

Describing Learning Experiences of Undergraduate Medical Students in Rural Settings

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This article describes a method for evaluating clinical experiences gained by undergraduate medical students at the University of Washington who take a family medicine clerkship at one of five rural communities. The students' clinical, community and practice management activities are documented on a standardized daily log. This log permits efficient transcription to punch cards. Data analysis results in a list of diagnoses, procedures, and community and practice management activities. These experiences are presented in order of frequency with a distribution of experiences by level of student responsibility, by location or agency, and by follow-up versus first contact.

The results presented here constitute a summary profile over three academic quarters. The data reveal a substantial student exposure to medical problems common in family practice. Students assume a relatively high level of responsibility and experience continuity in patient care. This paper describes various ways in which these results are used.

The basic clerkship in family medicine at the University of Washington is taught by family physicians in rural and small-town settings in the north-west region of the United States. When the WAMI (Washington, Alaska, Montana, and Idaho) Program began in 1971, a major goal was to establish community clinical units for medical student training in areas remote from Seattle. Five WAMI clinical units were developed by the Department of Family Medicine in Omak, Grandview, Anacortes, and Whidbey Island, Washington, and in Kodiak, Alaska. These community clinical units (CCU's) and the objectives for the clerkship have been described by Phillips.^{1,2}

Coordination and evaluation of the six-week clerkship over such a large geographic region presented a challenge. A package for evaluating student performance, faculty teaching, and course experiences was developed by representative faculty from each CCU in conjunction with the authors

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(the Seattle Departmental Coordinator for the course, and the evaluator).

This report outlines a method by which the learning experiences acquired by each student are quantified and qualified. It involves student documentation of experiences on daily logs (using established coding systems), simple transcription by keypunching to cards, descriptive analysis, and direct feedback to students and their CCU faculty after the third and sixth weeks of the clerkship. The data is also used to describe the common experiences characterizing each CCU location, and, more generally, clerkships remote from the metropolitan area.

Method

During the initial two years of this family medicine clerkship, students were asked to complete a comprehensive checklist indicating experiences gained thus far in their training. This was requested both before and after their six-week rotations to the CCU's in order to ascertain didactic and first-hand experiences gained during the course. However, inaccuracies occurred due to the difficulty of retrospective recall and the limited student compliance with the request to fill out

a lengthy checklist. A system was initiated which was simpler, more accurate, easier to monitor and amenable to feedback useful to students and faculty during and after the rotation.

The clinical entities listed on the checklist and those obtained by content analysis of structured interviews with students following each clerkship provided a list of common, important diagnoses and procedures used in the system. The diagnoses were coded using the I.C.D.A. (International Classification of Diseases - Adapted) Code System and procedures were coded with C.R.V.S. (California Relative Value Scale) codes. These codes were chosen in order to introduce students to a system commonly used by practicing physicians in third party carrier billing procedures. In addition, a list of community and practice management experiences were coded arbitrarily with a three-digit code. Coding of student experiences and analyzing data for frequencies of exposure permits quantification of learning experiences.

Experiences are qualified by incorporating: (1) the site of the experience (office, hospital, nursing home, house call, or Emergency Room); (2) level of student responsibility (primary, assisting, or observing); and (3) whether the exposure was a new patient or a follow-up contact for the student. This qualification is helpful in monitoring the student and the course in the achievement of clerkship objectives, such as to provide exposure to various agencies, to increase level of responsibility, and to provide follow-up and continuity of care.

Students provide input on a log form designed with numbered columns suitable for keypunching cards for computer analysis (Figure 1).^{*} Students are given detailed instructions and examples before the clerkship. Using the coded lists of diagnoses, procedures, and community/management experiences, students complete a log each day representing their learning experiences. For each I.C.D.A. or C.R.V.S. code number entry, the student indicates at which of the five locations the encounter took place, what degree of student responsibility was involved, and whether it was a

^{*}Copies of the student log form are available upon request from Dr. Elisabeth Zinser, Council on Public Higher Education, AHES Program, 305 Ann Street, Frankfort, Ky 40601.

Surname of Student	Initials		Date of Experience Mo. Day Yr.					CCU Site		Department	Community and Management (LZ)					Site of Experience					Level of Responsibility			"ICDA" CODE Diagnosis					Ongoing	New	"CPT" CODE (Procedure)																								
																																			Office	Hospital	House Call	Nursing Home	ER	Primary	Assisted	Observed													
1	2	3	4	5	6	16	17	18	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	47	48	49	52	53	54	55	56	57	58	61	62	63	64	65												
J	o	n	e	s		M	A		0	2	1	5	7	5	T	O	W	N	F	M																																			
Describe any other experience you feel is of importance such as involvement with the Welfare Department, Chamber of Commerce mental health clinics, work with the office business manager, etc.										0	2	2																																											
Visited local Indian Reservation - health care clinic.										0	6	3																																											

Figure 1. Log Form (condensed)

Table 1. Absolute Frequencies of Student Experiences with Diagnostic Categories

Absolute Frequency	Diagnostic Exposures
957	Ear, nose, throat, and upper respiratory
781	Musculoskeletal
674	Health maintenance/continuity
442	Obstetrics/gynecology
398	Trauma
379	Cardiovascular
352	Skin
330	Lung
288	Behavioral/emotional
268	Ill-defined conditions
263	Gastrointestinal
198	Urinary
169	Nervous system
122	Infectious diseases
84	Eye - conjunctivitis
82	Headache, migraine
80	Endocrine
79	Arthritis/rheumatism
59	Metabolic
53	Tumors
50	Hematology
45	Obesity
45	Allergy
26	Death
24	Hernia
14	Poisoning
4	Speech and hearing
4	Oral/dental
4	Impotence/infertility

new exposure or part of ongoing care of the patient. Time required to complete each daily log is 20 to 30 minutes, and students estimate that 80 percent of their work is documented.

Activities not included in the code lists are written on the log form and subsequently coded when the daily work sheets are returned to Seattle by mail at the end of each week. These amount to less than ten percent of the entries. Those occurring frequently are later incorporated into revisions of the code lists.

The documentation is strongly encouraged by faculty, but is considered voluntary. It is not used for grading purposes, but as a means of helping students and faculty shape the educational experience. Both students and faculty have evidenced a positive attitude toward the process and the output of the system.

Learning experiences during the student's first three weeks in the clerkship are described by analyzing the daily logs. A programmed printout lists (separately and in order of frequency) all exposures to: (1) diagnoses, (2) procedures, and (3) community and/or practice management activities. These printouts are discussed with the student and faculty. Perusal of the printout helps shape the remainder of the clerkship to facilitate achievement of clerkship objectives.

The data is also useful in defining problem areas, such as the student who spends too much time in the hospital, a place of greater comfort and familiarity.

At the end of the clerkship, a final printout covering all experiences is given to the student and faculty. Students find this helpful in planning subsequent work. For example, a dearth of obstetric experience may provide the impetus for the student to emphasize this area in a later clerkship.

The data obtained in this system are analyzed across students every three months to provide a profile of learning experiences characteristic of each community clinical unit. This allows another dimension of course evaluation: assurance that students are gaining a wide range of experiences, with depth of exposure in areas consistent with the course objectives. This information is presented to the CCU faculty at the end-of-quarter meetings so that issues in the clerkship curriculum can be discussed and educational experiences can be refined based on these data. The profiles of each site also help in advising students as to the location which may best suit their individual objectives, preparation, and career aspirations.

Results

Findings presented here are based

Table 2. Diagnoses Encountered at Least: A. Twice per Week, B. Once per Week

Diagnoses	Frequency	Level of Responsibility			Site of Experience					Ongoing or New	
		Primary	Assisting	Observing	Office	Hospital	House Call	Nursing Home	ER		
A. Twice per Week											
Upper respiratory infection	262	239	10	7	196	10	2	1	40	38	193
Otitis media	242	195	24	10	148	4	15	3	45	49	185
Surgical aftercare	219	141	37	35	91	122	3	1	1	164	42
Pre, post-partum examination	208	165	29	10	167	39	2	0	0	91	110
Pediatric physical	206	184	4	11	139	44	18	0	2	67	131
Fracture	199	103	75	18	56	75	0	1	68	65	119
B. Once per Week											
Abdominal pain	188	149	31	3	89	37	1	3	56	66	111
Lacerations	182	161	13	2	54	16	0	0	110	26	138
Hypertension	172	139	22	5	160	4	1	0	3	78	83
Low back pain syndrome	147	128	14	3	68	56	2	1	18	72	67
Sprain	142	119	15	8	68	3	2	0	62	29	109
Medical aftercare	132	109	11	6	34	93	3	0	2	114	12
Adult routine physical	117	101	2	2	90	19	0	1	2	25	79
Drug abuse	99	66	14	11	19	41	3	0	30	30	53
Rash	97	69	20	4	78	1	3	2	8	17	71
Asthma	96	67	17	7	51	16	0	1	24	28	59
Urinary tract infection	96	73	16	4	66	13	2	3	11	29	57
Pneumonia	93	81	8	3	36	46	2	0	10	38	49
Routine delivery	91	28	49	14	0	88	0	0	1	23	60

on data accumulated over three academic quarters. Generally, two students rotate through each of the five clerkship locations every six weeks. Students see approximately 12 patients per day. Data summarized over all five sites will be presented relative to the frequency of exposure to various diagnostic problems, medical procedures, and community/practice management experiences. The proportion of clinical experiences in various locations, levels of responsibility, and follow-up care will be discussed.

Diagnoses

Table 1 demonstrates the frequency of exposure to medical diagnoses categorized by systems and other general areas of medical care. The most frequent medical problems encountered by students are upper respiratory, ear-nose-throat, musculoskeletal, and ongoing health maintenance care.

This compares favorably to results reported by Baker,³ and Johnson and Wimberly.⁴ Notable differences include obstetrics/gynecology and trauma which rank higher, and emotional problems and drug abuse (including alcohol) which rank lower in the present study.

The specific diagnoses encountered

at least twice and a few of those seen at least *once* per week are presented in Table 2. The level of responsibility given to the student varies with the complexity of skills required to manage the problem. For example, the vast majority of upper respiratory infections were managed primarily by the student. In this clerkship, primary responsibility means the student sees the patient, is identified as the primary "helper," and makes most decisions. This care is always under the back-up supervision of the physician. In the management of fractures, about half of the care (103) was given primarily by the student, while in the other half (93) the student only assisted or observed the physician. Routine deliveries were more often accomplished by assisting the physician (49) than by either conducting the delivery with the preceptor only scrubbed and ready (28) or, on the other extreme, by merely observing (14).

Faculty teaching this clerkship are relatively consistent in their intent to enhance the student's ability to assume responsibility. Most community faculty allow students to assume primary responsibility (under supervision) in about 80 percent of the cases. Community sites do vary somewhat, however. For example, one site gives about ten percent more responsibility (91 percent) than the others,

while a second site relinquishes slightly less responsibility (67 percent). This discrepancy can, in part, be related to differences in the medical problems common to the various sites. For example, the high volume of emergency care in one location — trauma secondary to relatively serious industrial accidents — may relate to a lower proportion of student primary responsibility.

It is evident in these data that students participate in the delivery of medical care in various settings. For example, surgical aftercare is not only delivered in the hospital (122) but followed in the office (91), on house calls (3), in the nursing home (1) or in the Emergency Room (1). While otitis media is most often seen in the office (148), it is also encountered in the hospital (4), on house calls (15), in nursing homes (3), and in the Emergency Room (45).

Fifty-seven percent of patient care delivered by students occurs in the office, with a slightly higher proportion (67 percent) of clinic experience in two of the five community sites. About 25 to 28 percent of patient care is delivered to hospitalized patients at four of the locations, while one site provides only 16 percent of student experience in the hospital setting. Frequency of house calls by students varies among the rural locations. Two

Table 3. Procedures Done at Least: A. Once per week, B. Once per Month

Procedures	Frequency	Level of Responsibility			Site of Experience				
		Primary	Assisting	Observing	Office	Hospital	House Call	Nursing Home	ER
A. Once per Week									
Lacerations	278	247	12	7	65	24	0	0	0
Pelvic examination	159	119	20	13	138	13	0	0	6
Pap smear	99	81	7	8	94	5	0	0	0
Cast	96	63	26	9	56	23	0	0	18
Counseling	84	68	9	3	59	20	3	0	1
B. Once per Month									
Incision and drainage	50	26	14	9	33	8	0	0	8
Circumcision	42	24	8	10	0	41	0	0	0
Dilatation and curettage	36	11	23	2	1	35	0	0	0
Intrauterine device	34	18	3	13	33	0	0	0	0
Remove foreign body	34	21	8	5	15	3	0	0	16
Remove subcutaneous foreign body	34	23	7	2	16	5	1	0	13
Biopsy excision skin	33	11	17	6	22	11	0	0	0
Exploratory laparotomy	30	0	28	2	0	33	0	0	0
Proctosigmoidoscopy	27	5	13	9	19	7	0	0	1
Hysterectomy	26	0	22	2	0	25	0	0	0
Joint aspiration	25	14	8	4	18	3	0	1	2
Skin lesion cauterization	25	12	6	6	22	1	0	0	0
Tonsillectomy and adenoids	23	5	12	5	0	22	0	0	0
Vasectomy	22	1	14	7	21	1	0	0	0

provide relatively frequent opportunities for house calls; one community includes visits to children at a local mission (five percent). Nursing home visits are infrequent (one percent) but are regarded as an important exposure to the primary health-care facility. The clerkship places a high priority on teaching students expertise in responding to emergencies. Students are on call every two or three evenings and on alternate weekends. The on-call schedules and the volume of emergency care varies by community site, with emergency care constituting seven percent of student experience at one location and 20 percent of care at a second site.

Students have the opportunity for a substantial volume of follow-up contacts, establishing habits in providing comprehensive medical care. For example, patients being seen for medical and surgical aftercare were occasionally encountered by students as initial contacts, but in eight times as many cases the student has the opportunity to see such patients for repeat follow-up care. Patients with chronic problems present the student with an opportunity for repetitive contacts with one patient. For example, 72 of the 147 contacts with low back pain were follow-up encounters. While other problems involve a higher frequency of initial contacts than follow-up care, students see many of their patients more than once. In fact, 38 percent of student encounters were

follow-up visits with patients previously seen. This is regarded by the faculty as a substantial experience in continuity during a clerkship of six weeks' duration.

Procedures

The frequency of student experience performing various *medical procedures* is outlined in Table 3. The largest number of procedures experienced by students were therapeutic surgery, such as tonsillectomy and adenoidectomy, hysterectomy, and general surgery. Diagnostic surgery, such as biopsy, was less frequent. Medical procedures of a diagnostic (eg, Pap smears) and therapeutic (eg, orthopedic maneuvers) nature were quite common.

The five specific procedures experienced by students at least once per week and some of those done at least once per month are outlined in Table 3. Many of the more common and less complex procedures were accomplished primarily by students. Other complex surgical procedures were performed by the physician with the student assisting or observing. For example, pelvic examinations and suturing lacerations are most often accomplished independently by students even though faculty are present. Exploratory laparotomy, hysterectomy, and other such procedures are encountered with students as assistant or observer.

Sixty-three percent of the procedures were carried out by students assuming primary responsibility, under supervision. Only 11 percent cast the student in the role of observer.

Some variation was noted among sites. The two sites which allow higher levels of responsibility are those which show a higher proportion of experience in the office situation. Clinic procedures are most likely diagnostic and less complex, thereby enabling students to assume a greater level of responsibility.

The distribution of locations in which procedures are accomplished is characteristic of medical practice. Most diagnostic procedures occur in the office. Most surgical interventions take place in the hospital. Therapeutic techniques related to emergencies, such as sutures, casts, or removal of foreign bodies, occur in the Emergency Room.

Fifty-two percent of all procedures were accomplished in the office, 31 percent in the hospital, and 17 percent in the Emergency Room. Clerkship locations vary somewhat, with two sites providing a higher proportion of procedural experience in the office setting (64 percent) than other sites (41 to 52 percent).

Community/Practice Management

The objectives of this clerkship include exposing students to commu-

nity and practice management activities. Students have numerous experiences in the community, primarily in health-care agencies. Many of these contacts are made in the course of patient care. Common agencies are Planned Parenthood programs, alcohol and drug abuse programs, the county health department, and mental health clinics. Non-health-care agencies in which students work include programs for minorities, local schools, industries where health hazards are prevalent, and service clubs. Health-care meetings entail hospital staff meetings and medical society meetings. The major portion of practice management activities involves day-to-day work, such as dictation. Office management training includes issues related to billing, personnel hiring, referral systems, scheduling patients, and participating in audits.

All five communities provide rich learning experiences in community health hazards; the role of the physician in reducing them; the function of various services; and procedures and criteria in billing, hiring personnel, conducting audits, and establishing a system of consultation in a small community (Table 4).

Discussion

Clerkships in settings remote from the University provide an important element of a decentralized medical school curriculum. One of the challenges in extending student learning opportunities into rural areas is the coordination of these experiences with the overall clinical curriculum. It is important for university and community based faculty to share specific information on the student's experiences in order to insure that the teaching and learning which occur at remote settings: (1) constitute a necessary component of the student's training, (2) amplify rather than repeat other curriculum experiences, and (3) take place at an appropriate level or phase in the student's career in medical school. In order to assist the family medicine faculty in making decisions relative to the education of individual students and the role of rural clerkships in training for family practice, the methodology for daily logs of clinical, community, and practice management experiences was developed.

The results have been used in many

ways. The experience profiles are used by students and community faculty to evaluate the students' experiences while on site at a community clinical unit. For example, community faculty will review the student's log data after three weeks to see what key experiences might be under-represented in meeting clerkship objectives. They can then plan to include them in the student's remaining three weeks. The university based coordinator uses the profile in conference with each student to discuss the student's experiences, as well as the developing knowledge and skills related to the more common encounters. These data help to keep other family medicine faculty informed as to the nature of the clerkship experiences provided in the rural areas, which they can visit and experience firsthand only on an infrequent basis. Curriculum planning meetings in the Medical School have referred to these data in assessing the role of rural experiences in the overall curriculum — what learning can best be acquired in rural settings and what is most appropriately reserved for university based training. Common problems identified in these data have been referred to in discussing construction of a comprehensive examination. It is possible to derive some indication of the level of expertise desirable in a student in order for him to take best advantage of experience in a remote location. For example, some previous acquisition of basic surgical and obstetric skills enables the student to become more quickly and intensively involved in clinical situations at a rural site. Courses that should be prerequisite or strongly advised can then be identified more clearly. The profile of students' learning experiences has served as an important element in WAMI Program evaluation.

The results demonstrate a high congruence between actual student learning experiences and the course objectives. Students are exposed with high frequency to common medical problems. They assume a high level of responsibility consistent with the complexity of the problems. The fact that almost 40 percent of their patient care involves patients seen at least once before indicates a strong exposure to continuity in patient care. The aim of providing students with patient care experiences in various settings has been accomplished in that they care

Table 4. Absolute Frequencies of Exposure to Community and Practice Management Activities

Absolute Frequency	Community Management Activities
173	Health-care agencies (eg, drug abuse, Planned Parenthood)
82	Non-health-care agencies (eg, schools)
81	Meetings (eg, medical staff)
32	Teaching (eg, nurses)
17	Consultation
	Practice Management Activities
88	Day-to-day (eg, dictating)
75	Office/patient management (eg, personnel, billing procedures)
9	Upgrading quality (audits, CME)

for patients in the hospital, the physician's office, the Emergency Room, and, to a lesser extent, at nursing homes and on house calls. Finally, it is clear that students engage in community experiences which facilitate a broad view of health care in relation to community health needs and resources. Students also have reasonable exposure to issues in practice management. These include details of office management as well as skills in determining priorities in allocation of time to patient care, continuing education, community activities, and family.

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