

After-Hours Calls: A Five-Year Longitudinal Study in a Family Practice Group

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The provision of health care outside of regular hours is one of the major challenges in any primary care practice and an important focus of residency teaching in family medicine. In this study were studied the volume and pattern of after-hours calls in a residency based group family practice at the end of the first and fifth year of the practice's existence.

During the five-year study interval, the number of registered patients in the practice tripled, whereas the number of scheduled patient visits doubled. After-hours phone calls increased 40 percent, visits 70 percent, and hospitalizations 50 percent. The distribution of calls during the week remained stable over the five-year period, and the problems prompting the calls changed little except for an increase in traumatic injuries and obstetrics, paralleling changes in the services offered by the practice.

After-hours utilization decreased as a function of practice volume, suggesting that practice maturation decreases unscheduled demand for medical care. The burden of after-hours calls increased, however, because of the absolute growth in practice size. Residents handled the vast majority of the calls without consultation in both time periods. The rates and patterns of after-hours utilization are strikingly similar to those reported in other studies.

Illness can occur at any time. Adequate medical care requires that patients have access to physicians or their surrogates 24 hours a day. In most settings this access is accomplished through the telephone.¹ An on-call arrangement is the traditional solution to patient care demands outside scheduled hours and provides a means by which

the patient may interact with a health care provider at all times of day or night.

The provision of after-hours service presents some significant organizational problems for the ambulatory health care setting. The frequency with which and times at which after-hours calls occur are often unknown,² and the pattern may seem unpredictable. The severity of the presenting problems is variable, yet the responding clinician usually must deal with the limited information transmitted over the telephone, frequently by someone other than the patient. Demands occur when the

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health care organization has the least capacity to respond; the clinician may not be emotionally or physically ready to deal with the problem or may face multiple, simultaneous demands for care.

The quality and pattern of the demands made upon the on-call system can be analyzed using epidemiological tools. The rate of after-hours calls can be expressed as a proportion of some measure of the total practice volume or workload. In a structured ambulatory population practice, the population "at-risk" for requiring after-hours services represents all registered patients. Practice workload, however, is best measured by the actual volume of patients cared for per unit of time, since in all practices there is a substantial fraction of the patients who rarely interact with the health care system. Two major hypotheses which prompted this study were that practice growth and maturation are reflected in changing patterns of after-hours care, and after-hours calls expressed as a proportion of the total practice workload tend to remain constant both within and across practices.

Methods

This study investigates the patterns of after-hours calls during equivalent periods at the end of the first and fifth years of operation of a group family practice established as part of a residency training program in family medicine. For the purposes of this study after-hours calls were defined as the period from 5:00 PM to 8:00 AM on weekdays and from 8:00 AM to 8:00 AM on weekends and holidays when the clinic is closed.

The Family Medical Center (FMC) at the University of Washington School of Medicine opened its doors in July 1972. From the inception of the practice to the present, after-hours calls have been managed by the residents with faculty consultation. The data for this study were collected during the months of July and August of 1973 and 1978. All after-hours calls to the FMC are referred by the answering service to the resident on call, who promptly contacts the caller. This physician obtains the pertinent clinical information and then either deals with the problem over the telephone or sees the patient. During the 1973 data collection period, after-hours duty was rotated among the six second-year and six third-year residents in the program. Second-year residents were expected to consult with faculty after every call. During 1978,

calls were either managed by a first-year resident who was supervised by a senior resident or by a third-year resident working alone. Faculty consultation was left to the resident's discretion. Faculty involvement was mandatory for all hospital admissions.

All after-hours contacts were recorded by the resident during the months of July and August in 1973 and 1978. A standard encounter form was developed that recorded the essential parts of the encounter. The form was pretested, and the residents were trained in its use. During both collection periods, every encounter form was checked by one of the investigators on the first scheduled clinic day following the duty periods.

Results

Changes in Practice Utilization

The practice grew steadily during the five-year study period (Figure 1). The number of "active" patients, defined as registered members of a family of which at least one member had been seen within the past two years, almost tripled. Actual patient utilization, measured as the number of scheduled patient visits per month, more than doubled. After-hours telephone calls increased by 44 percent, after-hours visits increased 70 percent, and after-hours hospitalizations increased by 50 percent.

Table 1 displays after-hours utilizations as rates per thousand active patients and per thousand scheduled patient visits. If after-hours utilization is considered as an epidemiologic event, it is important to define the population at risk for seeking nonscheduled care. There is less change in the rates of after-hours utilization when expressed as a function of the ongoing workload (as reflected in scheduled patient visits) than when expressed as a function of the potential reservoir of patients found in the registration figures. However, although there has been an increase in the absolute quantity of after-hours care seeking, this increase has been considerably smaller than the growth of the practice in general, regardless of the denominator used.

Character and Distribution of After-Hours Demand

The distribution of after-hours calls remained stable over the study period, with the exception

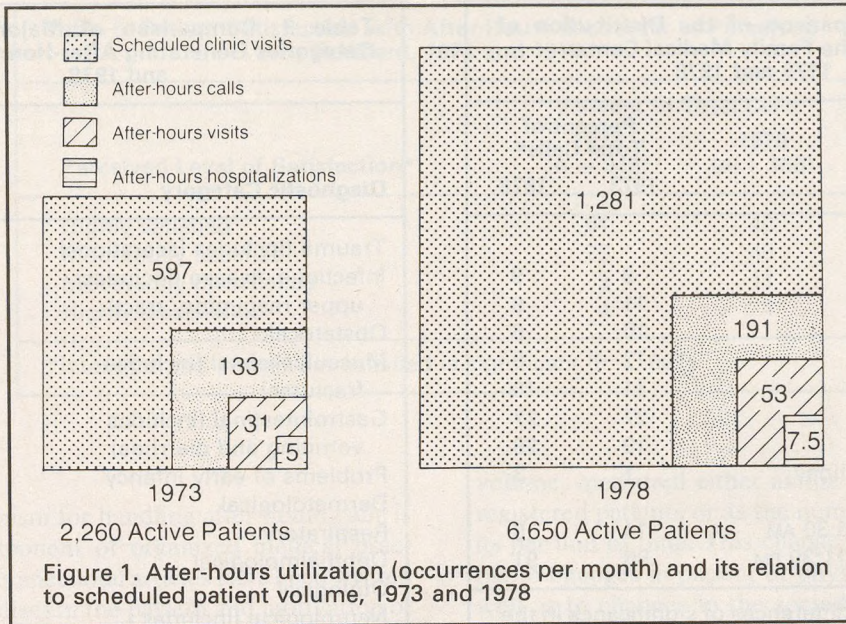


Table 1. After-Hours Utilization of Family Medical Center, 1973 and 1978

	Rate per 1,000 Registered Active Patients		Rate per 1,000 Scheduled Patient Visits	
	1973	1978	1973	1978
After-hours calls per month	59	29*	223	149*
After-hours visits per month	14	8**	52	41†
After-hours hospitalizations per month	2.2	1.1†	8.4	5.9†

*Chi-square significant at $P < .001$
 **Chi-square significant at $.01 < P < .025$
 †Not significant for interval

of a significantly greater proportion of total calls occurring on Sundays in 1978 (Table 2). Weekends and holidays were the busiest periods, accounting for 47 percent of all calls in 1973 and 58 percent of all calls in 1978. Calls during physicians' sleeping hours decreased slightly during the study period; however, because of the increase in practice activity, there was a 50 percent chance during both periods that the physician would be awakened while on call.

The distribution of patient problems prompting after-hours calls was stable over the study period (Table 3). Traumatic injuries assumed a somewhat greater proportional importance. Obstetrical prob-

lems increased, paralleling a doubling of the clinic's obstetrical commitment.

The location of after-hours visits changed during the five-year period. In 1978, 81 percent of patients were seen in the FMC clinic as compared with 63 percent in 1973. Five percent were seen in the obstetrical suite in both years, with the balance seen in the hospital's emergency room.

Physician Response to and Appraisal of After-Hours Calls

Since this study was performed in a teaching setting, the impact of training level upon response

Table 2. Comparison of the Distribution of Calls to the Family Medical Center, 1973 and 1978

	Percent of Total Calls*	
	1973	1978
Day of Week		
Monday	9	9
Tuesday	11	9
Wednesday	10	6
Thursday	12	8
Friday	11	10
Saturday	27	27
Sunday	19	28
Weekday holiday	1	3
Time of Day		
11:30 PM to 6:30 AM	14	9
6:30 AM to 11:30 PM	86	91

*No statistical differences of significance in the interval

to after-hours calls was examined. In 1973 residents were strongly urged to consult with faculty, and consultation was obtained in virtually every instance. In 1978 requests for consultation were left to the residents' discretion, and the consultation rate fell to 10 percent of calls. There was no significant difference in the consultation rate between second-year and third-year residents. In both study years a consultant infrequently saw the patient with the on-call resident: 4 percent of all cases in 1973, and 2 percent in 1978.

In 1973, 30 percent of the residents reported knowing the patient who called at night. This figure fell to 23 percent in 1978. Residents were asked to assess the appropriateness of each after-hours call and to judge "perceived patient satisfaction" with the encounter. Table 4 demonstrates that the majority of calls were judged appropriate during both study periods. Second-year residents in 1978, but not in 1973, were significantly more likely to judge the calls as inappropriate than were third-year residents. Calls during physicians' sleeping hours were somewhat more likely to be judged as inappropriate.

Residents perceived patients as less satisfied with the outcome of calls in 1978 as compared with 1973 (Table 5). No difference attributable to level of training was demonstrated in either year. Dur-

Table 3. Comparison of Major Diagnostic Categories Generating After-Hours Calls, 1973 and 1978

Diagnostic Category	Percent of Total Calls	
	1973	1978
Trauma (includes lacerations)	7	11
Infectious disease (includes upper respiratory tract)	9	11
Obstetrical	6	10
Musculoskeletal (includes fractures)	2	8
Gastrointestinal (includes vomiting and diarrhea)	9	6
Problems of early infancy	5	4
Dermatological	3	4
Respiratory	3	4
Ophthalmological	1	4
Otological	3	3
Neurological (includes headaches)	6	3
Miscellaneous (infrequent or unclassifiable problems)	53	32

Table 4. Appropriateness of After-Hours Calls as Perceived by Resident, 1973 and 1978

Resident's Assessment	Percent of Total Calls	
	1973 (n = 249)	1978 (n = 367)
Highly appropriate	50	46
Appropriate	32	31
Inappropriate	10	13
Highly inappropriate	8	10

ing both periods, the majority of callers who were judged to have used the system inappropriately were perceived as being dissatisfied with the results of the telephone encounter, and patient education was directed frequently at this group.

A prescription or over-the-counter remedy was prescribed or suggested in about one half of all after-hours encounters. The rate fell from 55 percent of all encounters in 1973 to 45 percent of all encounters in 1978. In the first study period, second-year residents were significantly more likely than their third-year counterparts to recommend a medication, whereas the converse was true in 1978.

Table 5. Patient Satisfaction with After-Hours Encounter as Perceived by Resident, 1973 and 1978

Perceived Level of Satisfaction*	Percent of Total Calls	
	1973 (n = 248)	1978 (n = 366)
Highly satisfied	64	40
Moderately satisfied	29	45
Moderately dissatisfied	3	11
Highly dissatisfied	4	4

*Interval trend away from satisfied is significant (P < .001)

Discussion

The mechanism for handling after-hours calls is a critical component of organized medical practice. Numerous anecdotal articles have been written attempting to discern the pattern and motivation of patients seeking after-hours care. Evidence from individual practices³⁻⁹ and surveys of family practice programs^{2,10} and of the general population indicate that a significant proportion of all physician-patient encounters occur through this route. Several authors have attempted to assess performance quality in the management of selected after-hours calls.¹¹⁻¹⁶ Still others have investigated patients' calls from the perspective of health services referral^{17,18} and have gone on to consider the role of the after-hours calls as related to health care delivery and the use of the physician extender.¹⁹⁻²³ There has been, however, little use of epidemiological tools in describing this event, nor have there been attempts to determine which factors have an impact on the observed variations in the frequency and nature of after-hours calls.

This study adopted the "ecological" perspective suggested by White.^{24,25} After-hours calls are considered to be a function of the number of patients at risk for such care seeking, the health status and health beliefs of the patient population, and the relative maturation of the practice. The phenomenon of after-hours utilization early in the life cycle of a new family practice and five years later, when it had achieved stability in terms of practice growth and operational maturity, has been examined.

The results demonstrate a change in patient behavior as evidenced by a significant decrease in after-hours utilization as a function of practice

volume, measured either as the number of active registered patients or as the number of patient visits per unit of time. This change may be attributable to changes in patient or physician behavior as well as to changes in the sociodemographic composition of the patient population.

Resident behavior also changed during the five-year period. Residents taking calls in 1973 were the first family medicine residents in a new program. This, coupled with intense faculty involvement in the after-hours calls process, resulted in most calls having faculty input. In 1978, night call was a tested and routine component of the practice operation, and faculty were involved only in perplexing problems and those that included hospitalizations. Again, differences here may reflect different types of residents. The difference in faculty input may reflect additionally the residents' perception that a greater proportion of the calls were inappropriate in 1978.

Despite the declining rates of calls as a function of practice volume, the absolute number of calls increased significantly, and when coupled with a larger obstetrical service, night call was considerably more burdensome in 1978 than it was in 1973. This, plus the greater anonymity of patients in a larger group practice, may help to explain the findings that a greater proportion of calls were judged inappropriate in 1978 and more of the patients were perceived as dissatisfied as a result of the encounter.

These findings are comparable to those reported by Curtis and Talbot,²⁶ who studied after-hours utilization in a similar setting over a two-year period. They report 474 after-hours calls or visits per thousand active patients per year; in

this study, averaging the data from 1973 and 1978 yields the comparable figure of 528 after-hours interactions per thousand active patients. In all other respects—pattern of utilization, diagnoses, percentage of calls handled entirely by telephone, and perceived appropriateness of calls—the data are strikingly similar. Although further studies in other settings are needed, this constancy tends to support the hypothesis that after-hours utilization bears a stable relationship to practice size and volume.

Conclusions

The after-hours call represents a significant proportion of patient encounters. The rate of after-hours calls as a function of practice volume diminished with practice maturation, while the rate of patients seen and patients hospitalized did not change significantly (Table 1). Resident physicians were able to manage more than 90 percent of all such calls without consultation and felt that in the majority of cases the calls were appropriate and the patients were satisfied with the encounter.

The significant decrease in after-hours calls as a proportion of practice volume tends to substantiate the hypothesis that changes in after-hours utilization reflect practice maturation. The sociodemographic profile of the practice changed during the five-year period of the study, with the average age of the practice population rising from 28 years 6 months to 29 years 8 months and the proportion of Medicaid patients decreasing from 30 percent to 25 percent. Since the health status of both the elderly and the poor populations in general is worse than that of the population at large, perhaps the mentioned population change influenced the decreasing rate of after-hours calls.

Another explanation for the decreased rate is that an increasingly stable patient population has evolved; as patients meld into a given practice, perhaps they are more efficient in the way they make the system meet their needs. They become less willing to disturb providers during after-hours situations. Reassurance and patient education offered in the early years of the practice may also be responsible.³ The changing diagnostic profile of after-hours encounters tends to substantiate this supposition. Traumatic injuries and conditions associated with pregnancy assumed much more relative importance in the 1978 sample, both examples of nondeferrable health care problems.

Self-limited problems became less important. Finally, this hypothesis is further supported by the relative decrease in week-night calls and in calls during sleeping hours; this would verify the contention that patients were deferring their needs to scheduled hours whenever possible.

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