

Reducing the Exposure of Children to Environmental Tobacco Smoke

An Office-Based Intervention Program

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DR EVAN W. KLIGMAN (*Assistant Professor, Department of Family and Community Medicine*): Studies have shown an increased incidence of pneumonia¹⁻³, bronchitis,¹⁻⁴ upper respiratory tract infection,⁵ chronic respiratory tract symptoms,⁶⁻⁹ and middle ear effusions and infections,¹⁰⁻¹³ as well as decreased pulmonary function,^{6,14-18} in children exposed to environmental tobacco smoke. Interest in environmental tobacco smoke or passive smoking as a health concern gained momentum in 1986 with the Surgeon General's report on the health consequences of involuntary smoking.¹⁹ Since then, however, there has been a lack of intervention studies within family practice to reduce environmental tobacco smoke exposure among children.

Today's Grand Rounds will discuss the family physician's role in reducing the exposure of young children to environmental tobacco smoke. An intervention program will be presented for training physicians and parents. Office-based techniques will be recommended for screening and counseling parents during visits for well-child care, related acute illnesses, and prenatal care. It is useful to begin with a review of current knowledge about environmental tobacco smoke as a risk factor for respiratory and ear infections.

ENVIRONMENTAL TOBACCO SMOKE AS A RISK FACTOR

DR SUZANNE NARCE-VALENTE (*Chief Resident, Section of Preventive Medicine, Department of Family and Community Medicine*): Environmental tobacco smoke is the smoke a child is exposed to in passive smoking. Cigarette smoke is composed of mainstream smoke, the smoke that passes through the cylinder of the cigarette from the burning end into the active smoker's lungs, and sidestream smoke, the smoke emitted from the burning end of the cigarette and released into the environment. Environmental tobacco smoke is a combination of sidestream smoke, residual exhaled mainstream smoke, and the smoke that is lost through the tobacco cylinder during active smoking. Smoke, in general, is composed of both very minute particulate matter and chemicals in the vapor phase. Sidestream smoke contains many toxic elements in greater quantities than mainstream smoke such as carbon monoxide, carbon dioxide, toluene, and nicotine and some of its decomposition products. The particulate matter content of sidestream smoke is also higher than mainstream smoke. Additionally, some of the known carcinogens, such as benzo(a)pyrene, benzene, 2-naphthylamine, and dimethylnitrosamine, are found in higher concentrations in sidestream smoke.¹⁹ It is difficult to quantitate the exposure a child might have to environmental tobacco smoke because exposure depends on such things as how close in proximity the child is to the smoker, the frequency of smoking, the ventilation, and the type of cigarettes smoked. Because smoke remains airborne for long periods of time, it can disseminate quickly throughout a room or house by air currents. Thus, passive smoking exposure can occur even if the parent is smoking in another room of the house when contiguous airspace is separated only by walls.¹⁹

The health effects of passive smoking on children have

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been studied for a variety of conditions. Studies have used different modalities, ages, and populations and have not uniformly controlled for confounding factors. Nevertheless, certain results have consistently been found despite these differences. First, children exposed to passive smoking in their first year of life have an increased incidence of pneumonia, bronchitis, and hospital admissions for these two illnesses.^{1,2} A dose-response relationship has been observed between frequency of illness and number of cigarettes smoked in the household in one study¹ and maternal level of smoking in another.²

Second, children of all ages who are exposed to environmental tobacco smoke have an increased frequency of a variety of acute respiratory tract illnesses and infections such as upper⁵ and lower²⁰ respiratory tract infections, chest illnesses before the age of 2 years,²¹ physician-diagnosed bronchitis,⁴ tracheitis,⁴ and recurrent respiratory tract infections²² compared with children of non-smokers. Three studies have indicated a positive association between frequency of both respiratory syncytial virus infection and bronchiolitis and level of parental smoking.²³⁻²⁵ Most of the above studies reveal a stronger association between increased frequency of illness and maternal smoking, although paternal smoking has been shown to be associated in some studies as well.^{17,23}

Third, exposure to environmental tobacco smoke is associated with an increased frequency of chronic respiratory tract disease symptoms such as chronic cough, phlegm, and persistent wheeze in children.⁶⁻⁹ These studies point to an excess prevalence of about 30% to 80% of these symptoms.

Fourth, studies of asthma have given mixed results as to the effect of environmental tobacco smoke on children. One study has shown an association between the prevalence of asthma and parental smoking,²⁶ whereas two have not.^{20,27} Some studies indicate bronchial hyperreactivity in children from smoking households when challenged with potential bronchoconstrictive agents (ie, histamine, eucapnic hyperpnea, isoproterenol, and carachol).²⁸⁻³¹ Further investigation is necessary to elucidate the questions raised by these studies.

Fifth, pulmonary function studies of young people aged 5 through 20 years have shown small decreases in respiratory tract function of approximately 1% to 7% in those exposed to environmental tobacco smoke compared with children from nonsmoking families in a dose-response fashion.¹⁴⁻¹⁸ Maternal smoking, again, seems to be more strongly associated with these deficits than paternal smoking. The noted deficits have been mainly obstructive with small decreases in forced expiratory volumes, FEV₁ or FEF₂₅₋₇₅.

Sixth, studies have shown that chronic middle ear effusions and acute otitis media are more frequent in the passive smoking-exposed child.¹⁰⁻¹³ Chronic middle ear

effusions may result in long-term hearing difficulties that may be associated with learning difficulties and subsequent personality and behavioral problems as well.³²⁻³⁴

Given the available studies, it is clear that family physicians should be screening for, documenting, and counseling parents to reduce environmental tobacco smoke exposure.

COUNSELING AND INTERVENTION TECHNIQUES

DR KLIGMAN: In response to the lack of published studies addressing passive smoking screening and counseling practices within family practice settings, a recent study was undertaken to assess these practices by University of Arizona family physicians (E.W.K. and S.N.V., unpublished data, 1989). Baseline chart studies and patient surveys revealed a negligible incidence of screening and counseling by these physicians and a virtual absence of documentation in those instances that parents reported they had been screened or counseled. A pilot office-based intervention program was then established to try to increase physician screening and counseling efforts aimed at reducing exposure of young children to environmental tobacco smoke. Preliminary results suggest that an office-based program as described below can succeed in substantially increasing the incidence of family physician screening and counseling for passive smoking exposure to young children. Documentation of this exposure and of intervention strategies also increased significantly following implementation of the program.

When counseling parents to reduce their children's exposure to environmental tobacco smoke, it is important for family physicians to start by defining terms and screening for the presence of this risk factor. Parents may not realize, for instance, that smoke from another room may have health implications for the child if good ventilation is not provided. Physicians should help parents identify sources of environmental tobacco smoke in their child's environment. These sources may include (1) the household where parents themselves may smoke or entertain visiting friends or family who are smokers and (2) places or persons outside the home such as babysitters, restaurants, friends' homes, and so on. Next, a clear, concise statement should be made of the health effects of this exposure to the child. This information may be new to parents, and they may be somewhat resistant to its acceptance. It may be necessary to give parents time to assimilate this knowledge before pursuing ways of controlling or reducing environmental tobacco smoke exposure. An important step in reducing exposure is the parents' acceptance that passive smoking does have harmful health ef-

fects and that reducing this exposure will be beneficial to their child and themselves as well (ie, less time off from work because the child is sick, less money spent on medical bills, less aggravation, and so forth).

Parents may feel guilty and react emotionally to this information by becoming defensive or hostile. Many mothers view counseling about passive smoking as a personal criticism.³⁵ Keeping these concerns in mind, it is important for the family physician to use a gentle and positive approach.

It is also important to consider the parents' expectation of their own efficacy in reducing risk. First, if the parents being counseled smoke, the physician needs to determine the parents' self-expectations in regard to quitting. Doubts and fears about quitting or negative feelings about failed past efforts may be present.

To help parents through this time, the main goal—to minimize the amount of smoke to which the child or infant is exposed—must be emphasized. Smoking cessation is only one option open to them. Other options include smoking only outside, keeping the child near an open window, getting an air purifier for the baby's room, and so on. This approach takes the immediate pressure off parents and keeps them more open to suggestions of smoking cessation at a later, more appropriate time. It also empowers parents with skills to start intervening in the child's environmental tobacco smoke exposure immediately.

Second, even if parents feel efficacious and comfortable with personal changes in smoking behavior, they may feel uncomfortable asking for changes in a spouse, friends, relatives, or other visitors to the house. It may take patient, stepwise counseling to help them gain confidence to tackle the external sources of environmental tobacco smoke. Continued positive reinforcement when reductions in environmental tobacco smoke are made and consistent empowerment of the parents by the physician and staff are imperative. The more positive experiences that parents have with these changes, the more impetus there will be for further reduction measures.

In summary, the family physician and support staff should provide nonthreatening information that helps to empower parents with an active role in reducing environmental tobacco smoke exposure, even if ceasing to smoke is not possible at the time of counseling.

If the family practice clinic operates within a residency program or health maintenance organization, the lack of continuity of care often means that a child will be seen by different physicians during the first 5 years of life. For this reason, a consistent method of chart documentation of the child's passive smoking exposure status is needed. A way of documenting interventions that have been initiated is also useful. In our clinic, we have a rubber stamp for use on the health summary face sheet of every child's chart next to the immunization record. (This location was cho-

sen because the immunization record is the best-documented section of a child's chart and is frequently referred to by our physicians.) The stamp provides for a yes or no answer to the question "Passive Smoking Exposure?" and includes space for recording interventions. When the physician sees a child for acute care or a well-child visit, the stamp is looked at to see if screening or initial counseling has occurred. If not, this should be accomplished and the stamp completed. Progress on intervention strategies may be recorded on the stamp as well. Both household and extrahousehold environmental tobacco smoke exposures should be considered. It may take several visits and counseling sessions to make headway toward reducing exposures. An acute-care visit that may be related to environmental tobacco smoke exposure, such as a respiratory tract illness or otitis media, is an ideal "teachable moment" to reinforce passive smoking information and risk reduction techniques with parents.

For well-child visits, our clinic utilizes early prevention, screening, detection, and treatment forms for different ages. A sample of this form is included as Figure 1. A passive smoking handout is given to the parent at the 2-week checkup. Reminders are listed in the "MD Teaching" section of the medical record for visits at 2 and 6 weeks, 12 and 24 months, and at 4 years. In this manner, the passive smoking message will be reinforced at various intervals, new passive smoking exposures identified, and parents of older children entering the clinic system will receive the passive smoking message.

Another critical time for intervention is during pregnancy. Mothers who quit smoking during pregnancy often resume smoking postpartum, frequently exceeding their prepregnancy level.³⁵ To anticipate this occurrence, it is important to deliver an extended message that passive smoking has negative health effects during pregnancy and the postpartum period. The family physician has an opportunity to prevent the mother's resumption of smoking through early counseling. Even if the mother resumes smoking, at least she may be better prepared to begin with a smoke-free environment for her baby.

Educational materials should be available to the physician and office staff to provide accurate counseling to parents. Handouts should also be available to the counseled parents to reinforce the passive smoking message. In our office, we utilize a fact sheet (Appendix 1), which serves as a memory aid of points to emphasize during counseling. Parents who smoke are also given a list of community referrals for smoking-cessation programs in the event they are interested in quitting. A new packet is available from the American Lung Association to give to parents, entitled "A Healthy Beginning—The Smoke-Free Family Guide for New Parents." This packet includes passive smoking reduction techniques for the

FPO
Well Child Care - 2 Weeks

Date _____ Age _____
 Ht _____ Percentile
 Wt _____ Percentile
 H.C. _____ Percentile
 T (Parent Demonstrate) _____ °R.
 Car Seat?
 Available for use _____
 Available & regularly used _____
 Not available _____

Intake Info / Nursing Observations:

PHN? _____

 (Name and Phone)

 (Nurse / N.A. Signature)

Handouts

- ___ Safety
- ___ Parenting
- ___ G & D, Mos. 1&2
- ___ Carseat
- ___ Feeding Guidelines
- ___ Fever
- ___ Temp. (How to Take)
- ___ Crying
- ___ Colic
- ___ Cradle Cap
- ___ Diaper Rash
- ___ Thrush
- ___ Passive Smoking
- Nurse Teaching**
- ___ Signs of Illness
- ___ Temp.
- ___ Calling In

History

Parent Concerns:

Prenatal Hx: _____
Birth: _____ ; **BW** _____ ; **APGAR** _____ / _____
Nutrition: _____ Breast: _____ min., q. _____ hr.
 _____ Formula (Type) _____ oz., q. _____ hr.
 _____ Stools _____

Development: _____ Regards Face _____ Startles at Loud Noise _____ Fussing

Family Adjustment: _____ Father Involved _____ Rest _____ Support
 _____ Depression _____ Sibling Rivalry _____ Mother / Child Interaction

P.E.	W/NL	Describe Abnormal Findings
Skin		
Head & Face		
Eyes (Red reflex)		
Ears		
Nose		
Mouth		
Vascular (Fem P.)		
Lungs		
Heart		
Abdomen (Umbil.)		
Extremities (hips)		
Genitalia		
Neurologic		

Assessment _____ NL Baby with NL Family Adjustment
 _____ High Risk for Hearing Loss? (BW < 1500;
 Bilirubin > 15; Asphyxia; F.Hx.; Congenital Infect.)
 If Yes, Audiology Consult

Plan (Orders)
 _____ F / U at 2 months

M.D. Teaching
 _____ Temperament
 _____ Diet (Solids at 4-6 months)
 _____ Passive Smoking

 (Physician Signature)

Figure 1. Two-week early prevention, screening, detection, and treatment form.

home, car, and other areas where children frequently play or spend time.

EXAMPLE OF ROLE-PLAYING

DR NARCE-VALENTE: Dr Myra Kerstitch (*Faculty Development Fellow, Department of Family and Community Medicine*) will play the role of a busy young mother bringing in her 2-month-old infant for acute bronchitis. She smoked prior to the pregnancy but did not smoke during the pregnancy. Postpartum, however, she is currently smoking more than before. She takes no passive smoking precautions in her home. She has been coached to be hostile in her responses to inquiries made by the physician. We will observe how Dr Gregory Raglow handles this situation.

DR RAGLOW (*Third-Year Resident, Department of Family and Community Medicine*): One of the questions I regularly ask new parents is whether anyone in the family smokes.

PARENT: Yes, I smoke.

DR RAGLOW: How long have you been smoking?

PARENT: About 5 years.

DR RAGLOW: Have you ever tried to give it up or thought about quitting?

PARENT: Oh sure, I've thought about it, but what does this have to do with my baby? I'm here about him.

DR RAGLOW: That's a good question. I'm not sure if you're aware of it, but when you have a child in the house exposed passively to smoke, the health of the child is affected. Studies have shown that household smoke or environmental tobacco smoke can cause the child to have more respiratory tract and ear infections. I wanted to let you know about these concerns to see whether there is something you can do to protect your child from these exposures.

PARENT: What are you saying? I really take very good care of my child. I would never hurt him on purpose. I feel like you're blaming me for his having this bronchitis.

DR RAGLOW: I know that you take good care of your child. The fact that you brought him in here so soon to be seen is proof of that. In no way am I suggesting that you are the cause of his bronchitis. But, there may be some action you can take to decrease the chances of his getting bronchitis again and help him stay healthy.

PARENT: Well, you know it's not so easy to take care of a two-month-old and work too. It's really stressful. I need to smoke just to calm my nerves. I was up with him all night and had to work today. And all I get is you talking to me about smoking.

DR RAGLOW: I really do appreciate that you are very busy and have a lot of stress. I don't want to push you to

quit smoking now. But perhaps you can think of strategies to eliminate the dangers of passive smoking in some other way. For example, maybe you could smoke outdoors or smoke near an open window, far from the baby, or keep the baby in a well-ventilated room in the summer months.

PARENT: Well, it's not like I smoke in his face.

DR RAGLOW: True, I'm sure you don't. But, in fact, studies show that smoke stays around in the house whether you smoke in the same room or not, especially during the winter, when the house is all closed up. So, the effects are still there, even when you're not smoking in the baby's face. Perhaps you could think about the things we have talked about today, and we can talk about it the next time you come in.

COMMENTS

FAMILY PRACTICE RESIDENT: I thought Dr Raglow handled this situation fairly well. He might have started with a less emotionally laden subject than the parent's smoking status. Perhaps something more general, such as, "I'm glad you brought your child in so early for treatment. It shows what good care he is receiving. We will provide him with immunizations along the way to help protect him from other illnesses. Also in line with his protection, we are learning more and more about negative effects of smoke exposure to children's health. I wonder if there is any smoke exposure in Johnny's household?" Then, when the mother's smoking comes out, don't question it directly. Rather, talk in general terms about what passive smoking is and what the effects might be.

FAMILY PRACTICE RESIDENT: Dr Raglow allowed the parent to express herself and went at a good pace, yet came back with good responses. He was also very nonjudgmental in his remarks and reassured the mother that he was not blaming her for this illness.

FAMILY PRACTICE RESIDENT: Sometimes the parent's hostility is just a temporary state secondary to the child's illness. Just screening for exposure may be sufficient the first time around. After things calm down for the parent or family may be the time to intervene more aggressively.

DR LUCY WILSON (*Clinical Psychologist, Department of Family and Community Medicine*): Also, when defusing hostility, it may be helpful to address it directly by saying something like, "You know, I feel like I might have come on too strong at a time when you're tired and frustrated. This has made it uncomfortable for both of us, and I think we can work on this better at a later time."

SUMMARY

It is important for the family physician to consider a spectrum of screening tests, counseling topics, and childhood immunizations when providing acute and chronic care, in addition to well-child care. The effectiveness of specific clinical preventive services in eliciting positive health outcomes and age-related guidelines to prioritize health promotion activity have recently been reviewed by the US Preventive Services Task Force.³⁶ Given recent studies identifying environmental tobacco smoke as a risk factor for children by being associated with an increase in the incidence and severity of respiratory tract and ear infections, family physicians should be routinely screening parents, especially during visits that provide teachable moments for counseling and intervention. Family physicians need to be aware of possible responses parents may have to their counseling and provide nonjudgmental information and guidance throughout a child's early years of development.

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**APPENDIX 1
FACT SHEET ON PASSIVE SMOKING**

1. The children of parents who smoke have an increased frequency of hospitalization for bronchitis and pneumonia during the first year of life when compared with the children of nonsmokers.
2. The children of parents who smoke have an increased frequency of a variety of acute respiratory tract illnesses and infections including chest illnesses before 2 years of age and physician-diagnosed bronchitis, tracheitis, and laryngitis, when compared with the children of nonsmokers.
3. Chronic cough and phlegm and persistent wheeze are more frequent in children whose parents smoke compared with children of nonsmokers. Overall, studies point to an excess prevalence of 30% to 80% of chronic respiratory tract disease symptoms in children exposed to passive smoking in the home. The implications of chronic respiratory symptoms for respiratory health as an adult are unknown and deserve further study.
4. The children of parents who smoke have small differences in tests of pulmonary function when compared with the children of nonsmokers. Although this decrement is insufficient to cause symptoms, the possibility that it may increase susceptibility to chronic obstructive pulmonary disease with exposure to other agents in adult life, eg, active smoking or occupational exposures, needs investigation.
5. A number of studies report that chronic middle ear effusions and acute middle ear infections are more common in young children whose parents smoke than in children of nonsmoking parents.
6. Passive smoking can cause lung cancer in nonsmokers. More data on the dose and distribution of environmental tobacco smoke exposure in the population are needed in order to accurately estimate the magnitude of risk in the US population.
7. The associations between cancers other than cancer of the lung and passive smoking require further investigation before a determination can be made about the relationship of passive smoking to these cancers.
8. Further studies on the relationship between passive smoking and cardiovascular disease are needed to determine whether passive smoking increases the risk of this disease.

Taken from *The Health Consequences of Involuntary Smoking: A Report of the Surgeon General*. DHHS publication No. (CDC)87-8398. Government Printing Office, 1986.