Failed Appointments in Residency Practices: Who Misses Them and What Providers Are Most Affected?

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Background: **Missed appointments can affect patient health, disrupt schedules, and result in poor utilization of resources, increased workload for staff and physicians, and lost learning opportunities for residents in training programs.**

Methods: **The setting was an established community-hospital-based family practice residency practice averaging 25,000 outpatient visits per year in a small northern New England town. Data from a computer-scheduling system and hospital mainframe, as well as demographic and other information contained in billing records and patient schedules, were abstracted for patients who scheduled 3962 appointments on 36 sampled days during 1995.**

Results: **The missed appointment rate during the study period was 6.7 percent. Characteristics associated with missed appointments were younger patient age (17 to 30 years), Medicaid coverage or lack of health insurance, and appointments scheduled with first-year residents or medical students.**

Conclusions: **Attention should be given to those patients most likely to miss appointments and, in training programs, to patients seeing first-year residents and medical students. It is possible that our relatively low missed appointment rate overall resulted from the nature of the practice and its environment.**
(J Am Board Fam Pract 1997;10:407-11.)

Failure to attend medical appointments affects practice efficiency and could affect patient health.[1,2] In our own practice we have found that missed appointments also affect the practice by disrupting schedules, causing poor utilization of resources, increasing the workload for staff and physicians, and decreasing practice revenue. In addition, in residency training settings, missed appointments reduce learning opportunities for residents.

The purpose of the study was to examine patient and appointment characteristics related to missed appointments in a Northern New England family practice residency practice. The medical literature shows wide variation in missed appointment rates. The lowest rate (6 percent) was reported in a family practice residency practice serving a largely middle-class neighborhood in Ontario, Canada.[3] A recent report from an urban family practice residency in Minnesota cited a missed appointment rate of 30 percent.[1] Other examples include a rate of 53 percent for new patients at the Wayne State University Family Practice Center[4] and 43 percent for adult patients and 48 percent for pediatric patients at the Family Health Center in Rochester, New York.[5]

Many of the studies were undertaken in urban clinics with lower socioeconomic-level populations, and higher rates appear to be associated with hospital-based clinics in urban areas. Insurance status of populations served was described in many studies but was usually not analyzed in relation to appointment keeping. The Minnesota residency study found that Medicaid and self-paying populations had higher rates of missed appointments.[1] Age appears to be the variable most consistently associated with visit attendance.[1,3,6] The age-group younger than 40 years was usually reported to have higher rates of missed appointments. After 40 years, attendance rates are reported to increase with age. Several studies found attendance associated with a day of the week, time of day, time between making and attending the appointment, and sex of patient; weather factors and distance from the health center have also been studied.[1,2,6,7] Transportation was found in

Submitted, revised, 29 May 1997.

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Table 1. Characteristics of Scheduled Patients.

Characteristics	Percent
Age, years	
Younger than 17	17
17-30	21
31-45	28
46-64	22
Older than 64	12
Sex	
Female	66
Male	34
Insurance	
Blue Cross, commercial	23
Medicaid	18
Self-paying	12
Managed care	20
Medicare	22
No information	5
Provider at visit	
Faculty physician	21
Nurse practitioner, physician assistant	26
Resident	49
Medical student	5

one study as the most common reason for missing appointments. Few studies have been undertaken in smaller towns or rural settings.

This study used available data within the information systems of a practice to examine the relation between missed appointments and patient and provider demographics.

Methods

The Family Medicine Institute (FMI), an outpatient practice of the Maine-Dartmouth Family Practice Residency, was the site of the study. The FMI is located in Augusta, Maine, the state capital with a population of 18,000. From 1 July 1994 through 30 June 1995, 23,576 outpatient visits were made to the center. At the time of the study, 5 faculty physicians, 3 faculty physician assistants, and 22 resident physicians were assigned to the FMI. At any given time, the center is also the site of 1- to 2-month clerkships for 4 (third- and fourth-year) medical students.

The center serves a diverse population that reflects the community. To sample from times of both good and bad weather in Maine, data were collected on all patients scheduled for an appointment during randomly selected days in January, March, July, August, and September 1995. February data were not used because the practice moved its location that month, and the flow of appointments was interrupted. An automated scheduling system was implemented in April, and the study was suspended until that system was functioning smoothly.

Demographic information, including sex, date of birth, and insurance status, as well as day of week, time of day, and level of training of provider for each appointment, was obtained from the hospital mainframe computer for those who attended their appointment. For those not attending the appointment, both the printed daily schedule and mainframe computer were used to collect this same information.

A missed appointment is defined as one in which the patient did not keep the appointment and did not give notice to the practice (either calling to cancel or canceling when the reminder telephone call was made were not considered to be missed appointments). For the analyses, whether the appointment was kept was the dependent variable, and the independent variables were patient demographic and appointment characteristics noted above. Chi-square analyses were performed on all variables with significance levels set at $P < 0.05$. A two-way analysis of variance was performed for level of training and insurance type, also with $P < 0.05$.

Results

A total of 3962 visits were scheduled on the 36 sampled days. The rate of missed appointments varied during those months from 4.2 percent to 8.4 percent (January 7.9 percent, March 5.8 percent, July 6.0 percent, August 4.2 percent, September 8.4 percent). The study reviewed information from 267 missed appointments and comparative information from 3695 kept appointments. Thus, the overall missed appointment rate for the study sample was 6.7 percent. Patient and provider characteristics of scheduled appointments are shown in Table 1. Table 2 displays information by age of the patient, Table 3 by insurance type, and Table 4 by provider level of training.

Since types of patient insurance were not equally distributed across the various levels of providers, a two-way analysis of variance was performed to determine whether differences noted in attendance by level of training were the result of the patient's insurance status. This analysis showed that both level of training ($f = 3.00$, 5 *df*,

Table 2. Patients Seen and Missed Appointment Data, by Age of Patient.

Age, years	Patients Seen No. (%)	Missed Appointments No. (%)	Total Number Scheduled
0–16	620 (94)	42 (6)	662
17–30	763 (90)	84 (10)	847
31–45	1039 (93)	81 (7)	1120
46–64	809 (95)	44 (5)	853
Older than 64	464 (97)	16 (3)	480
Total	3695 (93)	267 (7)	3962

$\chi^2 = 28.461$, $df = 4$, $P = 0.0001$.

$P < 0.05$) and insurance status (f = 7.27, 5 *df*, $P < 0.05$) were independently associated with appointment keeping.

Discussion

The most surprising finding of our study, considering its setting in a family practice training program, is the low rate of missed appointments. We are reasonably confident that the study finding of 6.7 percent is an accurate reflection of our no-show rate, since the most recent report taken from our scheduling system indicated a rate of 7.8 percent for the first 4 months of 1996 (based on 9568 scheduled appointments). This rate is also equivalent to the rate of missed appointments (7 percent) in several community primary care practices owned by our sponsoring hospital. When considering patient characteristics, however, the FMI more closely resembles private practices than the many urban practices summarized in the literature that had much higher levels of patients from lower socioeconomic backgrounds. Other characteristics that differentiate this practice from other practices summarized in the literature are its rural nature, stability of the area's population, and shortage of primary care physicians in the community. New patients might be more likely to keep their appointment here than elsewhere because it is so difficult to get an appointment.

The lower missed appointment rate might also be the result of the extensive social service system integrated into the practice. Funded primarily by a grant from the Robert Wood Johnson Foundation and others, 2.5 full-time-equivalent case managers provide social services to patients in the outpatient setting either on-site or in the home. This high level of social service to patients allows for many issues, such as transportation and child care difficulties, to be worked out before the visit.

Four of the seven characteristics of patients and appointments studied were found to be significantly associated with appointment attendance. The data for age of patient confirmed what other studies have shown: older patients keep their appointments more regularly than younger patients. The oldest patients keep their appointments most often, followed by those aged between 45 and 64 years. Young children's appointment-keeping behavior is dependent on

Table 3. Patients Seen and Appointments Missed, by Insurance Status.

Insurance Status	Patients Seen No. (%)	Missed Appointments No. (%)	Total Number Scheduled
Blue Cross, commercial	873 (95)	46 (5)	919
Medicare	827 (95)	40 (5)	867
Medicaid	632 (87)	85 (13)	717
Managed care	767 (97)	25 (3)	792
Self-paying	426 (89)	52 (11)	478
Other, no insurance	169 (91)	17 (9)	186
Total	3,694 (93)	265 (7)	3,959

$\chi^2 = 71.833$, $df = 5$, $P = 0.0001$.

Note: While appointment keeping varied with age and insurance type, no association was found with sex. Because children's appointment-keeping behavior is determined by parents, analysis of sex was restricted to patients older than 16 years. There was no significant difference in appointment keeping between male and female patients (92% vs 94%) ($\chi^2 = 0.183$, $df = 1$, ns).

Table 4. Patients Seen and Missed Appointments, by Level of Training.

Training Level	Patients Seen No. (%)	Missed Appointments No. (%)	Total Number Scheduled
Physician assistant	954 (93)	73 (7)	1027
Faculty physician	802 (97)	29 (3)	831
Medical student	167 (89)	21 (11)	188
1st-year resident	167 (87)	26 (13)	193
2nd-year resident	657 (94)	44 (6)	701
3rd-year resident	948 (93)	72 (7)	1020
Total	3695 (93)	265 (7)	3960

χ^2=34.59, *df*=5, *P*=0.0001.

their parents' attendance pattern; we found that 94 percent of children's appointments are kept. The data indicate that young adults are poor attendees of appointments. Those in the 17- to 45-year age-group require some health maintenance but are most frequently seen for acute conditions. After they reach 45 years, many patients come to a physician's office for regular examinations and for chronic physical problems, which begin to increase in frequency with age.

Unlike many practices cited in the literature, the various insurance categories are well represented at the FMI. The study found an association between insurance status and appointment compliance. Managed care, private insurance, and Medicare patients had very low missed appointment rates (3 to 5 percent). Patients without insurance (self-paying) had higher missed appointment rates (11 percent), perhaps owing to efforts to avoid out-of-pocket expenses for problems that resolve before the scheduled appointment. The group with Medicaid coverage had the highest rates (13 percent), even though both the office visit and transportation costs were covered services. The similarly high rates found in these latter two groups might have had less to do with having health insurance coverage and more to do with having other common factors, such as lack of telephone service to cancel appointments or increased problems of daily living associated with low income.

The results on level of provider training were not surprising. All 5 of the physician faculty had practiced with us or in the area for 5 to 20 years, and their kept appointment rate was 97 percent. It is likely their long association with patients resulted in better attendance for appointments regardless of payment source. There were 3 physician assistants during the study period whose longevity with the program varied from a few months to 15 years. Physician assistants, whose combined kept appointment rate was 93 percent, had their own panel of patients and a practice similar to that of the faculty physicians, although they did not provide care for hospitalized patients. Because of the few providers, we did not explore differences within either of these groups by length of service.

Medical students, whose kept appointment rate was 89 percent, saw patients of residents who were away and patients who had acute conditions. All patients were told in advance they would be seeing a medical student. Medical students had no previous relationship with the patients and whether they were available for follow-up depended on the amount of time on rotation at the residency.

The kept appointment rate for first-year residents was the lowest of all groups at 87 percent. First-year residents saw patients who were not only new to them but often new to the practice. Because first-year residents saw patients only 1 to 2 half-days per week on most rotations, it was more difficult to provide timely follow-up care, which further reduced the chances of establishing a stronger physician-patient relationship and perhaps affected appointment compliance. Kept appointment rates for second- and third-year residents (94 percent and 93 percent, respectively) were similar to that for physician assistants; this higher rate probably reflected the residents' increasing availability to see patients in the practice later in training. Because there were relatively few patients per resident, we did not attempt to analyze differences in rates between individual residents.

Overall, the results indicate that any interven-

tion in the area of missed appointments should concentrate on patients who are between the ages of 17 and 30 years, who are either Medicaid or self-paying patients, and who have first-year residents or medical students as their providers. Success with the 17- to 30-year-old population would likely improve medical interventions for children, also.

Additional areas for research include more rigorous documentation of the costs to a practice of missed appointments, including lost revenue, staff time to pull charts, and provider and staff time to assess whether action should be taken beyond the normal postcard reminder when an appointment is missed and should be rescheduled. The cost in terms of compromised medical management of health problems and lowered patient functioning is also an area that requires additional study.

As the practice patient mix changes, the issue of missed appointments will need to be reviewed in a new context. Although the patient care issues remain, the economic factors of missed appointments change in a managed care environment. In capitated systems, the practice receives payment regardless of whether the patient attends the visit. Even though the capitation payment is received, the overall costs for the care of managed care patients might be higher when patients miss appointments and their health is affected. Data from the present study indicate that 97 percent of managed care patients kept their appointments, and no intervention was necessary in this group. It is unclear how managed care will affect Medicaid patients, a change that might provide increased reason for intervention in this group.

One of the most interesting points for further study is what other characteristics of our practice have resulted in this low rate overall when compared with other residency practices experiencing higher rates. The effect that a rural practice or competition for appointments resulting from a physician shortage would have on appointment-keeping rates is worthy of future study. Qualitative studies of why appointments are more often missed when the provider is a medical student or first-year resident would also be worthwhile.

This analysis can be easily reproduced, and further findings might lead to cost-effective interventions in both academic and nonacademic settings.

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