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# Analysis of Inpatient and Outpatient Visits in the Veterans Administration Dental Service

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THE VETERANS ADMINISTRATION DENTAL SERVICE is an extensive public program that includes service, education, training, and research (1). The program is administered by the Department of Medicine and Surgery, which operates the largest hospital program in the world—169 hospitals, more than 200 outpatient clinics, and 82 nursing homes.

In 1975 more than 720,000 veterans received dental examinations, with or without subsequent treatment by the VA Dental Service. Although the primary concern is dental care for inpatients, outpatient dental care represents approximately one-fifth of all dental patient visits. Dental visits totaled 1,277,000 for inpatients and 345,000 for outpatients in 1975. In that year, the VA employed 777 staff dentists, 305 residents, 907 dental assistants, 99 hygienists, 463 laboratory technicians, and 235 clerical staff (2).

In this paper, we examine VA inpatient and outpatient dental visits with respect to patients' ages, types of visits, and disposition of visits. We compare these visits in terms of the distribution of treatment time by service categories and types of service providers.

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*Computing assistance for this study was provided by the Health Sciences Computing Facility, UCLA, sponsored by the National Institutes of Health Special Research Resources grant No. RR-3. This study was supported by contract No. ALS34-75-125 from the National Academy of Sciences. This paper is adapted from one presented at the 105th annual meeting of the American Public Health Association, October 30–November 3, 1977, in Washington, D.C. Tearsheet requests to Dr. Marcus.*

## Methods

A stratified probability sample of 11 VA facilities in 7 States was selected for participation in this study according to the following criteria: size (number of hospital beds), hospital turnover rates (determined by dividing 30 by the average length of stay), and the amount of money allocated for research. Of the facilities selected, 9 hospitals and 2 outpatient clinics, the largest has a multispecialty program that includes residency training and care delivery; it has 16 operatories and a total staff of 35. The smallest facility has three operatories and a staff of only two general dentists.

The method of collecting visit data was similar to that employed in previous studies (3,4); patient and care characteristics were recorded by the staff at each facility. The basic data collection instrument was an encounter-like form (available on request), the Dental Patient Contact Record (DPCR), containing two major sections. The first section, usually filled out by the receptionist, included patient visit data in terms of age, patient eligibility, location of visit, and type of visit. The second section, concerning treatment provided, included tasks performed, units and surfaces (if appropriate), materials used, personnel who performed the tasks, and time spent for treatment. This information was recorded by the providers at the time of treatment. Digital clocks were used to aid in recording time data.

At each participating site, DPCRs were filled out for each patient visit, whether scheduled, walk-in, or missed appointment. The study, conducted during 20 working days in 1975, resulted in the collection of data for a total of 11,541 patient visits—8,869 for inpatients and 2,673 for outpatients. The data from all sites were combined for this presentation.

## Findings

The findings of this study are presented in three sec-

tions: a comparison of inpatient and outpatient visits by patient and visit characteristics, a comparison of the treatment and chair time per visit for inpatients and outpatients, and the distribution of treatment time by category of service and by personnel involvement.

The following distribution of visits by age groups show a highly significant difference ( $P < 0.01$ ) between inpatient and outpatient visits.

Age groups (years)	Inpatients		Outpatients	
	Number	Percent	Number	Percent
Under 25 .....	374	4.2	791	29.6
25-44 .....	2,277	25.7	776	29.0
45-64 .....	4,798	54.1	891	33.3
65 and older .....	1,420	16.0	215	8.1
Total .....	8,869	100.0	2,673	100.0

$\chi^2 = 1,591.0$

Only 4.2 percent of the inpatients were under 25 years old, whereas 29.6 percent of the outpatients were in this age group. At the other end of the age spectrum, 16 percent of the inpatients were 65 or older, in contrast to only 8.1 percent of their outpatient counterparts. Inpatients aged 45-64 had the greatest number of visits, but the outpatient visits were more equally distributed among all age groups under 65.

The following table shows inpatient and outpatient visits by three types of visits. The first type of visit concerns patients who were receiving care for non-urgent conditions. The second concerns patients with urgent conditions needing immediate attention. The third concerns patients who did not come, canceled their appointments, or whose appointments were canceled by the VA staff. By types of visits, outpatients were significantly different ( $P < 0.01$ ) from the inpatients. Although both groups had a relatively high rate of missed

appointments, the outpatients had a higher rate for urgent visits.

Type of visit	Inpatients		Outpatients	
	Number	Percent	Number	Percent
Nonurgent .....	6,895	77.7	1,924	72.0
Urgent .....	419	4.7	195	7.3
Missed .....	1,555	17.5	554	20.7
Total .....	8,869	99.9	2,673	100.0

$\chi^2 = 45.8$

At the conclusion of a patient visit one of the following five dispositions is made: (a) the patient is given an appointment for another visit (return), (b) no further arrangement is made for the patient to return although treatment is not completed (no followup planned), (c) the patient is referred to another VA facility or to a private practitioner, (d) treatment completed, or (e) the providers have not determined whether further treatment will be given (still pending). The still pending disposition is related to the VA's requirement for medical authorization for the provision of dental treatment.

The difference between inpatient visits and outpatient visits with respect to disposition was highly significant ( $P < 0.01$ ), as the following data show.

Disposition	Inpatients		Outpatients	
	Number	Percent	Number	Percent
Return .....	5,242	59.1	2,115	79.1
No followup .....	1,293	14.6	256	9.6
Referral .....	38	0.4	164	6.1
Treatment completed ..	428	4.8	109	4.1
Still pending .....	1,868	21.1	29	1.1
Total .....	8,869	100.0	2,673	100.0

$\chi^2 = 1,051.0$

Table 1. Mean task time and chair time in minutes per patient visit, by selected characteristics

Characteristics	Inpatients				Outpatients			
	Task time		Chair time		Task time		Chair time	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<b>Age group (years):</b>								
Under 25	25.4	21.3	37.1	41.2	35.4	24.9	44.7	31.1
25-44	27.0	23.6	37.6	40.7	36.4	26.1	47.0	48.1
45-64	25.3	24.9	35.7	42.5	35.1	25.3	47.0	40.9
65 and older	20.6	19.1	28.8	30.8	30.5	23.9	36.5	25.6
<b>Type of visit:</b>								
Nonurgent	25.2	24.0	34.9	39.0	36.4	25.8	46.9	41.1
Urgent	21.7	17.5	40.0	58.8	24.2	17.0	33.2	23.5
<b>Disposition:</b>								
Return	32.2	28.1	43.3	44.9	38.5	26.4	49.9	43.0
No followup	16.4	15.9	27.1	41.7	23.1	16.6	29.8	22.1
Referral	21.8	19.1	31.3	28.3	23.4	12.0	30.0	16.2
Treatment completed	22.1	18.4	27.8	23.5	29.4	25.0	35.7	27.4
Still pending	16.1	10.0	24.7	27.2	24.0	20.3	34.6	28.6

The most substantive difference was between the still pending and return dispositions. Inpatients had 21.1 percent still pending dispositions, while outpatients had only 1.1 percent. This differential of approximately 20 percent also occurred between inpatients and outpatients with respect to the return category. Another difference was in the proportion of referrals—only 0.4 percent of the inpatients were referred elsewhere, as opposed to 6.1 percent of the outpatients.

Task time and chair time per visit are shown in table 1 for age groups, types of visit, and disposition. Task

time is the time the patient is being treated; it does not include waiting time. Chair time is the time when the patient is in the dental operatory and can include waiting time. Generally, the outpatient visits were longer than the inpatient visits, with approximately a 10-minute differential between chair time and task time. The oldest age group for both inpatient and outpatient visits had about 5 minutes less task time per visit than the other age groups. Although outpatients received more than 10 minutes of task time per visit for nonurgent visits, little difference was noted between outpatients and inpatients for urgent visits. The greatest

Table 2. Percentage distribution of task time by category of service, types of providers, and age groups of patients

Service and provider	Under 25 years		25-44 years		45-64 years		65 and older	
	Inpatient	Outpatient	Inpatient	Outpatient	Inpatient	Outpatient	Inpatient	Outpatient
<b>Service</b>								
Diagnostic	34.6	28.8	31.4	24.9	33.4	23.9	38.9	21.7
Preventive	15.7	11.1	15.7	10.8	9.9	9.5	6.9	11.1
General	4.8	4.9	3.5	4.4	2.6	3.2	1.8	2.3
Operative	19.0	20.6	14.6	18.1	7.7	12.8	4.4	5.7
Crown and bridge	5.1	13.7	5.2	14.6	4.0	13.7	1.9	4.1
Prosthetics	1.5	2.1	7.9	10.0	22.0	21.1	30.1	41.3
Surgery	6.3	6.5	7.2	4.6	7.2	4.8	6.1	4.3
Endodontics	2.8	5.0	3.3	5.3	1.7	2.6	1.3	2.1
Periodontics	2.0	1.4	4.6	3.3	4.6	3.8	1.5	2.5
Record progress notes	8.2	3.5	6.6	3.9	7.0	4.5	7.2	5.0
<b>Provider</b>								
Dentist	37.9	44.4	31.9	48.7	34.7	49.8	36.3	51.0
Specialist	11.1	7.4	14.1	8.6	19.5	17.5	21.2	9.4
Assistant	17.2	16.2	15.0	11.4	14.3	11.6	15.7	11.9
Hygienist	13.7	8.3	13.8	5.5	7.6	5.1	4.3	4.4
Trainee	20.1	23.7	25.2	25.8	23.9	14.9	22.5	23.3

differences in task times occurred in the disposition category; the longest visits were for the return disposition, and the no followup and still pending visits were considerably shorter.

Tables 2-4 present a different perspective on the task-time data. These tables show the percentages of task time by service activity (category of service) and by types of service providers. The personnel component shows who provided direct patient care; delegated time (performed by nondentist providers) as opposed to nondelegated time and the time spent by trainees are presented. The proportion of time by category of service provides a perspective on the kind of care given by the VA during inpatient and outpatient visits. The task "record progress notes" is included under category of service because it is an important single activity.

The distribution of time by age groups of patients is shown in table 2. Generally, a higher proportion of time was spent on diagnostic services and the recording of progress notes for inpatient visits than for outpatient visits; these activities for all age groups accounted for about 40 percent of the time spent during inpatient visits and less than 30 percent for outpatient visits. Regardless of age, the categories of crown and bridge, removable prosthetics, and endodontic services accounted for a larger proportion of time for outpatient visits than for inpatient visits. Except for the age group 65 and over, general dentists tended to spend more time with outpatients than with inpatients. On the other hand, specialists tended to spend more time with inpatients. Dental assistants and hygienists also spent more time with inpatients than with outpatients. The dental resident trainees spent more time with inpatients aged 45-64 than outpatients of this age group; however, for the remaining age groups they spent similar amounts of time with inpatients and outpatients.

Certain trends were noted for the service and personnel categories with respect to age groups. As expected, the proportion of time spent in removable prosthetics increased dramatically for both inpatients and outpatients in the 65 and older age group. Crown and bridge time was fairly constant for the first three age groups but fell off markedly for the oldest age group. The proportion of time spent in surgery, diagnostic services, and recording progress notes did not change dramatically from one age group to another. The patients' ages were not related to the types of providers to the same extent that they were to the service categories. However, the typical role of the hygienist led to more time being spent with younger patients (table 2). Specialists' time tended to increase with older patients, while trainees' time showed no consistent pattern.

A comparison of urgent visits with nonurgent visits disclosed marked differences in their distribution. Table 3 presents the percentage of time distribution for urgent and nonurgent visits. The nonurgent inpatient visits required greater proportions of time for diagnostic and removable prosthetic services, surgery, and recording of progress notes than the nonurgent outpatient visits. The proportion of time for operative and crown and bridge services was considerably higher for the outpatient nonurgent visits. The urgent visits, however, had similar distributions for both groups, with high concentrations of time in diagnostic and surgical services.

With respect to personnel task time for urgent and nonurgent visits, general dentists spent the most time with nonurgent outpatient visits and the least time with urgent inpatient visits. Specialists and trainees were most involved with urgent inpatient visits. Hygienists spent no substantive amount of time with urgent visits for either group.

The dispositions of visits by types of providers and task time are shown in table 4. Patients with return or treatment completed dispositions, were considered to have received routine dental care. Patients with referral or no followup dispositions were dropped from the system. The still pending disposition represents a state of limbo between being accepted for treatment or dropped from the system.

The task time for patients who received routine care (return and treatment completed) was slightly more than 25 percent of the time they received for diagnostic

Table 3. Percentage distribution of task time by category of service, types of providers, and types of visits

Service and provider	Nonurgent visits		Urgent visits	
	Inpatient	Outpatient	Inpatient	Outpatient
<i>Service</i>				
Diagnostic .....	32.7	24.0	49.4	50.4
Preventive .....	11.9	10.9	1.0	3.7
General .....	2.7	3.9	4.5	5.3
Operative .....	9.7	16.8	8.0	6.3
Crown and bridge ...	4.1	14.1	4.1	9.0
Prosthetics .....	18.9	14.2	9.9	6.7
Surgery .....	6.8	4.9	11.2	9.5
Endodontics .....	2.1	4.0	3.4	5.5
Periodontics .....	4.2	3.1	2.6	0.7
Record progress notes.	7.1	4.1	5.9	3.0
<i>Provider</i>				
Dentist .....	34.9	48.8	23.9	38.2
Specialist .....	17.7	11.4	21.0	14.5
Assistant .....	14.5	12.1	19.1	22.7
Hygienist .....	9.6	6.4	0.0	0.8
Trainee .....	23.4	21.2	35.5	23.7

services and recording of progress notes. The major difference between inpatient and outpatient visits is in the distribution of services. Inpatient visits received relatively small proportions of crown and bridge time and large proportions of time for removable prosthetics and surgery. Outpatient visits received considerably high proportions of crown and bridge time and less prosthetic and surgery time. This distribution reflects differences in patients' needs, primarily because of age differences in both groups.

More than 50 percent of the task time for patients dropped from the system was spent in diagnostic services and the recording of progress notes. Unlike the routine patient visits, the referral and no followup visits tended to have similar service distributions for inpatients and outpatients. Patients with a disposition of still pending also had similar service distributions, except for surgery and endodontics (table 4).

The general dentists' task time was high for routine visits of both groups of patients, as well as for patients who were dropped from the system; their task time decreased for patients with a still pending disposition. The specialists' task time was fairly constant for all inpatient dispositions; however, their time with outpatients was low for patients who were dropped from the system and relatively high for patients with still pending dispositions. The dental assistants spent most of their time with patients who had a still pending disposition and the least time with routine visits for both groups of patients. The assistants and hygienists showed similar time patterns, but the trainees had rela-

tively little involvement with no followup outpatients or still pending inpatients.

### Discussion

The comparisons between inpatient and outpatient visits obtained from a probability sample of VA dental clinics are unique because they link characteristics of patients and visits with use of service and time spent by various providers. The ages of patients served by a dental care system are particularly important because dental diseases are generally irreversible, chronic, and progressive. Therefore, a system that treats older patients has different requirements from one that treats younger ones. In this study, the comparison of visits by age showed significance differences. The outpatients were younger, largely because of the great number of Vietnam-era veterans eligible for treatment of dental needs that were not attended to when they were in service.

These younger patients will continue to have access to the VA for several more years. The VA can treat them in its facilities or it can finance their care in the private sector through the VA Fee Program. A younger outpatient population requires a different mix of services than an older population, unless changes are made in the delivery of care. If substantial numbers of younger patients are treated as outpatients in VA facilities, the time devoted to removable prosthetics and surgery will be shifted to operative and crown and bridge services. As a result, more provider time will be required.

Table 4. Percentage distribution of task time by category of service, types of providers, and dispositions of patients

Service and provider	Return and completed		Referral and no followup		Still pending	
	Inpatient	Outpatient	Inpatient	Outpatient	Inpatient	Outpatient
<b>Service</b>						
Diagnostic .....	21.0	21.7	48.3	52.7	84.6	74.8
Preventive .....	12.2	10.0	14.2	14.5	4.9	4.4
General .....	3.5	4.3	2.2	1.5	0.1	2.6
Operative .....	11.7	17.1	8.1	9.4	0.4	0.0
Crown and bridge .....	5.2	15.1	1.3	4.3	0.2	0.0
Prosthetics .....	22.7	14.1	12.7	11.5	0.3	2.6
Surgery .....	9.0	5.8	3.1	1.0	0.1	3.3
Endodontics .....	2.6	4.4	1.7	0.8	0.1	9.3
Periodontics .....	5.2	3.2	1.9	0.6	0.1	0.0
Record progress notes .....	6.8	4.1	6.6	3.7	8.3	2.8
<b>Provider</b>						
Dentist .....	35.9	48.3	33.5	50.8	27.9	10.1
Specialist .....	18.7	12.3	15.8	6.7	16.0	24.0
Assistant .....	8.3	11.1	21.4	25.0	38.1	32.8
Hygienist .....	10.0	5.9	8.4	8.0	5.5	5.4
Trainee .....	27.2	22.4	22.9	9.5	12.5	27.7

The VA Dental Service can respond to outpatient care by (a) better use of facilities and staff, (b) deemphasizing diagnostic services for inpatients, or (c) referring patients to the private sector. Each of these three strategies has advantages and problems. The increased use of personnel, particularly in terms of the expanded-function dental auxiliaries, would require the VA to resist pressures from dental groups opposed to increased delegation of tasks to auxiliaries. However, effective use of auxiliaries would reduce costs and increase the capacity of the system to treat inpatients and outpatients.

The second strategy would require a change in the dental service's approach to inpatient care. VA policy requires that 75 percent of the inpatients receive an oral examination as part of their physical examination. This policy has resulted in the devotion of a large proportion of inpatient treatment time to diagnostic services and a relatively small portion of time to actual treatment. As the length of hospital stays decrease, it will be increasingly difficult for the dental service to treat inpatients unless they are followed on an outpatient basis. A possible alternative approach would be triage examinations performed by hygienists at locations that are convenient for the patients. These examinations would include screening for oral lesions, and the results of such screening would indicate priority for treatment. Implementation of this approach would reduce the high number of missed appointments and the still pending dispositions among inpatients.

The third possible strategy—referring all outpatients to private care—would, of course, decrease the funds available for VA dental facilities. At present, almost half of the VA's dental budget is spent for dental care for eligible veterans in private dental offices.

The greater the number of patients with appointments who are seen as scheduled, the easier it is to plan and control practice resources. Urgent visits or broken and canceled appointments tend to disrupt the flow of patients through the system. In this study, the examination of the interaction of inpatients and outpatients with the VA Dental Service in terms of non-urgent (routine), urgent, and missed visits disclosed that outpatients have higher rates for urgent visits and that inpatients and outpatients have equally high rates for missed appointments.

The surprisingly high rate (17.5 percent) of missed appointments by inpatients resulted from a lack of communication between the hospital and dental service staffs. One reason was the competition among the various services of the hospital for patients' time. It is not uncommon for patients to miss dental appointments because they are being seen elsewhere. It seems that

more effective control of patient scheduling would alleviate this problem. Also, patients often miss their appointments because the dental service is not informed when they are discharged from the hospital. On the other hand, missed appointments by outpatients is a problem common to many public and private dental care programs. To reduce the missed appointment rate for outpatients probably will require selection of patients and notification of pending appointments.

The outcome of the visit or disposition is an important indicator of the patient's and the provider's intention to continue the care. Although few of the visits in this study had dispositions of treatment completed, the major difference between outpatient and inpatient visits was in the still pending category. The interface between medical and dental programs in the VA contributed to the high proportion of inpatient visits terminating with an undecided disposition. One-fifth of all the inpatient visits examined in this study ended without a decision on future treatment for the patients. This disposition rarely occurred for outpatient visits.

The disposition of no followup planned also represented a substantial percentage of inpatient visits (14.6 percent). As a result, approximately two-thirds of the inpatient visits had dispositions that represented continuity of care. The rest of the inpatient visits represented either no continuity or no decision. In contrast, the outpatient visits reflected a continuity of 80 percent; the remaining 20 percent were in the no followup or referral categories. The lack of decision making and continuity, as evidenced by the disposition rates in this study, requires some administrative changes within the VA Dental Service and between the dental and medical services.

## References

1. Veterans Administration Advisory Council on Dentistry: Helping to meet the dental health care needs of the nation: the potential role of the dental service of the VA health care system. *J Am Dent Assoc* 86: 615-625, March 1973.
2. National Academy of Sciences-National Research Council: Study of health care for American veterans. A report submitted to the Committee on Veterans' Affairs, United States Senate. U.S. Government Printing Office, Washington, D.C., June 7, 1977, p. 90.
3. Marcus, M., Bleich, D., and Van Baelen, A.: A method for examining personnel in dental care delivery: application in 14 practices. *Public Health Rep* 91: 373-377, July-August 1976.
4. Marcus, M.: Task analysis in dentistry: computer applications. Final report, Public Health Service, Health Resources Administration grant No. 1R27MB0018-10S1. University of California at Los Angeles School of Dentistry, September 1975.