers in the home to the number of symptoms appears in Figure 1. To determine if

indeed the number of symptoms reported increased as the number of cigarettes smoked in the home increased, Pearson r was used. The correlation coefficient was .18 which shows a weak, but positive relationship. This value is not significant at the .05 level. Two studies (Colley et al., 1974; Harlap & Davies, 1974) found that as the amount of smoke increased, respiratory illnesses increased. However this study did not support this finding. If the sample size of smokers had been greater, a stronger or weaker positive correlation might have been found. However, the data are consistent with the data of Tager et al. (1979) who also reported no tendency for increased respiratory illnesses with increased parental smoking.

Parental Phlegm Production

Of the families in the "smokers" group, only one person reported chronic phlegm production. The infant in this family had a total of 17 symptoms for the month. This is below the mean. No one in the "nonsmokers" group reported chronic phlegm production. No statements about the effects of phlegm production can be made. Future studies with a larger sample size are needed to examine the influence of parental phlegm production on infant respiratory symptoms.

Economic Status

To determine if socioeconomic status as defined in this study by gross yearly income was related to the number of symptoms observed in infants, chi-square was used (Table 4). Categories of income and symptoms were divided

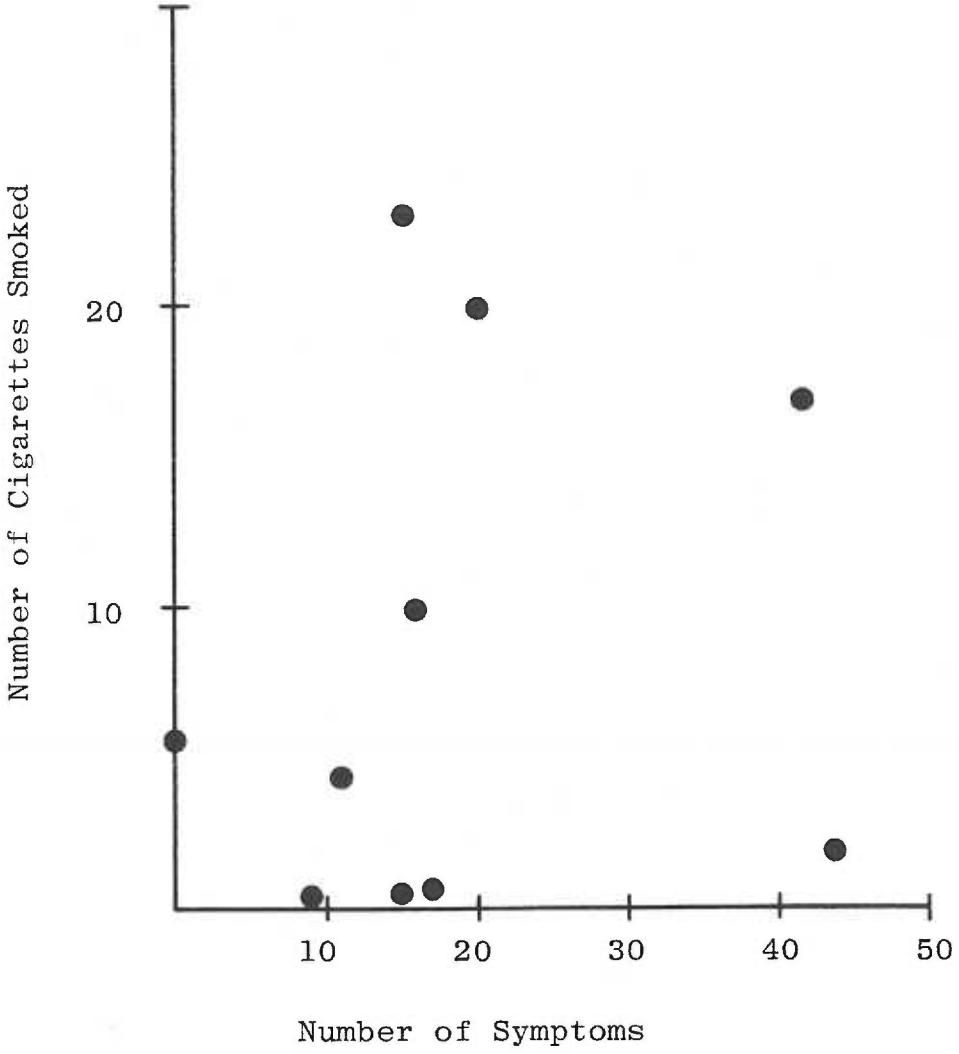

FIGURE I

Relationship between Number of Cigarettes Smoked in the Home in the "Smokers" Group and Number of Symptoms (n=10)

R=.18

TABLE 4

Number of Infants Reported to Exhibit Respiratory Symptoms by Number of Symptoms per Month and Gross Yearly Income

Number of Symptoms	Gross Yearly Income		N
	Less than the median[a]	Greater than the median	
Less than 15	8	8	16
Greater than 15	4	7	11
Total	12	15	27

[a]median = $24,999

chi-square = .67, df = 1, $p > .05$

were divided as they are in the table for convenience. Chi-square equaled .67 which is not statistically significant at 1 degree of freedom. Therefore, this study found no relationship between respiratory symptoms and socioeconomic status. The subjects in this study were middle to upper middle class. Perhaps a difference would be evident if a larger sample which included families representative of all socioeconomic levels were included.

Infant Weight

To determine if infant weight had an influence on number of symptoms exhibited in infants, chi-square was again calculated (Table 5). Chi-square equals 2.64 which is not significant at the .05 level. Therefore, no relationship between weight and symptoms was found.

TABLE 5

Number of Infants Reported to Exhibit Respiratory Symptoms by Number of Symptoms per Month and Infant Weights

Number of Symptoms	Infant Weight		N
	Less than 6.8 kg.	Greater than 6.8 kg.	
Less than or equal to 16	8	11	19
Greater than 16	6	2	8
Total	14	13	27

chi-square = 2.64, df = 1, $p > .05$

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

A convenience sample of infants between the ages of $5\frac{1}{2}$ and $9\frac{1}{2}$ months and their families was gathered from 2 private pediatric clinics in the Portland metropolitan area at the time of the 6 month well-child examination. Only those families with both parents and 1 infant living in the home were included in the study. Demographic information, parental smoking history, and occurrence of parental phlegm production was elicited using a questionnaire devised and administered by the researcher during the intake interview. A general infant health history was also gathered. Parents then recorded incidence of respiratory symptoms of cough, runny nose, stuffed up nose, and wheezing observed in their infants for 1 month, utilizing a diary designed by the researcher. Parents were contacted weekly by a followup telephone call.

The sample consisted of 27 families with 10 in the "smokers" group and 17 in the control group of "nonsmokers". All parents had completed 12 to more than 16 years of formal education.

Infants of parents who smoked had a significantly higher overall incidence of symptoms ($t= 1.82$, $p > .05$) than infants of nonsmoking parents. No correlation was found, however, between numbers of cigarettes smoked in the home

and numbers of respiratory symptoms experienced by the infants. The symptom most often experienced by infants of smokers was a cough, whereas the symptom most often experienced by nonsmokers' infants was a runny nose. All symptoms were more frequently observed in the "smoking" than the "nonsmoking" group.

The hypothesis that infants of parents who smoke cigarettes would have a higher incidence of respiratory symptoms of cough, runny nose, stuffed up nose, and wheeze was accepted. This greater number of symptoms could not be explained by socioeconomic status of the family, size of the family, parental production of phlegm from a chronic cough, or age and weight of the infant.

This study was limited in the number of subjects. Because of the criteria for inclusion in the study, many families who were screened failed to meet all of the qualifications. The group of smokers was smaller than that of the nonsmokers. A publication by the U.S. Department of Health, Education, and Welfare (Advancedata, 1979) states that, generally, people who smoke cigarettes are fewer in number than those who do not smoke. The researcher had a difficult time finding families with individuals who smoked.

Generally, the socioeconomic status of subjects in the study was higher than the general population, probably due to the locations where the sample was derived. Private pediatricians, on a whole, probably see patients of a higher

socioeconomic class for well-child examinations.

A further limitation is the manner in which the subjects were selected. If one group became too large, subjects were selected only for the other group until the groups became somewhat similar in size. Ideally, the study should have extended for 1 year to take into account the possible seasonal variation in the concentration of smoke in the home. During the winter months, ventilation may be poorer, allowing the concentration of smoke to rise.

Implications for Nursing

One of the important roles for professional nurses is that of an educator. Contact with the public is extensive, providing an opportunity to emphasize the importance of preventative health care. This study, along with many studies implicate a negative effect of cigarette smoke on infants and children. If nurses teach parents about the effects of environmental cigarette smoke, then parents may make more informed decisions concerning the environment they provide for their infant, thus promoting health.

In addition to educating the public, nurses can put theory into practice by encouraging the prohibition of smoking in public areas where children are present. This includes hospital patient rooms and medical office waiting rooms. Nurses could support legislation promoting nonsmoking areas in public places as well.

Implications for Further Research

The findings of this study showed a relationship between second-hand smoke and respiratory symptoms in infants 5½ to 9½ months of age. The study needs to be replicated using a larger sample size to determine if the findings are representative of a more varied economic group and to determine the influence of parental phlegm production on respiratory symptoms. This study should continue for a full year to control for seasonal variations in the ventilation of homes. It could be modified to include children of varying ages, and families of different sizes. Use of the diary was well accepted by the subjects and is recommended for further studies.

The relationship between age of the individual, second-hand smoke, and respiratory symptoms should be studied. Why has a relationship been reported in infants less than 1 year of age but not in older children? Does the immature immunological system of infants predispose them to more respiratory illnesses when they are exposed to cigarette smoke?

The direct effects of second-hand smoke on the respiratory tract should be further explored. Early research literature suggests that in smokers 1) there is a decrease in cilia in airways of those exposed to smoke thereby leaving them more susceptible to infections and 2) smoke causes a change in cell-mediated immunity leaving the individual compromised. Do these changes occur in individuals

exposed to second-hand smoke as well?

Professional nurses in their roles as health educators, maintainers and promoters of health, nurse educators, and nurse researchers are in a favorable position to initiate, conduct and participate in research related health problems in order to develop a sound knowledge base for the practice of nursing.

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APPENDICES

APPENDIX A

Parental Information and Health Questionnaire

PARENTAL INFORMATION AND HEALTH
QUESTIONNAIRE
(Administered by researcher)

This questionnaire is composed of approximately 15 questions which I would like you to answer concerning general information and your smoking history.

1. How many people live in your home? _____

2. Are you presently employed: ___yes ___no (husband)

   If yes, what is your occupation?_____

3. Are you presently employed: ___yes ___no (wife)

   If yes, what is your occupation?_____

4. Is your present total gross household income
   under $3,000 _____
   $3,000 to 3,999_____
   $4,000 to 4,999_____
   $5,000 to 5,999_____
   $6,000 to 6,999_____
   $7,000 to 9,999_____
   $10,000 to 11,999_____
   $12,000 to 14,999_____
   $15,000 to 19,999_____
   $20,000 to 24,999_____
   $25,000 and over _____

5. What was the last year of education you completed? (husband)
   1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
   more than 16

6. What was the last year of education you completed? (wife)
   1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
   more than 16

7. Do you smoke cigarettes? (at least 1/day for 1 year)
   husband ___yes ___no
   If yes, approximately how many per day do you smoke?_____

   Approximately how many per day do you smoke in the home?_____

8. Do you smoke cigarettes: (at least 1/day for 1 year)

wife ___yes ___no

If yes, approximately how many per day do you smoke?_____

Approximately how many per day do you smoke in the home?_____

9. Is your child presently in the care of anyone (besides parents) who smokes cigarettes? ___yes ___no

10. Does anyone live in your home, besides parents, who smoke cigarettes? ___yes ___no

11. Do you usually cough first thing in the morning or sometime during the day? (for at least 3 months prior to the study) ___yes ___no (husband)

    If yes, do you usually bring up phlegm from your chest? ___yes ___no

12. Do you usually cough first thing in the morning or sometime during the day? (for at least 3 months prior to the study) ___yes ___no (wife)

    If yes, do you usually bring up phlegm from your chest? ___yes ___no

13. Do you or your spouse smoke a pipe or marijuana cigarettes in the home? ___yes ___no

14. Do you or your spouse have a history of multiple allergies? ___yes ___no

APPENDIX B

Infant Respiratory Symptom Diary

#_____ INFANT RESPIRATORY SYMPTOM DIARY

Below is a diary to help you record the respiratory symptoms of your child for a period of one month. If your infant has any of the symptoms listed below, please check the symptom(s) each day they occur. If you are not available to observe and record symptoms on a particular day, draw a line through that day. Record the approximate number of cigarettes smoked in the home for each day.

1. a cough
2. a runny nose
3. a stuffed up nose
4. wheezing or a whistling sound made when breathing

Please mail the completed diary after 1 month in the stamped, self-addressed envelope to Kathy Siebe.

If you have further questions, my telephone number is: 244-8759 (Kathy Siebe)

Date_____to_____

	COUGH	RUNNY NOSE	STUFFED UP NOSE	WHEEZING	NUMBER OF CIGARETTES SMOKED
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
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APPENDIX C

Infant Health Information Card

INFANT HEALTH INFORMATION CARD

#_____

Birth date _____

Male ___ Female ___

Birth weight _____Present weight _____

Gestational age _____

Illnesses since birth _____

_____

Operations since birth _____

Medications presently taking _____

APPENDIX D

Informed Consent

FAMILY-CHILD NURSING MAJOR
SCHOOL OF NURSING

Area Code 503 225-7889

3181 S.W. Sam Jackson Park Road

Portland, Oregon 97201

UNIVERSITY OF OREGON

HEALTH SCIENCES CENTER

CONSENT FOR HUMAN RESEARCH PROJECT

I, _____
(First Name) (Middle Initial) (Last Name)

_____
(First Name) (Middle Initial) (Last Name)

agree to participate in the investigation named "The Prevalence of Upper Respiratory Symptoms in Infants of Parents Who Smoke" conducted by Kathy J. Siebe under the direction of Wilma Peterson, Ph.D. As the legal guardian of _____, I agree to allow the
(First Name) (Last Name)
participation of my infant. The study aims to look at the relationship between parental smoking habits and infant upper respiratory symptoms. I agree to:

1. Accept an interview by Kathy Siebe, lasting approximately 15 minutes, for the purpose of answering a few questions dealing with parental smoking history and general health.
2. Keep a daily record of observed respiratory symptoms in my infant for a period of one month.
3. Accept one follow-up telephone call per week for a period of the same one month.
4. Mail the completed infant diary in a self-addressed, stamped, envelope to Kathy Siebe.

My participation does not involve any risk to myself or my infant and I may refuse to participate or withdraw from the study at any time. Although I will not directly benefit from participating in this study, I realize I may be contributing to a better understanding of the relationship between cigarette smoke and respiratory symptoms. The information that I give will be handled in a confidential manner and I will be given a code number for anonymity.

I understand that it is not the policy of the Department of Health, Education and Welfare, or any other agency funding the research project in which I am participating, to compensate or provide medical treatment for human subjects in the event the research results in physical injury. The University of Oregon Health Sciences Center, as an agency of the State, is covered by the State Liability Fund. If I suffer any injury from the research project, compensation would be available to me only if I establish that the injury occurred through the fault of the Center, its officers, or employees. If I have further questions, I will call Dr. Michael Baird, MD at (503) 225-8014.

I have read the preceding statement and agree to be a participant in this study.

_____ _____
(Date) (Signature(s)

ABSTRACT

AN ABSTRACT OF THE THESIS OF

Kathleen Joan Siebe

For the MASTER OF NURSING

Date of Receiving this Degree: June 12, 1981

Title: RESPIRATORY SYMPTOMS IN INFANTS OF PARENTS WHO SMOKE CIGARETTES

Approved: [redacted]

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The relationship between parental smoking habits and respiratory symptoms in their infants was studied. A convenience sample of infants between the ages of 5½ and 9½ months was drawn prior to the 6 month well-child examination from 2 cooperating private pediatric clinics in the Portland metropolitan area. Demographic data and general infant health information was collected during the intake interview. Parents recorded a daily diary of the incidence of cough, runny nose, stuffed up nose, and wheeze in their infants for a period of 1 month.

The sample consisted of 17 families, 10 in the smoker group and 17 in the control group of nonsmokers. Parents were generally middle to upper class and well educated.

It was found that infants of smokers had a statistically greater ($P < .05$) incidence of total symptoms. This increase in symptoms could not be explained by socioeconomic status, family size, parental production of phlegm, or age

and weight of the infant. Therefore, the hypothesis of an increased number of respiratory symptoms in $5\frac{1}{2}$ to $9\frac{1}{2}$ month old infants of smoking parents, regardless of parental phlegm production, was accepted.