Increasing Physician Screening and Counseling for Passive Smoking

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Background. The adverse health effects of passive smoking on children, including increased respiratory tract illnesses and otitis media, are well documented. A child's visit to a physician for these illnesses represents a "teachable moment" to screen for household smokers and to counsel parents regarding the health effects of passive smoking. Whether physicians are performing these activities in their offices is unknown. We hypothesized that screening and counseling by physicians with regard to passive smoking would be low in this setting and that these activities could be increased by a simple, two-part intervention.

Methods. We used chart audits and postvisit parental surveys to assess the preintervention and postintervention screening and counseling activities of physicians with regard to passive smoking. The two-part intervention consisted of a 2-hour educational seminar for the physicians and a passive smoking chart reminder and documentation system.

Results. In comparing the preintervention with the postintervention parental surveys, there were increases in the passive smoking screening (17% vs 32%, $P = .03$) and counseling (19% vs 46%, $P = .03$) activities of physicians. Chart documentation of these activities, however, showed very little change regarding screening (2% vs 6%, $P = .19$) or counseling (4% vs 6%, $P = .64$).

Conclusions. These results indicate initially low rates of passive smoking screening and counseling of parents by physicians during acute illness visits of their children. These data also indicate that a simple two-part intervention was very useful in increasing passive smoking screening and counseling activities by physicians in this setting.

Key words. Tobacco smoke pollution; health promotion; preventive health services; primary health care.
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The exposure of children, especially young children, to tobacco smoke has been associated with a variety of acute and chronic adverse health effects, including an increased incidence of pneumonia and bronchitis and hospitalization for these diseases in the first year of life[1–6] and an increased incidence of upper, lower, and recurrent respiratory tract infections.[3,4,7–10] In addition, chronic middle ear effusions as well as acute otitis media have been associated with passive smoke exposure.[11–14] These sequelae have been more frequently associated with exposure to maternal smoking,[1,3,5,7,8,10] although exposure to paternal[10] and total household[2,6,8,9] smoking have also shown positive associations in some studies.

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Passive smoking intervention efforts by family physicians have been largely directed at the pregnant and postpartum smoker.[15,16] It is clear that pregnancy and the postpartum period are both "teachable moments"[17] in the family life cycle and appropriate for passive smoking intervention by family physicians. Another teachable moment is offered, however, when parents bring children into the office for evaluation and treatment of such conditions as respiratory tract infections and middle ear problems.

The degree to which physicians counsel parents about their children's passive exposure to smoking is not clear. The purpose of this study was twofold: (1) to investigate baseline rates of passive smoking screening, counseling, and documentation by family physicians in a university-based residency program during acute-care visits of children for passive smoking–associated illnesses, and (2) to measure the effects of a two-part intervention on physician behaviors with regard to passive smoking screening, counseling, and documentation in this setting.

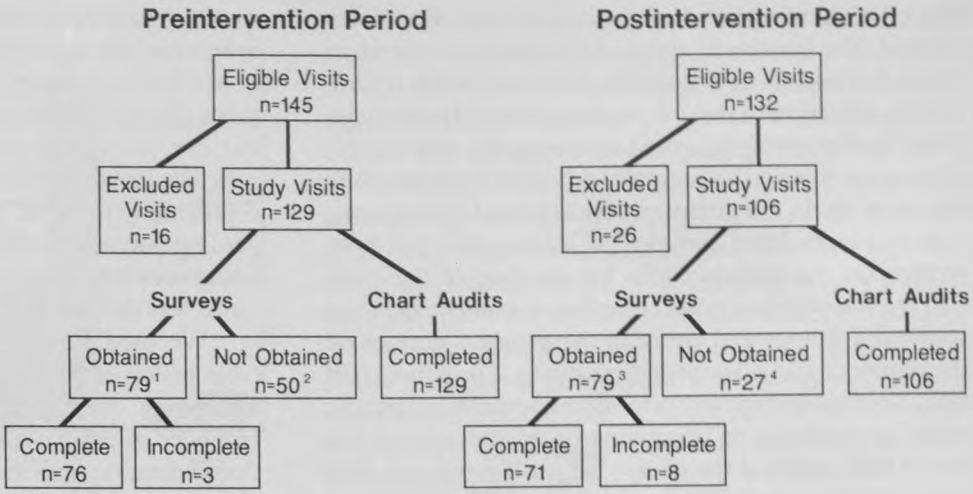

Figure 1. Summary of office visits and data collection (parental surveys and chart audits) in the preintervention and postintervention periods.[1] Parental surveys obtained: at the time of the visit (28), by mail (7), by telephone interviews (44). [2]Parental surveys not obtained: language barriers (4), refusal (1), inability to contact parent within 2 weeks of the visit (45). [3]Parental surveys obtained: by mail (24), by telephone interview (55). [4]Parental surveys not obtained: language barriers (1), inability to contact parent within 2 weeks of the visit (26).

Materials and Methods

Sample and Temporal Selection

We collected data on passive smoking screening and counseling activities of physicians ($N = 28$) at the University of Arizona Family Practice Residency Program. These physicians included residents in training ($n = 18$) and faculty attending physicians ($n = 10$). The physicians were not informed of the study during its progress.

The initial phase of the study during which baseline data were obtained took place between December 5, 1988, and February 3, 1989 (termed *preintervention period*). The second phase of data collection following the initiation of the intervention took place between March 31, 1989, and July 13, 1989 (termed *postintervention period*).

We chose to study the first office visits that occurred during the preintervention and postintervention study periods of all children aged 5 years or younger seen for diagnoses of upper respiratory tract infection, bronchitis, pneumonia, or otitis media. The remainder of visits by a child during a given study period were disregarded. Thus, the first eligible visit of an individual child could be either an initial or a follow-up visit during the course of an illness, providing, in essence, a cross-sectional assessment of passive smoking screening and counseling activities. These diagnoses were chosen because they are closely associated with passive exposure to smoking in childhood.

During the preintervention period, there were 145 office visits that qualified for the study. Three of these were excluded because they involved visits to the investigators, and 13 were excluded because care involved medical students, leaving 129 (89%) eligible physician encounters (Figure 1). In the postintervention period, there were 132 office visits that qualified. Of these, we excluded one visit involving the investigators, 12 visits with medical students, 4 involving a physican's assistant, and 9 in which medical records included previous or unaccountable passive-smoking documentation, leaving 106 (80.3%) eligible visits (Figure 1).

Intervention

The intervention consisted of two parts: an educational seminar, and a chart reminder and documentation system (termed *reminder*). The seminar and reminder system have been described in detail elsewhere.[18]

Briefly, a 2-hour educational seminar was presented to the family physicians on March 30, 1989, one day before the postintervention period began. The seminar contained information on the health effects of passive smoking and on techniques for physicians to use in counseling parents on the reduction of exposure of children to household environmental tobacco smoke. Of the 28 physicians, 11 (39%) attended the seminar.

The second part of the intervention was a newly developed, office-based chart reminder that consisted of a stamp in red ink on a flowsheet at the front of each child's chart. This stamp could also be used by physicians to document whether the child was exposed to smoke at home and, if so, what counseling was provided to the parent to reduce this exposure. This reminder was introduced at the seminar and was implemented on the day of the seminar. The reminder stamp was to be placed in the charts of all pediatric patients by the office staff in advance of the office visit.

Data Collection

Data were collected in two ways: chart audits and postvisit parental surveys. Weekly chart audits were per-

formed to determine whether the physician had documented the smoking status of household members (termed *screening*) or documented any counseling regarding the reduction of passive smoking (termed *counseling*). Chart audits were performed following the first eligible office visits during the preintervention and postintervention periods. In the preintervention period, documentation was considered complete if information had been written on the progress note for the date of the study visit. In the postintervention period, documentation was counted if it appeared either in the progress note or on the reminder and documentation stamp. The entire chart was also reviewed for any prior documentation of passive smoking screening or counseling. If documentation was found that predated the study visit, or if it was not clear when counseling had been performed, the child was excluded from the study. This occurred in nine cases in the postintervention period.

To determine whether physicians actually asked about passive smoking, data were independently collected from parents by the project staff. In the preintervention and postintervention periods, 158 (67%) exit surveys were obtained, including 28 (18%) after clinic visits and 31 (20%) by mail (Figure 1). Ninety-nine parents (63%) were surveyed by telephone. We did not analyze the screening and counseling data from 11 (7%) surveys because the information was incomplete, leaving 147 (63%) surveys for analysis. Of the 77 families for whom surveys were not obtained, 1 (1.3%) parent refused, 5 (6.5%) parents did not speak English, and 71 (92%) parents could not be contacted or did not return the survey within 2 weeks of the office visit (Figure 1).

Survey information collected included the identity of the caregiver bringing in the child, his or her current or past smoking status, and the identification of other household smokers. The survey also asked whether the physician, on the study date only, screened or counseled the parent regarding exposure of the child to household tobacco smoke.

Statistical Analysis

Chi-square tests (Yates' corrected) were used to test for significant differences between the preintervention and postintervention periods regarding passive-smoking screening and counseling activities (parental surveys) and documentation acitivities (chart audits) of physicians. Comparisons were also made for these activities by chi-square testing regarding charts with and without the chart reminder and documentation system. We also performed chi-square analyses to examine whether there were differences in survey completion or reporting of passive smoking screening between smoking and nonsmoking parents or families. To compare the physicians at baseline, chi-square analyses of the parental survey data in the preintervention period were performed between those physicians who eventually attended and those who did not attend the educational seminar. Comparisons were also made between the different methods of survey completion (postvisit, mail, telephone interviewing) regarding parental recall of physician screening and counseling activities using chi-square tests. Statistical significance was defined as $P < .05$.

We used Kendall's tau-β, which is a contingency table analog of the correlation coefficient, to measure the association of the educational seminar and the chart reminder to passive smoking screening, counseling, and documentation activities in the postintervention period. These activities were correlated with four combinations of the two interventions: (1) absence of the treating physician from the seminar and absence of the chart reminder at the time of the study visit, (2) physician absence from the seminar and chart reminder presence, (3) physician presence at the seminar and absence of the chart reminder, and (4) physician presence at the seminar and chart reminder presence. We assessed significance by 95% confidence intervals.

Results

Parents completed 79 (61%) surveys in the preintervention period and 79 (75%) surveys in the postintervention period. The survey results revealed that 28 (35%) and 33 (42%) of the children seen in the preintervention and postintervention periods, respectively, were exposed to environmental tobacco smoke in the home. Twenty (25%) and 18 (23%) of the parents bringing in a child were smokers in the preintervention and postintervention periods, respectively. In the majority of cases, this person was the mother. There was no statistically significant difference by chi-square analyses between the preintervention and postintervention survey completion rates by smoking and nonsmoking parents or by parents in households with and without smokers.

Chart audit results revealed that the reminder was present in 69 of 106 (65%) of the postintervention charts at the time of the study visit. Chi-square analyses revealed a significant difference between the presence of the reminder in the charts of children seen by physicians who attended the educational seminar (50%) and physicians who did not (72%) ($X^2 = 4.6$, $P = .03$).

Figure 2 shows a summary of the results of parental surveys and chart audits regarding passive-smoking screening, counseling, and documentation activities by physicians. Chi-square analysis revealed a statistically sig-

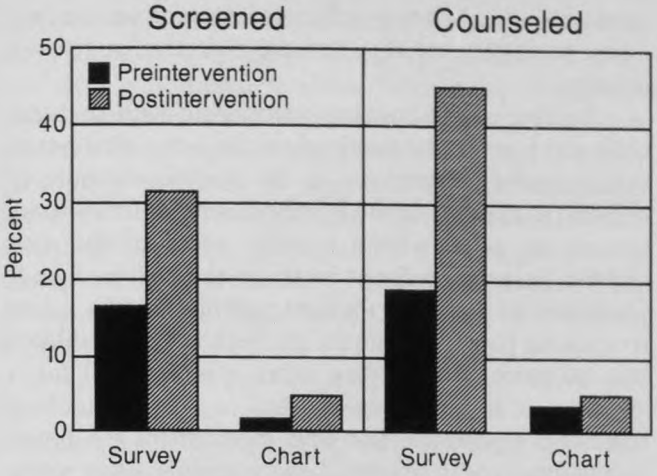

Figure 2. Comparison of physician passive smoking screening and counseling activities as reported on postvisit parental surveys and comparison of screening and counseling documentation by physicians as revealed by chart audits in the preintervention and postintervention periods. Significant differences were found for survey-reported screening ($\chi^2 = 4.6$, $P = .03$) and survey-reported counseling ($\chi^2 = 4.5$, $P = .03$).

nificant increase in the postintervention period in parental survey reports of screening by physicians (17% vs 32%, $\chi^2 = 4.6$, $P = .03$). Chart documentation of screening showed a nonsignificant increase in the postintervention period (2% vs 6%, $P = .19$). When comparing presence or absence of the chart reminder by chi-square testing, there was a significant difference in documentation of screening between those with (67%) and those without (33%) the reminder ($\chi^2 = 6.3$, $P = .01$). Parents reported screening more frequently when the chart reminder was present (35%) vs absent (20%) ($P = .05$).

For passive smoking counseling, we analyzed the data from charts or parental surveys only if there was at least one household smoker indicated on the parental survey. We studied only known smoking families, as it was unlikely that physicians would counsel nonsmoking families. There was a significant increase in passive-smoking counseling activities by physicians to smoking families in the postintervention period (19% vs 46%, $\chi^2 = 4.5$, $P = .03$). Chart documentation of counseling activities was virtually unchanged (4% vs 6%, $P = .64$) (Figure 2). There was no significant difference in counseling or documentation of counseling between charts with and charts without the reminder. Thus, the number of charts in which these activities had been documented in the postintervention period was sixfold to eightfold lower than the actual number of activities reported on the parental surveys for screening and counseling, respectively (Figure 2).

It should be noted that the chart reminder was absent from 35% of the postintervention charts, and that 61% of the physicians did not attend the educational seminar. To control for these two situations, we analyzed the postintervention data further.

We investigated the association of the educational seminar and the chart reminder with screening, counseling, and documentation activities by Kendall's tau-β analysis of the parental survey and chart audit results (Table 1). The intervention variables were ranked from no intervention (ie, physician did not attend the educational seminar and the chart reminder was not present) to either intervention alone or both interventions together. The analyses were performed two ways. In the first, physician presence at the seminar alone was ranked higher than presence of the chart reminder alone (ABCD, Table 1). In the second, the chart reminder alone was ranked higher than the seminar alone (ACBD, Table 1). In all cases, regardless of whether the chart reminder or seminar was ranked higher, there were positive associations, indicating that the activity occurred more frequently when the physician had attended the

Table 1. Effects of Physician Attendance at an Educational Seminar and Presence of a Chart Reminder on Physician Activities in Passive Smoking Screening, Counseling, and Documentation

	Intervention Combination					
	A	B	C	D	Kendall's Tau-β (95% Confidence Intervals)	
	No Reminder/ No Seminar	Yes Reminder/ No Seminar	No Reminder/ Yes Seminar	Yes Reminder/ Yes Seminar		
Results	No. (%)	No. (%)	No. (%)	No. (%)	A B C D	A C B D
Survey						
Screening reported	2/14(14)	10/36(28)	5/12(42)	6/10(60)	0.26(.05, .47)	—
Counseling reported	0/2(0)	5/15(33)	4/5(80)	4/6(67)	0.40(.10, .70)	—
Chart audit						
Screening documented	0/21(0)	5/53(9)	0/16(0)	1/16(6)	—	0.13(.03, .23)
Counseling documented	0/2(0)	1/18(6)	0/6(0)	1/6(17)	—	0.20(−.07, .47)

NOTE: "No Reminder" and "Yes Reminder" refer to the absence or presence of the chart reminder at the time of the study. "No Seminar" and "Yes Seminar" refer to the treating physician's absence or presence at the educational seminar.

seminar and in those cases in which a chart reminder was present. For actual screening and counseling activities as measured by parental surveys, the association was significantly stronger when attendance at the seminar was ranked higher. Conversely, chart documentation showed a stronger association (significant for screening) when the chart reminder was ranked higher. In fact, documentation in the postintervention period occurred only when the reminder was present and only on the red-inked reminder and documentation stamp.

In order to establish whether physicians who attended the seminar were more likely to screen and counsel before the intervention, we did chi-square analyses of the parental surveys in the preintervention period. These analyses revealed no significant differences between screening and counseling behaviors of those physicians who subsequently did and did not attend the seminar.

We examined by chi-square analysis whether the smoking status of the parent completing the survey may have affected reporting rates. Because of the study design, we used the rates of screening and not counseling since counseling reflected results from smoking families only. There was no significant difference in reports of screening between parents who did and did not smoke.

Parental recall rates between the three methods of survey completion were also examined by chi-square testing. We found no significant differences between how parents completed the survey (postvisit, mail, and telephone interviewing) and their rates of recall of physician screening and counseling activities.

Discussion

A variety of respiratory tract illnesses in children have been associated with passive smoke exposure in the home, particularly from smoking mothers. These include pneumonia,[1–4] bronchitis,[1–5] upper respiratory tract infections,[7] respiratory syncytial virus infections,[19] bronchiolitis,[19–20] and asthma.[21] Studies have also revealed a 30% to 80% excess prevalence of chronic respiratory symptoms such as chronic cough, phlegm, and wheeze in children exposed to tobacco smoke in the home.[9,22–24] Other childhood illnesses that have been associated with passive smoking are chronic middle ear effusions,[11] acute otitis media,[12] colic,[25] and sudden infant death syndrome.[26] In addition, recent evidence has linked childhood and adolescent passive exposure to household smoking with lung cancer in adulthood.[27] The nation's blueprint for health in the year 2000, *Healthy People 2000*,[28] has established a national objective to "reduce to no more than 20 percent the proportion of children aged 6 and younger who are regularly exposed to tobacco smoke at home." Clearly, effective interventions are necessary to implement this national objective in practice settings.

Because of the ongoing relationship with both the child and parents, the family physician is the ideal health care provider to intervene in the passive exposure of children to tobacco smoke in the household. In addition, parents are often willing to make sacrifices for their children that they will not make for themselves. Family physicians who counsel smokers may find that an appeal to smoking parents to quit for the health of their children may be more effective than other approaches. Thus, a child's visit for an illness related to passive smoking represents a powerful teachable moment for the physician to intervene in smoking behaviors and passive smoking exposures.

In the present study, we used a two-part intervention consisting of an educational seminar and a chart reminder and documentation system to significantly increase passive smoking screening and counseling activities of family physicians in a university-based clinic when treating young children for illnesses closely associated with passive smoking. Our results are similar to other studies that have used a combination of interventions to increase physician compliance with recommended clinical preventive services.[29–33]

Despite the sizable increases in screening and counseling activities in our study, chart documentation increased minimally. Our low rates of documentation are also consistent with previous studies that reported that physicians infrequently document their clinical preventive activities despite the availability of a chart reminder system.[30,31,34] Documentation of ongoing passive smoking counseling activities is important, especially in a clinic setting in which multiple physicians may provide care to a child. In addition, documentation of preventive health care recommendations is becoming increasingly important from a medicolegal standpoint.[35]

When we began our study, we were investigating a relatively novel concept, that is, counseling parents regarding tobacco smoke exposure of infants and children during related illness visits. We were, therefore, very impressed by the preintervention rates of screening (17%) and counseling (19%) activities of our physicians. These initial rates compare favorably with baseline rates reported by Madlon-Kay[30] and Shank et al[32] (2% and 7%, respectively) for tetanus-diphtheria immunizations in adults, a very common preventive service.

In our study, screening and counseling activities were more strongly associated with the educational seminar than with the chart reminder. In contrast, we found that chart documentation was more strongly associated with the chart reminder. Our results conflict with those

of Cohen et al,[29] who found that a preventive medicine checklist added to patients' charts was much more effective than educational seminars in changing the health promotion activities of physicians. Likewise, other studies have found significant increases in physician health promotion activities in response to chart reminders alone.[36,37] Our reminder and documentation system might have been more successful in increasing screening and counseling if we had involved office or nursing staff, as did the studies mentioned above, rather than relying on physicians.

An important consideration is whether only physicians who had an initial interest in passive smoking attended the seminar, causing an overly optimistic view of the seminar's effect on screening and counseling. On chi-square analyses, we found no significant associations between subsequent seminar attendance or absence and preintervention screening, counseling, and documentation actitivies. Attitudinal differences in the two groups were not measured, however, and may have affected the results to an unknown extent.

Omission of the chart reminder occurred in the postintervention period in 37 of 106 (35%) cases and may have influenced our results. This omission most likely occurred on days that were busier than usual. Screening and counseling activities would be less likely to occur on busy days, as well. Thus, the lack of a reminder would have had a minimal effect on those days. Since all documentations in the postintervention period were made on the red-inked reminder stamp, the lack of reminders undoubtedly contributed to the lower-than-expected documentation rates. In addition to higher documentation rates, we would most likely have seen higher rates of actual screening and counseling activities in the postintervention period had the reminder been present in all charts, since these activities were positively associated with presence of the chart reminder. The reminder was absent more frequently from charts of children seen by physicians who attended the seminar. The rates of screening and counseling would undoubtedly have been even higher in the postintervention period had the reminder been universally present.

A major potential source of bias in the present study was our reliance on parental recall to determine whether physician screening and counseling actually occurred. Parental information was collected within 2 weeks of the visit, making it less likely that the content of the visit would be forgotten. Analyses of screening and counseling rates were similar across all methods of survey completion (ie, postvisit, mail, telephone interview). The numbers for analysis were small, however, and thus not conclusive. It is possible that parents may have completed surveys more or less accurately in the office setting. Telephone interviewing may have elicited responses that the parent thought the interviewer wanted to hear. It is possible that parents who returned surveys answered more or less positively than those who did not. Since these possibilities were not controlled for, we acknowledge that an unknown bias could have influenced our results.

It is unlikely that the increases in screening and counseling activities in the postintervention period were due to secular trends. First, postintervention data collection began less than 2 months after the end of the preintervention period so that there was very little time for physician awareness of this issue to change dramatically. In addition, we found different associations between actual screening and counseling and attendance at the seminar on the one hand and, on the other hand, chart documentation and presence of the reminder. These results suggest a direct influence from the interventions on these respective activites and not general increases due to secular trends.

In the current study, two simple interventions were successful in substantially increasing physician passive-smoking screening and counseling activities. Whether these increased screening efforts were continued on a long-term basis and whether they were efficacious in decreasing passive exposure of children to tobacco smoke in the home are questions to be answered in future investigations.

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