# The Effect of Care Coordination on Pediatric Dental Patient Attendance

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## ABSTRACT

**Purpose:** The objectives of this retrospective study were to determine if care coordination improved appointment-keeping behavior, and identify factors associated with patient attendance at an urban Medicaid dental clinic.

**Methods:** Children with sedation appointments received care coordination comprising telephone reminders, education regarding the appointment, and were mailed reminders or home visits if necessary. Collected chart audit data included age, behavior, appointment history and caries status. After several months, care coordination services were extended to routine, nonsedation appointments. Sedation and routine appointment controls were matched by appointment date and selected from the previous year. Attendance information was obtained from appointment and patient records.

**Results:** Sixty-one sedation appointments and 698 routine appointments were analyzed along with 61 and 931 control appointments, respectively. Sedation patients with care coordination had an attendance rate of 59% compared to 53% in the control group ($P>.05$). Routine patients with care coordination had an attendance rate of 70% compared to 62% in the control group ($P<.001$).) Data trends suggest that the children least likely to attend their appointments are those with: (1) high caries scores; (2) poor behavior; (3) long wait times between appointments; (4) multiple missed appointments; and (5) lack of a serviceable phone.

**Conclusions:** Care coordination can improve attendance at an urban Medicaid dental clinic, but improvements are modest. Prospective studies are needed to better delineate which interventions and which patient predictors result in the most improvement in attendance-keeping behavior. (J Dent Child 2007;74:124-9)


KEYWORDS: DENTAL APPOINTMENT ATTENDANCE, PATIENT MANAGEMENT

Nonattendance for pediatric dental appointments disrupts children's oral health and leads to ineffective use of resources. Private dental offices, dental schools, resident training programs, and community clinics all deal with the problems associated with missed pediatric dental appointments. Missed appointments affect the efficacy of treatment for the child, impact the continuity of care and the development of a doctor-patient relationship, decrease scheduling efficiency, and result in loss of income.[1]

Pediatric outpatient medical and dental safety net clinics typically treat low income populations. Many parents in this population have continual economic and personal disruptions in their lives, leading to nonattendance at medical and dental appointments for their children. Collected data show that Medicaid managed care patients have the highest no-show rates for scheduled appointments when compared to patients with fee-for-service insurance.[2,3] In general, patients exempt from charges for dental treatment and those receiving income support are more likely to fail appointments than fee-for-service patients .[4]

Multiple studies have attempted to assess predisposing factors for poor appointment compliance in the medical setting. Barriers that keep patients from attending scheduled pediatric appointments include:

1. lack of education regarding the appointment's purpose;
2. forgetting the appointment was scheduled;
3. waiting times at the office;
4. unreliable transportation;
5. inability of the parent to take time off from work; and
6. concern regarding the child missing school.[5-7]

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Interventions to reduce nonattendance in pediatric medical clinics have included:

1. mailed reminders;
2. parking passes to reduce time and effort needed to attend an appointment;
3. incentive programs;
4. threat of being placed at the bottom of a wait list in case of nonattendance;
5. computerized appointment confirmation or tracking systems, and identification of patients in need of family centered care coordination.[1,8,9-15]

Telephone reminders have been shown in several studies to augment total clinic attendance by 10% to 19%.[16-18] In a study of automated appointment confirmation, the no-show rate for dental appointments was reduced from 23% to 19%.[14] Personal confirmation phone calls implemented at a children's hospital dental clinic resulted in a 12% no-show rate compared to 38% among those who did not receive a phone call reminder. No significant difference was found between placement of the confirmation phone call 24 hours or 48 hours prior to the dental appointment.[19]

Although it is apparent that telephone reminders improve appointment keeping behavior, it is unclear whether a personal phone call is superior to an automated call.

Family centered care coordination involves the services of one or more care coordinators hired to help families' access medical/dental services. Services provided by a care coordinator can include appointment reminders, home visits, arrangement of transportation and babysitting for scheduled appointments, and referral as needed to other medical/social/educational services.

Compared to medicine, limited information exists on the use of care coordination in dentistry to facilitate appointment attendance and no studies could be located in the dental literature examining the effect of care coordination on appointment attendance. It is unclear whether adding home visits and appointment education to appointment confirmation phone calls results in any further reduction in broken appointments.

Like many community pediatric dental clinics, the University of Connecticut/Burgdorf Dental Clinic in Hartford, Conn has a high no-show rate. At a particular premium are appointment slots for the treatment of young, apprehensive, or uncooperative children requiring the use of nitrous oxide or oral conscious sedation. Effective treatment of this group of patients is compounded by other factors, including:

1. low socioeconomic status;
2. long time periods between appointments; and
3. parents' failing to ensure the child has nothing by mouth (N.P.O)after midnight when sedation appointments are planned.

Care coordination was instituted to improve parental education regarding dental treatment, and attendance at scheduled appointments. The objectives of this retrospective study were to determine if care coordination interventions improved appointment-keeping behavior, and reduced the no-show rate for sedation and routine appointments at an urban Medicaid dental clinic. Patient predictors of successful intervention with care coordination were also assessed.

## METHODS

Children scheduled for dental care with nitrous or oral sedation between May 2003 and May 2004 received care coordination. Interventions for sedation appointments by the care coordinator included telephone reminders 1 week and 1 day prior to the appointment date and education regarding the sedation appointment.

If the care coordinator needed to leave a message on an answering machine, multiple follow-up phone calls were made to contact the parent. If the telephone was out of service, a home visit was conducted. An appointment reminder, sedation guidelines, and the care coordinator's contact information were left if the patient's family was not home. If a home visit was not possible, a letter was mailed to the parent/guardian with information on planned dental treatment and sedation guidelines. If a patient failed to attend the appointment, a follow-up phone call was made to try and ascertain the reason for the missed appointment, solve any outstanding issues, and encourage rescheduling.

Controls matched by appointment date were selected from the previous year prior to the implementation of care coordination services. Dental charts of the study and control groups were audited. Data collected for each sedation appointment included: (1) age at appointment; (2) behavior at last exam; (3) number of missed appointments; (4) age of the patient; (5) number of months from last attended visit; and (6) number of decayed teeth at previous exam. For the care coordination patients, information was also recorded regarding the number of intervention phone calls, mailings, home visits, and whether the telephone was out of service.

In March 2004, care coordination services were extended to routine, nonsedation appointments for 2 days each week. Utilizing records of the care coordinator, attendance information was collected from these patients for the period March 2004 to May 2004. Care coordination for these routine appointments consisted of telephone reminders at least one day prior to the appointment. If no contact could be made, a letter was sent to remind the patient of the appointment if there was adequate time for the letter to be received. Data collected for study appointments included: (1) appointment type (restorative or preventive); (2) number of phone calls and mailings; (3) appointment outcome; and (4) whether the telephone was out of service. Appointment outcome for the control appointments were obtained from attendance records for the same days during the same three month time period the previous year. For both control groups, an automated telephone reminder system was in place. The automated telephone reminder system was not in place when the care coordinator was working.

Differences in appointment outcome were analyzed by chi-square test. The study was reviewed by the Institutional Review Board of the School of Dental Medicine, Univer-

sity of Connecticut, Farmington, Conn, and was deemed exempt due to the use of deidentified patient data.

## RESULTS

This care coordination project was implemented in an urban dental clinic serving a predominantly African American and Hispanic population with Medicaid insurance. During the study period, there were 63 sedation appointments. Data was discarded for 2 appointments due to incomplete records. In total, 61 sedation care coordination appointments and 61 sedation control appointments were analyzed. The average age for both groups was 5 years.

A total of 789 care coordination appointments for routine dental care occurred during the study period. Data was discarded for 91 appointments due to incomplete records, leaving 698 for analysis. The routine appointment control group included 931 appointments. The largest percentage of interventions for both sedation and routine appointment groups was phone calls (Figures 1 and 2).

Overall, care coordination for sedation patients increased attendance from 53% in the control group to 59% in the care coordination group. These results, however, were not statistically significant (Table 1). When examining the effect of different variables on patient attendance, cancelled appointments (N=19) were excluded because the cause and time of the cancellations were not recorded and could have been due to patient or provider factors. Of the variables analyzed, only a previous history of no-show appointments showed a significant association with appointment attendance ($P<.05$). Patients with lower caries status (dmft) or better behavior (Frankl behavior rating=3-4) recorded at the recall visit prior to the sedation appointment showed a tendency toward better attendance. Among sedation patients with care coordination, attendance was 70% if their phone was in service compared to 50% if it was not (Table 2).

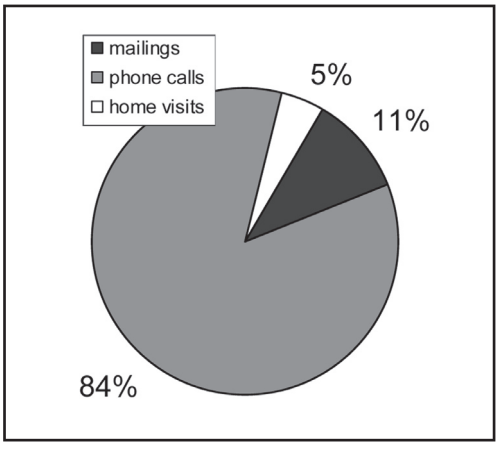


*Figure 1. Care Coordination Interventions for Sedation Appointments*

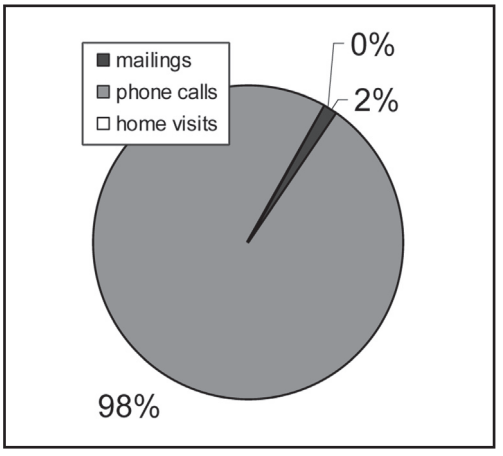


*Figure 2. C are Coordination Interventions for Routine Appointments*

Care coordination for routine patients increased attendance from 62% in the control group to 70% in the care coordination group *(P*<.001; Table 3). Of the routine care coordination patients, 18% had a telephone that was out of service. An out-of-service phone was significantly associated with a decreased likelihood of attendance ($P<.001$). The type of visit had no significant effect on patient attendance (Table 4). Patients who had 2 or more scheduled appointments during the study period were more likely to attend and less likely to not show for appointments (Table 5).

To assess if a care coordinator is cost effective in an urban Medicaid dental clinic setting, care coordination services were extrapolated to include all visits for 1 year. This amounted to 566 additional visits per calendar year. Estimating $75 Medicaid fees billed per visit on average, revenue would be expected to increase by $42,450.

## DISCUSSION

As with any retrospective study, certain limitations must be acknowledged. Although care coordination protocols were in place, it cannot be expected that activities were recorded with the rigor expected of a prospective research study. This limits the amount of detail that can be derived from the results. In addition, the control groups comprised existing groups of patients that received care in a different time period and for which limited information was available compared to the study groups. These limitations do have their benefits, as these results are those that can be expected from programs implemented in real life conditions.

The patient population studied appears similar to other clinics providing dental care to Medicaid clients. Other studies report a broken appointment rate of 20% to 38% for dental appointments in Medicaid clinics.[3,14,19] These results are comparable to the 24% to 30% broken appointment rate found in the control groups of the present study. Such a high broken appointment rate suggests that significant room for improvement exists, yet the interventions in the present study only reaped marginal benefits.

In the present study, attendance for routine appointments improved by a significant 8 percentage points ($P<.001$), while that for sedation appointments improved

**Table 1. Effect of Care Coordination on Sedation Appointment Attendance**

| | | Appointments (N) | Attendance (%) | No show (%) | Cancelled (%) |
|---|---|---|---|---|---|
| Movement disorder | Yes | 61 | 59 | 28 | 13 |
| | No | 61 | 53 | 30 | 18 |

**Table 2: Appointment attendance by selected variables for sedation patients with and without care coordination (excluding cancelled appointments)**

| | | Attended (%) | | |
|---|---|---|---|---|
| | | Care Coordinator | No care coordinator | All sedation patients |
| Caries status | dmft 1-8 | 72 | 70 | 70 |
| | dmft 9-18 | 57 | 56 | 56 |
| No-show history* | 0 failed appointments | 94 | 100 | 96 |
| | 1 failed appointment | 69 | 71 | 70 |
| | 2 failed appointments | 50 | 33 | 42 |
| | 3+ failed appointments | 44 | 44 | 44 |
| Frankl behavior rating | 1 or 2 | 62 | 43 | 55 |
| | 3 or 4 | 70 | 67 | 69 |
| Time between appointments | 0-1.9 mos. | 90 | 55 | 71 |
| | 2.0-3.9mos | 61 | 71 | 67 |
| | 4+ mos | 64 | 50 | 61 |
| Phone-in service | Yes | 70 | — | — |
| | No | 50 | — | — |

** Significant difference in attendance (P<.05)*

**Table 3. Effect of Care Coordination on Routine Appointment Attendance ***

| | | Appointments (N) | Attended (%) | No show (%) | Cancelled (%) |
|---|---|---|---|---|---|
| Care Coordination | Yes | 698 | 70 | 16 | 14 |
| | No | 931 | 62 | 24 | 15 |

** Significant difference in appointment outcome (P<.001)*

by a nonsignificant 6 percentage points. The lack of significant difference in the sedation group could have been due to the small sample size. The modest improvement in attendance compliance is slightly lower than other studies that documented an increase in clinic attendance by 10% to 19% with telephone or mailed reminders alone.[24-26] Possible explanations for the modest improvement in appointment compliance in the present study include the potential for a refractory group of parents/patients. Lack of education, parental/patient age, and poverty have been previously linked to poor ability to improve appointment compliance in a medical clinic setting.[15] In the present study, although multiple factors were examined to try and determine clients who would be most successfully helped by care coordination, no distinct factors appeared. Trends suggest, however, that children with high caries rates, poor behavior, long waiting times between appointments, multiple missed appointments, and a lack of phone service are the least likely to attend their appointments.

Although improvements in attendance in the present study were modest, it must be remembered that the control groups had automated phone calls so the changes reflect the increased improvement seen when personal calls are substituted for automated calls. If care coordination was expanded across the whole clinic operation, this increased productivity could easily pay for at least a half-time care coordinator—which would be sufficient to carry out most of the duties described in the present study.

The authors know that indigent populations deal with multiple economic and personal disruptions in their lives on a daily basis that can compromise their ability to obtain necessary dental treatment for their children. The modest improvements in attendance and reduction in broken appointments seen in this study could be due to a generalized care coordination strategy applied broadly across the patient populations. More rigorous interventions focused on a more limited number of patients may produce better results. Further research is needed in the form of prospective controlled studies to delineate which interventions and which patient predictors result in the most improvement in attendance-keeping behavior.

**Table 4. Appointment Attendance by Selected Variables for Routine Patients With Care Coordination**

| | Appointments (N) | Attended (%) | No show (%) |
|---|---|---|---|
| **Preventive visit** | 263 | 80 | 21 |
| **Restorative / other visit** | 336 | 83 | 17 |
| **Phone out of service*** | 110 | 66 | 35 |
| **Phone-in service** | 489 | 85 | 15 |

** Significant difference in appointment outcome based on phone status (P<.001)*

**Table 5. Appointment Attendance for Routine Patients Who Had Multiple Appointments With Care Coordination**

| | Appointments (N) | Attended (%) | No show (%) | Cancelled (%) |
|---|---|---|---|---|
| **First appointment** | 103 | 66 | 7 | 27 |
| **Second appointment** | 103 | 72 | 17 | 12 |
| **Third appointment** | 29 | 76 | 14 | 10 |

## CONCLUSIONS

Based on this study's results, the following conclusions can be made:

1. Care coordination modestly improved attendance and reduced broken appointments for patients with routine appointments at an urban Medicaid dental clinic.
2. Patients with a history of broken sedation appointments were significantly less likely to attend their next sedation appointment
3. Patients with an out-of-service phone were highly likely not to attend an appointment whether or not care coordination was provided.

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