# Factors Associated with Missed Dermatology Appointments

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To the Editor:

Missed appointments are a major issue in every discipline of medicine[1] and can be detrimental for dermatologists,[2,3] whose clinics often have long wait times for referred patients and can lose up to $200 for each missed appointment.[4] The purpose of this study was to quantify the rate of missed appointments at an academic dermatology clinic and identify factors associated with patient nonattendance.

After approval by an institutional review board, appointment data was collected from the electronic medical record at the dermatology clinic at Wake Forest Baptist Health, Winston-Salem, North Carolina, for the period from May 1, 2013, to April 30, 2014. Variables that were evaluated included age, race, sex, primary language, employment status, zip code, appointment time, insurance coverage, scheduled provider, patient status (new vs returning), and the nature of the visit (cosmetic vs noncosmetic visits and procedural vs nonprocedural visits). Zip codes served as a representation of distance traveled and were stratified into 4 concentric zones: zone 1 represented the region corresponding to the clinic's zip code; zone 2 represented regions with zip codes adjacent to zone 1; and the remaining zones were determined by regions with zip codes adjacent to the prior zone. Primary language spoken was categorized as English or non-English. Insurance coverage was categorized as private, Medicaid, Medicare, self-pay, and other. Using stepwise selection, both a univariate model and a multivariable logistic regression model were created (variable inclusion, $P \leq .10$; variable exclusion, $P > .05$). Of the 28,772 appointments scheduled during the study period, 5584 (19.4%) were missed. Univariate and multivariable analyses of the factors associated with missed appointments are shown in Table 1.

A telephone survey also was conducted to evaluate patient-reported factors associated with missed dermatology appointments. A list of patients who missed appointments during the period from January 1, 2014, to April 30, 2014, was extracted and every fourth patient was called within 6 weeks of the appointment to minimize recall bias. Patients were excluded from the study if they could not be reached after 3 attempts. Of the 799 patients contacted, 300 (38%) responded to the survey; 98 (12%) had phone numbers on record that were incorrect or were no longer in service; and 401 (50%) could not be reached after 3 attempts. The results of the telephone survey are provided in Table 2.

The demographic data suggested that characteristics associated with higher rates of missed appointments tended to reflect physical or financial barriers, such as dependency on others for transportation (eg, pediatric patients), longer distance traveled to the clinic, and lack of insurance coverage; however, only 4% and 8% of the survey respondents reported that they missed their appointment due to financial reasons or that they were unable to obtain transportation, respectively. Of the patients surveyed, 35% cited that the reason they missed their appointment was that they forgot about the appointment; additionally, 24% of respondents reported that they had not been reminded of the appointment.

Although physicians cannot directly address physical or financial barriers to attendance, we can introduce more effective methods of communication for patient reminders. Of the 799 patients who were called

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Table 1.

## Univariate and Multivariable Analyses of Demographic Data Associated With Missed Dermatology Appointments[a]

| Characteristic | No. of Scheduled Appointments, n (%) (N=28,772) | No. of Missed Appointments, n (%) (n=5584) | Univariate OR (95% CI) | *P* value | Multivariable OR (95% CI) | *P* value |
|---|---|---|---|---|---|---|
| **Age, y** | | | | | | |
| 0–12 | 2332 (8.1) | 1069 (19.1) | 3.0 (2.8–3.3) | <.0001 | 1.8 (1.4–2.3) | <.0001 |
| 13–18 | 2165 (7.5) | 567 (10.2) | 1.7 (1.6–1.9) | <.0001 | 1.3 (1.0–1.7) | .03 |
| 19–25 | 1519 (5.3) | 506 (9.1) | 2.2 (2.0–2.5) | <.0001 | 2.3 (2.0–2.7) | <.0001 |
| 26–45 | 5322 (18.5) | 1311 (23.5) | 1.6 (1.5–1.8) | <.0001 | 1.4 (1.2–1.5) | <.0001 |
| 46–65 | 9925 (34.5) | 1492 (13.1) | 1.0 (Reference) | | 1.0 (Reference) | |
| 66+ | 7509 (26.1) | 639 (11.4) | 0.6 (0.5–0.6) | <.0001 | 1.1 (0.9–1.3) | .26 |
| **Race/ethnicity** | | | | | | |
| White | 21,760 (75.6) | 3005 (53.8) | 1.0 (Reference) | | 1.0 (Reference) | |
| Black | 4890 (17.0) | 1897 (34.0) | 2.8 (2.6–3.0) | <.0001 | 1.9 (1.7–2.0) | <.0001 |
| Hispanic | 1073 (3.7) | 423 (7.6) | 2.9 (2.5–3.2) | <.0001 | 1.2 (1.0–1.4) | .01 |
| Other | 1049 (3.6) | 259 (4.6) | 1.7 (1.5–2.0) | <.0001 | 1.1 (0.9–1.3) | .30 |
| **Sex** | | | | | | |
| Female | 18,467 (64.2) | 3595 (64.4) | 0.9 (0.9–1.0) | .04 | 0.9 (0.8–1.0) | .004 |
| Male | 10,305 (35.8) | 1989 (35.6) | | | | |
| **Primary language** | | | | | | |
| English | 27,904 (97.0) | 5257 (94.1) | 0.5 (0.4–0.6) | <.0001 | | |
| Non-English | 868 (3.0) | 327 (5.9) | | | | |
| **Employment status[b]** | | | | | | |
| Employed | 10,823 (37.6) | 1705 (30.5) | 1.0 (Reference) | | 1.0 (Reference) | |
| Not Employed | 2234 (7.8) | 560 (10.0) | 1.6 (1.4–1.8) | <.0001 | 1.0 (0.9–1.1) | .98 |
| Student | 1011 (3.5) | 244 (4.4) | 1.5 (1.3–1.8) | <.0001 | 0.9 (0.7–1.1) | .25 |
| Retired | 6783 (23.5) | 519 (9.3) | 0.5 (0.4–0.5) | <.0001 | 0.8 (0.7–0.9) | .0005 |
| Disabled | 1232 (4.3) | 367 (1.3) | 1.9 (1.7–2.1) | <.0001 | 1.9 (1.7–2.3) | <.0001 |
| Child | 4214 (14.6) | 1530 (27.4) | 2.3 (2.1–2.5) | <.0001 | 1.1 (0.9–1.4) | .40 |
| Unknown | 2475 (8.6) | 659 (21.1) | 1.7 (1.5–1.9) | <.0001 | 1.4 (1.2–1.6) | <.0001 |
| **Zip code[c]** | | | | | | |
| Zone 1 | 2644 (9.2) | 267 (4.8) | 1.0 (Reference) | | 1.0 (Reference) | |
| Zone 2 | 7996 (27.8) | 1573 (28.2) | 1.9 (1.7–2.2) | <.0001 | 1.3 (1.1–1.5) | .001 |
| Zone 3 | 6497 (22.6) | 1384 (24.8) | 2.1 (1.8–2.4) | <.0001 | 1.4 (1.2–1.6) | <.0001 |
| Zone 4 | 11,635 (40.4) | 2360 (42.3) | 2.0 (1.8–2.3) | <.0001 | 1.3 (1.1–1.5) | .003 |

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|---|---|---|---|---|---|---|
| **Time of Appointment** | | | | | | |
| Morning (8:00 AM to 12:00 PM) | 13,855 (48.2) | 2878 (51.5) | 1.0 (Reference) | | | |
| Afternoon (12:00 PM to 5:00 PM) | 14,406 (50.1) | 2634 (47.2) | 0.9 (0.8–0.9) | <.0001 | | |
| Evening (5:00 PM to 7:00 PM) | 511 (1.8) | 72 (1.3) | 0.7 (0.5–0.9) | .002 | | |
| **Insurance coverage** | | | | | | |
| Private | 19,105 (66.4) | 2392 (42.9) | 1.0 (Reference) | | 1.0 (Reference) | |
| Medicare | 5215 (18.1) | 477 (8.5) | 0.7 (0.7–0.8) | <.0001 | 0.9 (0.8–1.0) | .06 |
| Medicaid | 2767 (9.6) | 1305 (22.2) | 3.8 (3.5–4.1) | <.0001 | 2.1 (1.9–2.3) | <.0001 |
| Self-pay | 1602 (5.6) | 1396 (25.0) | 7.0 (6.4–7.6) | <.0001 | 10.6 (9.5–11.7) | <.0001 |
| Other | 83 (0.3) | 14 (0.3) | 1.3 (0.8–2.4) | .30 | 1.1 (0.6–2.1) | .60 |
| **Scheduled provider** | | | | | | |
| Attending physician | 22,534 (78.3) | 4183 (74.9) | 1.0 (Reference) | | 1.0 (Reference) | |
| Resident physician | 1323 (4.6) | 534 (9.6) | 2.2 (2.0–2.4) | <.0001 | 1.5 (1.3–1.8) | <.0001 |
| Physician assistant | 3517 (12.2) | 579 (10.4) | 0.9 (0.8–1.0) | .01 | 1.1 (1.0–1.2) | .29 |
| Aesthetician | 1398 (4.9) | 288 (5.2) | 1.1 (1.0–1.3) | .12 | 8.1 (6.3–10.5) | <.0001 |
| **Patient status** | | | | | | |
| New | 6464 (22.5) | 1618 (29.0) | 1.3 (1.3–1.4) | <.0001 | | |
| Returning | 22,308 (77.5) | 3966 (71.0) | | | | |
| **Cosmetic visit** | | | | | | |
| Yes | 2639 (9.2) | 403 (7.2) | 0.8 (0.7–0.9) | <.0001 | 0.1 (0.1–0.2) | <.0001 |
| No | 26,133 (90.8) | 5181 (92.8) | | | | |
| **Procedural visit** | | | | | | |
| Yes | 316 (1.1) | 31 (0.6) | 0.5 (0.3–0.7) | .0003 | 0.3 (0.2–0.5) | <.0001 |
| No | 28,456 (98.9) | 5553 (99.4) | | | | |

Abbreviations: CI, confidence interval; OR, odds ratio.

[a]Criteria for variable inclusion was $P \leq .10$ and for variable exclusion was $P > .05$.

[b]Employment status was determined based on patient self-identification in electronic medical record.

[c]Zip codes served as a representation of distance traveled and were stratified into 4 concentric zones: zone 1 represented the region corresponding to the clinic's zip code; zone 2 represented regions with zip codes adjacent to zone 1; and the remaining zones were determined by regions with zip codes adjacent to the prior zone.

Table 2.

**Results from Telephone Survey of Patients with Missed Dermatology Appointments (N=300)**

| Reason for Missed Appointment[a] | No. of Respondents, n (%) |
|---|---|
| Forgot | 106 (35.3) |
| Not notified | 72 (24.0) |
| Work | 38 (12.7) |
| Transportation problems | 25 (8.3) |
| Condition improved/ resolved | 11 (3.7) |
| Cost | 11 (3.7) |
| Long wait time | 10 (3.4) |
| Weather | 8 (2.7) |
| Saw another provider (dermatologist) | 8 (2.7) |
| Saw another provider (nondermatologist) | 2 (0.7) |
| Other | 72 (24) |

[a]Respondents could provide more than 1 answer.

for the telephone survey, 12.3% had phone numbers on record that were either incorrect or no longer in service. As these patients' phone numbers were listed in the electronic medical record for contact purposes, they likely did not receive telephone calls reminding them about their appointments. Although it was not formally evaluated in this study, many respondents expressed that they had other preferred methods of receiving appointment reminders (eg, e-mail, text message) than those that are currently considered commonplace (ie, telephone calls, voicemails).

This study was limited in that the appointment data came from a single academic dermatology clinic. There also were limitations in the data set for subgroup analysis; for example, to appropriately assess socioeconomic barriers to attendance of dermatology appointments, it would be valuable to stratify income within established factors of socioeconomic barriers (eg, race, employment status) to avoid research bias. Although many variables assessed were statistically significant ($P<.05$), the odds ratios often were close to 1, suggesting that they may not be clinically or practically relevant.

By identifying factors associated with missed dermatology appointments, interventions can be instituted to target high-risk groups and alter patient reminder protocols. If possible, identifying patients' preferred contact methods (eg, telephone call, text message, etc) and verifying contact information may be cost-effective ways to reduce missed appointments in dermatology offices.

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