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# Factors Associated with Appointment Keeping in a Family Practice Residency Clinic

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**Background.** Failure to keep an appointment not only affects the patient's health care, but also has an impact on the effectiveness and productivity of the medical facility. This study explored patient demographic factors associated with appointment keeping.

**Methods.** In a Midwestern, urban family practice residency clinic serving 2500 patient visits each month, data were obtained from the computer scheduling system and chart audits for 4669 patients who kept or missed 7283 physician appointments between April and June 1991. Independent variables studied were age, race and ethnicity, type of health insurance, marital status, sex, patient status, day and time of appointment, medical reason for the visit, and geographic proximity to the clinic.

**Results.** The kept-appointment rate for this study was 73.9%. Appointment keeping was associated with age,

race and ethnicity, type of health insurance, the day of the appointment, the medical reason for the visit, and geographic proximity to the clinic.

Rates of appointment keeping were higher for patients who were older, who were Asian or white, who had private or managed care insurance, who had longer distances to travel to the clinic, and those who had appointments scheduled for the day on which they contacted the clinic.

**Conclusions.** Several identifiable factors significantly affect whether a patient will keep a clinic appointment. Our findings should be considered in program changes in appointment scheduling and follow-up methods for noncompliant patients.

**Key words.** Appointments and schedules; patient compliance; family practice; internship and residency.  
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A patient's failure to keep an appointment affects not only his or her health care, but also has an impact on the health care of other patients.<sup>1</sup> Missed appointments disrupt scheduling and result in an underutilization of resources as the physician is left inaccessible to other potential patients.<sup>1</sup> Studies of appointment keeping in general medical settings and inner-city community health centers indicate no-show rates of between 15% and 30%.<sup>1-3</sup> One study of family practice residency clinics in the northwestern United States, however, found no-show rates of only 5% to 11%.<sup>4</sup>

The characteristics of patients who miss appointments have been studied extensively. Most studies found that patients who missed visits were younger than patients who kept appointments; however, many of these studies did not include patients under 18 years of age.<sup>3,5,6</sup> Studies exploring racial characteristics produced mixed results, with some studies showing a higher rate of kept appointments among whites and others showing no association with race.<sup>2,3,7</sup> The association of appointment keeping with the method of payment for a medical visit also produced conflicting results. Some studies found that self-paying patients missed more visits than those with public or private insurance,<sup>5</sup> whereas other studies found no correlation between missed appointments and payment method.<sup>3</sup>

The day of the week and time of day of appointments have been associated with appointment keeping,

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with most studies showing greater missed appointment rates on Mondays and Fridays and in the evenings.<sup>8,9</sup> Patients with chronic health care needs kept more appointments than patients with acute conditions.<sup>10</sup> Geographic distance from the medical facility was found to be an important factor in one study<sup>11</sup>; however, other studies have shown no relation between geographic distance and appointment keeping.<sup>2,7</sup>

From a review of the literature and experiences at our clinic, we expected to find that appointment keeping was highest among patients who had private insurance, who lived in close proximity to the clinic and who were established patients; and to vary among patients by age, race, and the day and time of their appointments.

## Methods

Established in 1969, Family Medical Center is the family practice residency clinic of Hennepin County Medical Center. Our patient population is predominantly low income (over 60% receive some form of medical assistance), racially and ethnically diverse, and young (nearly 34% of patient visits in 1991 were for patients under 20 years of age). Between April and June 1991, 33% of visits were for routine care, 27.3% were for follow-up, 17.8% were for same-day or acute care needs, 12.5% were for well-child care, and 9.4% were for prenatal care.

All patients who kept or missed a scheduled appointment from April through June 1991 were included in this study (N = 7283 appointments for 4669 patients). Canceled appointments, as well as appointments for nurse, laboratory, radiology, and dietician services, were excluded.

Patient and appointment characteristics were obtained from the patient schedule database. To register patients at the time of their appointment, a clerk had to enter the "kept" status code into the computer. Because of concerns regarding the accuracy of the database information, the charts of a subsample (all of the patients who did not keep their appointments in May 1991) were audited. Of the 634 appointments recorded as missed, 24 (3.8%) were found to have been incorrectly recorded; those 24 appointments either had been canceled or had never been made.

The dependent variable in this study was kept physician visits from April 1, 1991, to June 30, 1991. Only the verified data for May 1991 were included in the logistic regression analysis. The independent variables were age, race and ethnicity, type of health insurance, marital status, sex, patient status (new or established), day and time of appointment, medical reason for the visit, and geographic proximity to the clinic.

Demographic characteristics, the day and time of appointments, and the medical reason for visits were collected through reports generated from a mainframe computer system. This database system links patient name and medical record number with demographic characteristics such as age, sex, race, and insurance coverage; medical information including diagnosis codes and reason for visit; and day and time of appointment. Patient status (new or established) and geographic proximity to the clinic were obtained through manual chart audits and by plotting zip codes on a city map. Frequency distributions and rates were used to determine which factors, if any, were related to missed appointments. Confidence intervals were calculated to determine which factors, if any, significantly corresponded to appointment-keeping compliance. All confidence intervals (CI) were performed at the 95% confidence level.

## Results

Of the 4669 patients who scheduled 7283 appointments between April and June 1991, 3013 patients kept 5381 appointments (73.9%). Just over 26% of visits were missed (1656 patients missed 1902 visits). This was lower than the year-end missed appointment rate for 1991, which was 30.5%.

Appointment keeping varied by age. Those 20 to 39 years of age were least likely to keep appointments (69.3%, CI, 0.677 to 0.710). Patients aged 0 to 19 years kept appointments at a better rate (72.7%, CI, 0.710 to 0.744), and older patients were most likely to keep appointments. Patients aged 40 to 59 years kept 80.4% of appointments (CI, 0.782 to 0.825) and those aged 60 years and over kept 89.9% of appointments (CI, 0.873 to 0.925).

Appointment keeping was also significantly associated with recorded race and ethnicity. Asians were most likely (86.4%, CI, 0.818 to 0.909) and Hispanics were least likely (57.6%, CI, 0.475 to 0.677) to keep appointments. The rates of kept appointments for other groups were 58.3% (CI, 0.562 to 0.604) for African Americans, 63.7% (CI, 0.584 to 0.690) for Native Americans, and 75.8% (CI, 0.739 to 0.776) for whites. Controlling for socioeconomic status did not alter these associations.

There are two types of medical assistance available in Minnesota: managed care medical assistance and traditional medical assistance. Patients with traditional medical assistance were least likely to keep clinic appointments (70.5%, CI, 0.685 to 0.725) whereas those with private insurance were most likely to keep their appointments (78%, CI, 0.742 to 0.817). There was no significant difference in appointment keeping between managed



Table 1. Appointment Keeping, by Day of Appointment, at a Family Practice Residency Clinic

Day of Appointment	No. of Appointments	Appointments Kept (%)
Monday	1112	80.8
Tuesday	1645	76.1
Wednesday	1338	69.3
Thursday	1511	77.0
Friday	1345	68.1
Saturday	332	67.5

care medical assistance patients, who kept 75% of appointments (CI, 0.736 to 0.764), and those with private insurance. The higher rate of appointment keeping among those with managed care medical assistance vs traditional medical assistance cannot be accounted for by differences in socioeconomic status.

The appointment-keeping trends by day of appointment are shown in Table 1 and illustrate the general trend for appointment-keeping rates to decrease over the week, with Thursdays showing an increase in appointment-keeping compliance.

The rates for kept appointments by visit type are illustrated in the Figure. The results indicate that appointments for same-day visits are the most likely to be kept. The number of occupational medicine and colposcopy appointments was too small for comparing with other types of appointments.

Patients who lived more than 3 miles from the clinic

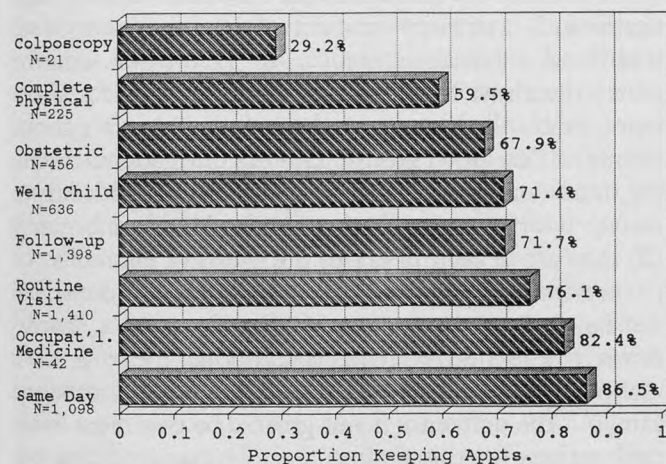


Figure. Rates of appointment keeping according to type of visit made by patients to a family practice residency clinic. Patients were significantly less likely to keep colposcopy visits than other visits. Patients were significantly less likely ( $P < .05$ ) to keep visits for complete physical examinations, and obstetric, well-child care, follow-up, and routine visits than to keep occupational medicine or same-day visits. The number of patient visits for colposcopy and occupational medicine were small and therefore may have influenced the results.

kept significantly more appointments (78.2%, CI, 0.755 to 0.806) than patients living 3 miles or less from the facility (71.7%, CI, 0.705 to 0.730). Appointment-keeping compliance was not related to sex or to patient status (new or established) when univariate analysis was used.

Since race, socioeconomic status, site of residence, sex, marital status, and age may be interrelated in their association with appointment keeping, logistic regression models were developed. Models were developed separately for those younger than 16 years of age and those aged 16 and older. For those younger than 16 years, appointments are often made and kept by parents, who bring their children to the clinic. None of the patients younger than 16 years of age were listed as ever having been married. Therefore, the model in those younger than 16 years of age does not include marital status or demographic factors such as insurance and site of residence, as those factors are more indicative of the parent than the patient. The model for patients over 16 years of age includes marital status and is considered to reflect the patient and not a parent or guardian.

After several attempts, no satisfactory model for association of appointment keeping and demographic factors assessed in this study could be developed for those younger than 16 years of age. Although individual factors were important in the younger patient group, no combination of factors improved the ability to predict appointment-keeping behavior to a statistically significant degree.

Among those aged 16 years and older, a logistic regression model that included type of insurance, race, age, and marital status was found to be useful in predicting appointment-keeping behavior. The odds ratios and confidence intervals are listed in Table 2. In using logistic

Table 2. Logistic Regression Analysis to Determine the Likelihood of Patients 16 Years and Older Keeping Appointments at a Family Practice Residency Clinic

Reference Group and Variable	Odds Ratio <sup>†</sup> (95% CI)
Private insurance*	
Managed medical assistance	1.1 (0.6-2.0)
Traditional medical assistance	0.7 (0.4-1.2)
White race*	
African-American	0.4 (0.3-0.6)
Asian	1.9 (0.6-5.9)
Other race	0.4 (0.2-0.6)
Married*	
Single	1.1 (0.7-1.9)
Divorced or widowed	8.2 (2.8-24.1)
Separated	0.4 (0.2-0.7)

\*Reference groups by definition have odds ratios of 1.00. <sup>†</sup>Odds ratios compare listed variables with the reference group. CI denotes confidence interval.

regression with a dichotomous outcome (missed or kept), it is necessary to develop a reference group and multiple variables for each classification of the independent variable. Reference variables for the model are private insurance, white race, and married. Age is a continuous variable. When looking at the odds ratios in multiple logistic regression, the estimated odds ratio for an effect is statistically adjusted for the other factors in the model.

## Discussion

In our study population, several factors were associated with appointment keeping, including age, race and ethnicity, type of health insurance, day of appointment, medical reason for the visit, and geographic proximity to the clinic.

Infants and children (those 0 to 19 years of age) tend to require immediate medical attention when they are ill and need frequent preventive examinations. During early adulthood (20 to 39 years of age) most persons require little medical intervention. At ages 40 to 59 years, health diminishes slightly, and more frequent care and thorough preventive examinations are encouraged. At age 60 years and older, most persons have frequent health care needs.

Given these stages of health and medical needs, it might be expected that infants and young children and those 60 years of age and older would keep more appointments than those between the ages of 10 and 59 years. This expectation, however, was inconsistent with the literature<sup>3,7</sup> as well as with the results of this study. Whereas those over the age of 60 years kept a high proportion of appointments, patients under 20 years of age kept significantly fewer visits. Approximately 78% of the visits in the group under 20 years of age were by children under the age of 10. Whether these appointments are kept or missed is usually determined not by the child but by the parent. However, demographic factors such as the child's insurance status, site of residence, and race are good proxies for those of the parent. It is the group of people aged 20 to 39 years who make many of the decisions about appointment keeping for the group 0 to 19 years of age. Both groups have significantly lower kept-appointment rates than older patients. It is the group under the age of 40 years who account for 75% of the appointments made in our clinic. It is therefore important to develop methods to facilitate this group's appointment-keeping behavior. A follow-up study should compare the characteristics of parents whose children keep clinic appointments vs those who do not.

The relation between race and appointment-keeping

compliance in this study was statistically significant: Hispanics, African-Americans, and Native Americans missed more appointments than either whites or Asians. Asians kept significantly more appointments than whites. The literature indicated either no significant difference in appointment-keeping compliance among different racial and ethnic groups,<sup>2</sup> or that nonwhites kept fewer appointments than whites,<sup>3</sup> or that Hispanic patients were less compliant than either African-Americans or whites.<sup>7</sup>

None of the studies reviewed discussed associations between appointment keeping and Asian race, yet this was an important finding for our center. One possible explanation is the way the clinic provides care to this population. In February 1991, our center established a specialty clinic for Southeast Asian children. Two pediatric physicians who have worked with this population for an extended period staff the clinic. A nurse was designated from among the center's nursing staff to become part of this Southeast Asian team. Although none of these providers were of Southeast Asian descent, they were sensitive to and aware of this population's special needs. This sensitivity, coupled with continuity of providers and interpreters, may be the most important reason why Asian patients kept such a high proportion of their scheduled clinic appointments. It is also possible that there are cultural reasons why Asians kept more appointments than patients of other races. These explanations would have to be verified through further research, and may have potentially meaningful implications.

Patients with managed care medical assistance kept significantly more appointments than did patients with traditional medical assistance. In Hennepin County, where the clinic is located, all clients eligible for assistance are enrolled in managed care unless they are members of an "excluded group." Among our patients receiving traditional medical assistance, most are excluded from managed care because (1) they receive Medicare benefits, (2) they are in their first 1 to 3 months of eligibility, or (3) they pay a portion of their medical care, and medical assistance pays the balance (referred to as a "spend down"). Patients receiving spend-down benefits have marginally higher incomes than those receiving managed care, but the difference is not great. The two most likely explanations for this finding are: (1) managed care patients are mandated by the state to choose one provider for all their care; therefore, they may keep more appointments because they have no other clinic to which they can go; or (2) continuity of care is greater because patients have developed a relationship with the health care staff which has led to increased appointment keeping. Conversely, patients in their first 1 to 3 months of eligibility for medical assistance and not yet in the man-



aged care program may not have had opportunities to develop relationships with a primary care physician or facility.

Using multivariate logistic regression analysis, age, race and ethnicity, and type of health insurance were combined and considered with sex and marital status. The results indicated that the combination of age, race, and type of insurance continued to be statistically significant variables among those 16 years of age and older. In the group younger than 16 years of age, some individual factors such as race and socioeconomic status were important, but no useful model could be developed from the data collected. It is likely that other factors, such as the specific reason for the appointment or parental characteristics, are more important in determining appointment-keeping behavior in this younger age group. Further research is required.

Our findings concerning appointment-keeping compliance by day of appointment (Table 1) were somewhat different from those found elsewhere in the literature. Previous studies found significantly higher no-show rates on Mondays and Fridays.<sup>8,9</sup> At our clinic, patients kept the most appointments on Mondays and Thursdays. Thursdays may have had higher kept-appointment rates because a psychiatric consultant comes into the clinic on that day, and his patients rarely miss clinic visits.

Findings for the medical reason for the visit are difficult to compare with other studies because visit types are not coded consistently (Figure). Appointment lead time may be a factor at the clinic, especially since same-day appointments (the appointment type with the highest kept rate) are usually made no more than 24 hours in advance. Most other visits were scheduled as much as 2 weeks in advance. However, that time frame may be long enough for patients to forget, especially considering that many have continual economic and personal disruptions in their lives. Instituting a mail or telephone reminder system may be helpful.

Previous research has found a relation between the incidence of scheduled and missed appointments<sup>12</sup>: namely, the more appointments a person scheduled, the more appointments were missed, especially if numerous appointments were scheduled over a brief period. Well-child care and obstetrical appointments often involve several appointments for one patient over a short time. This may be the cause of poor appointment-keeping rates for well-child and obstetrical visits (71.4% and 67.9% kept rate, respectively) and should be considered in a follow-up study.

Patients living more than 3 miles from the center kept significantly more appointments than those living closer to the facility. This was an unexpected finding,

particularly since our center has a transportation program for patients living within a 3-mile radius of the clinic. The clinic employs two full-time drivers and provides rides for pregnant women, families with young children, the elderly, and patients with disabilities. Nearly 67% (4879 of 7283) of clinic visits were made by patients who lived within 3 miles of the clinic. It may be that patients living farther away have more accessible means of transportation, such as an automobile, whereas patients who live closer walk or rely on the bus. This may reflect a problem with our current transportation program. A follow-up study investigating appointment keeping among those who use the transportation program vs those who do not might be beneficial.

Missed appointments can compromise patient care, reduce revenue, decrease staff productivity, and deprive other patients who need to schedule time with a physician. Program strategies to reduce the rate of missed appointments will be developed based on our findings. Further research should study the characteristics of parents with young children, delineate reasons for race and ethnic differences, and reassess unanticipated findings such as geographic proximity to the clinic being inversely related to the rate of kept appointments.

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