

Analysis of the Medical Records in a Pediatric Emergency Room

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A prospective evaluation of Pediatric Emergency Room records permitted analysis of major errors and of factors contributing to them. All records from July 1973 to June 1975 were reviewed daily by a board certified pediatrician using a previously established protocol. Patients had been seen by pediatric house staff from 4 PM to 8 AM on weekdays and from 8 AM to 8 AM on weekends and 25,907 records were reviewed. Errors were detected in 9.5 percent of these. The most common was an incomplete set of vital signs which accounts for 68 percent of all errors. Failure to arrange for appropriate follow-up care occurred in 16 percent of cases. Other errors ranged from two to four percent and included inadequate use of laboratory, incomplete physical examination, inappropriate diagnosis or therapy. Major omissions in the history were uncommon (1.3 percent). The frequency of errors was significantly greater at the start of each academic year (July to October), and at the start of each month ($P < 0.001$). The errors occurred significantly more often at the first year level than the second year level ($P < 0.01$). This study suggests a means of improving record keeping and house staff education, ie, attending-level supervision should be emphasized at the start of each month and academic year. Daily reviews of errors with the house staff as well as modification of chart design may bring about more complete patient evaluation and detailed recording of findings, diagnosis, and disposition.

Documentation of medical management has become increasingly important. It is demanded by government agencies, and third party payers, and is a necessity in medical-legal situations. To evaluate a system designed to provide pediatric emergency room care, a prospective study was undertaken of the medical records of patients treated over a two-year interval.

Methods

The Jewish Hospital and Medical Center of Brooklyn is a large hospital which serves all segments of society including a large, medically indigent, patient population. It is a major teaching affiliate of the Downstate Medical School. The Pediatric Emergency Room consists of a three-bed isolated unit staffed with two residents, one PL-1, one PL-2, and one nurse. In the Pediatric Emergency Room, approximately 70 percent of patients examined receive Medicaid, 60 percent are black, 20 percent are of Hispanic origin, and the remainder are white or oriental. From July 1, 1975, records of all Pediatric Emergency Room patients were reviewed daily. All were seen without appointment. They ranged in age from newborn to 14 years. Each patient was seen in order of the time

registered except for true emergencies. The diagnoses in most cases were upper respiratory infection, asthma, bronchitis, gastroenteritis, skin infections, and minor trauma.

All Pediatric Emergency Room charts were reviewed by a full-time board certified pediatrician within 24 hours of the emergency room visit with the following protocol. This protocol was expected to be filled out completely.

1. Name, Age, Sex, Record Number, Date and Time of Visit.
2. Name of resident and level of training (PL 1, 2, 3).
3. Each of the following was evaluated for completeness:
 - a. Pertinent positive and negative aspects of history
 - b. Vital signs: pulse, respiratory rate, temperature, blood pressure
 - c. Physical examination
 - d. Laboratory studies
 - e. Diagnosis, differential diagnosis
 - f. Therapy, including dosage and duration
 - g. Follow-up plan
 - h. Appropriate subspecialty consultation: eg, surgical consultation for acute abdomen or neurosurgical consultation for head trauma.

After completion of the chart review, the results were discussed with the resident involved, usually on a daily basis.

During this two-year period, a total of 25,907 charts were reviewed. Of these, 83.48 percent were medical and 16.52 percent surgical. A summary of patients seen monthly in the emergency room for the two-year period and the frequency of errors found are listed in Tables 1 and 2. The errors considered were: failure to record vital signs completely, no notation of review of organ systems, failure to obtain appropriate consultation, and delay in follow-up

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Table 1. Emergency Room Record Review Analysis by Months, 1973-1974

	July	August	September	October	November	December	January	February	March	April	May	June	Total (%)
Total Number of Patients seen in ER	1,228	1,140	1,204	1,398	1,199	1,010	1,319	1,220	1,219	1,098	1,192	1,028	13,565
Total Number of Charts with Errors	435	289	150	130	54	77	74	32	20	45	43	14	1,363 (10.04)
Analysis of Errors													
History	10	5	1	8	2	1	1						28 (2)
Vital Signs	280	175	110	85	42	53	49	20	17	37	38	13	919 (67.42)
Physical Examination	20	15	1	15		1							58 (4.25)
Laboratory Studies	25	25	3	8	5	6	4	3		4			83 (6.08)
Diagnosis	10	15	12		1	2	2	1	1	1			45 (3.30)
Therapy	1	4	9	2		7	4			1	1		43 (3.15)
Follow-up	75	50	8	12	4	7	14	6	1	1	4	1	183 (13.42)
Consultation								2	1	1			4 (0.2)
ER Monday-Friday 5 PM-8 AM, Saturday-Sunday 8 AM-8 AM													
$\left. \begin{array}{l} \text{July, August, September, October} = \frac{X \text{ errors}}{Y \text{ charts}} = \% \\ \text{November-June} = \frac{X \text{ errors}}{Y \text{ charts}} = \% \end{array} \right\} P < .001$													

Table 2. Emergency Room Record Review Analysis by Months 1974-1975

	July	August	September	October	November	December	January	February	March	April	May	June	Total (%)
Total Number of Patients seen in ER	977	980	1,216	1,012	1,078	992	1,135	1,039	948	871	1,077	1,017	12,342
Total Number of Charts with Errors	287	104	66	59	67	148	73	58	76	75	43	40	1,096 (8.8)
Analysis of Errors													
History	2									3			5 (0.4)
Vital Signs	186	81	56	48	48	89	55	53	61	23	26	28	754 (68.79)
Physical Examination	7			1					1	11			23 (2.09)
Laboratory Studies	14	5	1	1		2	1	2	1	4	3	2	36 (3.28)
Diagnosis	1	2		6		1	2			3	2	4	21 (1.91)
Therapy	5	5	9	3	3	4		2	1	10	3		45 (4.10)
Follow-Up	72	10			16	52	15	1	12	21	9	3	211 (19.25)
Consultation		1											1 (0.09)
ER: Monday-Friday 5 PM-8 AM, Saturday-Sunday 8 AM-8 AM													

Table 3. Analysis of Errors—Two-Year Study (25,907 Charts Reviewed)

Item Analyzed	Number	Percentage
Charts with errors	2,459	9.49
History	33	1.342
Vital Signs	1,673	68.0
Physical Examination	81	3.29
Laboratory Studies	119	4.83
Diagnosis	66	2.68
Therapy	88	3.57
Follow-up	394	16.02
Consultation	5	0.2

plan of potentially severe illness. Errors, using these criteria, were found in 9.5 percent of the records examined. An analysis of errors is listed in Table 3.

Results

Failure to obtain a complete set of vital signs was the single most frequent and important oversight, accounting for 68 percent of errors. Failure to arrange for appropriate follow-up care accounted for 16 percent. Other errors included failure to order proper laboratory tests, inappropriate diagnosis or therapy, and incomplete physical examination. These ranged from two to four percent of the total. Incomplete history was uncommon comprising only 1.3 percent of the errors (Tables 1 and 2). The frequency of errors was greatest at the start of the academic year, July and August, and at the beginning of each calendar month, the first week vs the fourth week (each $P < 0.001$). This was concomitant with the change of assignment for our house

staff. Errors were also more common among the PL-1 group than the PL-2 group ($P < 0.01$).

Discussion

A daily review of medical records with the house staff served several purposes. Potential errors in disposition were readily corrected. If, for example, a seriously ill patient was not given an appointment for follow-up the next day, the family could be called promptly to prevent undue delay. Systematic omission or other defects in performance by a particular resident were identified quickly and corrected. The "feedback" process from the attending physician either to the individual resident, or to a group of residents, served as an educational experience and led to literature reviews and conference-level discussion of problems identified. In addition, it served to increase the frequency and appropriateness of consultation requested by the house staff in the Emergency

Room. These positive effects of chart review confirm previous observations of Buck et al.¹ Likewise the relatively frequent failure of house staff to obtain blood pressure levels, or to record their findings, is comparable to the observation of Pazdral et al.²

The observation that junior house staff had a higher error rate than senior residents and that there were more errors at the start of the academic year than later on, were predictable. However, the magnitude of the differences was substantial, and, to our knowledge, not described previously. These findings have obvious implications for the scheduling of lectures and reviews and suggest the need for selective concentration of attending staff efforts early in the academic year.

Literature Cited

1. Buck CR Jr, White SCD, Kerr L: Peer review: Impact of system based on billing claims. *N Engl J Med* 291:877, 1976
2. Pazdral PT, Lieberman HM, Pazdral WE, et al: Awareness of pediatric hypertension: Measuring blood pressure. *JAMA* 235:2320-2322, 1976

Six Schools Receive \$3 Million in Distress Grants

A total of \$2,970,000 in financial distress grants has been awarded by the Bureau of Health Manpower to six health professions schools.

Most of the funds went to Meharry Medical College's schools of medicine and dentistry in Nashville, Tennessee.

The amounts of the Fiscal 1978 awards and the recipients are: Meharry School of Medicine, \$1,632,126; Meharry School of Dentistry, \$733,443; University of Detroit School of Dentistry, \$395,261; Xavier University of Louisiana College of Pharmacy, \$102,349; Tuskegee Institute School of Veterinary Medicine, \$91,821; and California College of Podiatry, \$15,000.

Funds are set aside in each grant for management review studies to assist the school in overcoming financial problems.

A school of medicine, osteopathy, dentistry, optometry, pharmacy, podia-

try, veterinary medicine, or public health may be awarded financial distress assistance to meet operating costs, to overcome accreditation deficiencies, or to carry out operational, managerial, or financial reforms.

Fourteen schools applied for financial distress in fiscal 1978.

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Concept of Twilight Medical School Found Unfeasible

The Bureau of Health Manpower's Division of Medicine in a report, "The Feasibility of the Twilight Medical School Concept," concluded that the concept of the Twilight Medical School

(TMS) is not feasible, given the current status of physician manpower and medical education philosophy. The study was requested by the House-Senate Conference Committee on the Health Professions Educational Assistance Act of 1976 (PL 94-484).

A Twilight Medical School is defined as a program of undergraduate medical education taught to a second, administratively separate, student body utilizing the facilities of a currently operating medical school. A teaching day would extend from late afternoon into evening hours with a student completing the MD or DO requirements in four to seven years.

The study found the concept not feasible because: "There is no overriding impetus for the TMS concept, such as a need for a rapid increase in the number of physicians trained. It would not be cost-effective and limited availability of clinical teaching resources at nonstandard hours would severely limit TMS clinical training."