

# Survey of Accident Experience in a Chronic Disease Hospital

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THE HOSPITAL, often considered to be one of the most protected environments, is frequently the locus of accidents. This undesirable component of hospital routine, however, is in many ways engendered by this supposedly protective environment as well as by the highly selected population involved. In truth, a hospital presents many potential hazards: explosive gases, availability of toxic solutions and compounds, high beds and examining tables, litters and wheelchairs, radiation, and dangerous equipment. Obviously in an atmosphere where the possibility of accidents is well recognized, most are prevented by diligent and enlightened planning.

A "dangerous" environment is but part of the picture, however. Of considerable influence, as well, in a hospital's accident record is the composition of its patient population. Pediatrics, chronic disease, acute illness, and other branches of hospital service all present particular problems, some more predisposing to accidents than others. Thus, hospital studies concerning accidents and accident prevention are not comparable unless the populations are similar. The purpose of this study was to identify prevent-

able factors in accidents among chronically ill hospitalized patients so that steps might be taken to reduce incidence to the lowest possible figure.

Lemuel Shattuck Hospital is a 400-bed institution operated by the Massachusetts Department of Public Health. It provides facilities for the diagnosis and treatment of patients with chronic diseases or cancer who may benefit from intensive medical or surgical care. The hospital also provides a complete rehabilitation service for the physically disabled and chronically ill. New patients are not accepted for custodial, domiciliary, or terminal care. However, cancer patients who have been treated at the hospital may be readmitted during the final phase of their illness. Consequently, a small proportion of patients do receive terminal care.

## Methods

For the purpose of this paper, the term "accident" refers to any sudden and unexpected event involving a patient whether or not resulting in injury for which a report is filed. At the Shattuck Hospital every such event is required to be reported on a standard form which provides the following information: age and sex, severity of accident, patient's condition, bed height and presence or absence of bed rails (for falls from bed), date and time, whether or not accident was witnessed, and result of physician's examination.

The data for this study were obtained from a

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review of all accident reports for 1964. The population basis consists of all patients admitted during this same year.

Patients were categorized by service in order that intrahospital experiences might be compared. Of particular interest were the patients between the ages of 50 and 59 because they were victims of the greatest number of accidents. This group was examined in more detail, in regard to the number of accidents in relation to length of hospital stay and condition of patient at the time of the accident, by service.

### Results

During 1964, 465 accidents were reported at the Shattuck Hospital. There were 1,987 admissions during this same period, giving a crude accident rate of 23.4 percent. Compared with rates of 2.85 percent and 2.98 percent reported from general hospitals at which accidents were defined in the same manner, this figure appears startlingly high (1, 2). However, in a chronic disease hospital patients are at risk longer than

in a general hospital, and meaningful comparisons cannot be made unless patient days of exposure are taken into consideration.

In 1964 the average length of stay at the Shattuck Hospital was 62 days, for a total of 122,372 patient days of exposure and an accident rate of 38 per 10,000. This figure is more in keeping, though still higher, than the 25 per 10,000 rate reported from Mt. Sinai and the 23.4 per 10,000 from the data collected by Stone from several hospitals (1, 2). This difference may be attributed to various factors, such as less effective accident prevention programs or differences in reporting practices. It also may reflect an inherent difference between chronically ill patients and those with acute conditions. The study was conducted on the premise that there is an inherent difference between the two kinds of patients.

*Effect of age and sex.* The experience at other hospitals indicates that men tend to be more susceptible to accidents than women (1). Such was not the case in this study, where the accident rate showed no appreciable difference

**Table 1. Accidents by age and sex, Lemuel Shattuck Hospital, 1964**

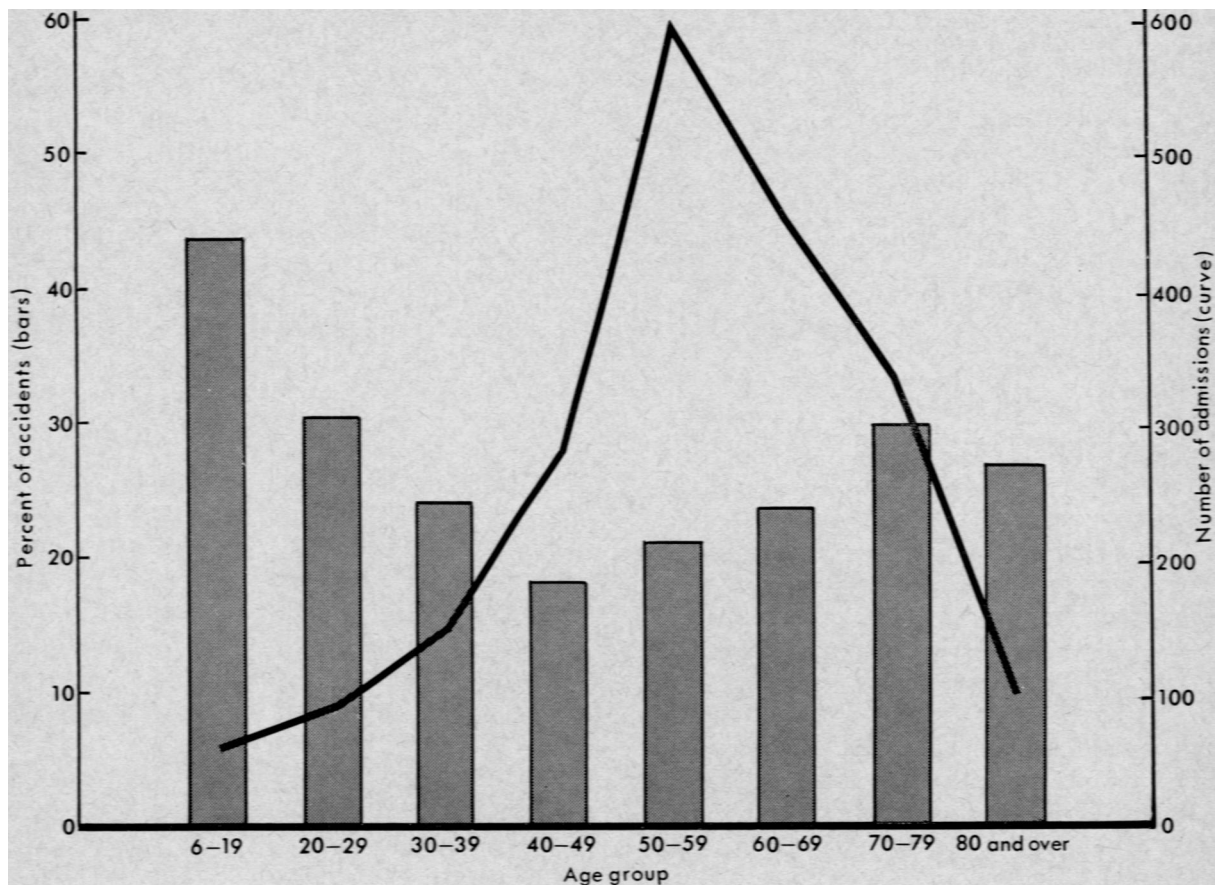
Age	All accidents			All admissions			Percent of accidents per total admissions
	Male	Female	Total	Male	Female	Total	
6-19.....	17	4	21	27	22	49	42.9
20-29.....	18	7	25	49	35	84	29.8
30-39.....	21	12	33	75	66	141	23.4
40-49.....	16	32	48	120	151	271	17.7
50-59.....	63	59	122	297	291	588	20.7
60-69.....	59	42	101	217	217	447	22.6
70-79.....	39	51	90	156	156	310	29.0
80 and over.....	10	15	25	39	58	97	25.9
Total.....	243	222	465	991	996	1,987	23.4

**Table 2. Incidence of accidents by hospital service, Lemuel Shattuck Hospital, 1964**

Service	Patients exposed	Average number of days per admission	Patient days of exposure	Number of accidents	Rate per 100 patients	Rate per 10,000 days of patient exposure
Medicine.....	1,319	47	61,993	175	13.27	28.23
Surgery <sup>1</sup> .....	337	78	26,286	60	17.80	22.83
Neurology.....	331	103	34,093	230	69.49	67.46
Total.....	1,987	62	122,372	465	23.40	38.00

<sup>1</sup> Including orthopedic service.

## Relationship of age to accidents



between the sexes (table 1). There were 243 accidents per 991 male admissions (24.5 percent), and 222 accidents per 996 female admissions (22.3 percent).

Accident rates were greatest at the extremes of the age spectrum and lowest in the middle (see chart). No very young children or babies are included in these figures because the hospital has no pediatric facilities.

*Relation to hospital service.* Table 2 shows the incidence of patient accidents by hospital service at the Lemuel Shattuck Hospital. The number of patient days of exposure was obtained by multiplying the patients exposed by the average number of hospital days per admission. Examination of the rates per 100 patients and per 10,000 days of patient exposure, respectively, reveals the apparent discrepancy in the number of accidents when the various hospital services were compared.

Accident rates in the neurology service, for

example, more than tripled those for surgical patients both in numbers of patients and days of exposure. Medical patients, though having the lowest per person rate, also had greater accident experience than surgical patients despite a shorter average number of days per admission. Patients on the neurological service were at greater risk than those on other services. The fact that differences exist is not surprising. One might expect that the very nature of neurological diseases would contribute to accident proneness. However, a difference of the magnitude in this study warrants further consideration of safety measures and patient practices.

*Severity of injury.* The extent or severity of injury usually is described in narrative form on the accident report and therefore is subject to interpretation by the person filling out the forms. For purposes of this study, it was arbitrarily decided to classify injuries according to the following criteria:

No injury—no physical evidence of trauma, no symptoms.

Slight—abrasion or contusion.

Moderate—multiple abrasions or contusions, lacerations requiring suturing.

Severe—concussion, fracture, ruptured viscus, and so forth.

Death.

Table 3 shows severity of injury in relation to the site of occurrence. By far the greatest percentage of accidents resulted in no harm; 4.1 percent resulted in moderate or severe injury. None led to death.

Approximately one-half of all accidents were falls at the bedside and about one-fourth involved wheelchairs. These same proportions hold true with respect to the 19 moderate and severe accidents.

The fact that no injury resulted from most of the incidents is no cause for complacency. Obviously, in every such occurrence, the potential for serious injury is present because the patient is already incapacitated.

*Time and place of accident.* Table 4 lists the location of accidents by time period. Nearly one-half of the accidents took place during the 8:00 a.m. to 3:59 p.m. shift, the period of greatest hospital activity, when staffing is at a maximum. The fewest number of accidents occurred during the last shift when most patients presumably were sleeping. The opposite was true, however, in the proportion of bedside accidents occurring during each time period. As might be expected, a greater proportion of accidents at the bedside occurred at night rather than during either of the other work shifts.

Although most accidents occurred at the bedside (42.4 percent), a substantial number occurred with wheelchairs (26.7 percent). The

**Table 4. Place and time period of accidents, Lemuel Shattuck Hospital, 1964**

Location of accident	8:00 a.m.- 3:59 p.m.	4:00 p.m.- 11:59 p.m.	12:00 a.m.- 7:59 a.m.	Total	Percent of accidents
Bedside.....	79	68	50	197	42.4
Wheelchair.....	68	51	5	124	26.7
Bathroom.....	36	18	13	67	14.4
Hall.....	15	9	1	25	5.4
Other.....	27	17	8	52	11.1
Total.....	225	163	77	465	100.0
Percent of total.....	48.4	35.1	16.5	100.0	-----

lack of proper instruction on how to move from the bed to the wheelchair and from the wheelchair back to the bed may account for the high proportion of such accidents.

Since the greatest number of accidents have been shown to occur at the bedside, a more detailed examination revealed that 85 of the 144 beds that were the sites of accidents had bedrails while 59 beds were not equipped with rails. Only 28 rails were up while 57 were down at the moment of the accident.

*Multiplicity of accidents.* Of the 294 patients involved in accidents, 103 had more than one accident in the hospital during the year. This fact is not unexpected as the prolonged length of hospitalization contributed to multiple accidents. The frequency of accidents among this group of repeaters was as follows: 67 had 2 accidents, 19 had 3 accidents, 10 had 4, 3 had 5, 2 had 6, 1 had 7, and 1 had 9. This strongly suggests the probability of accident proneness in certain individuals.

*Condition of patient.* What effect does seda-

**Table 3. Severity of injury from accidents, Lemuel Shattuck Hospital, 1964**

Severity of injury	Bedside	Bathroom	Hall	Wheelchair	Other	Total	Percent of accidents
None.....	141	49	18	95	23	326	70.1
Slight.....	47	16	7	24	26	120	25.8
Moderate.....	8	2	0	5	3	18	3.9
Severe.....	1	0	0	0	0	1	.2
Death.....	0	0	0	0	0	0	-----
Total.....	197	67	25	124	52	465	100.0

**Table 5. Accident experience of patients 50-59 years, Lemuel Shattuck Hospital, 1964**

Sex	Pa-tients	Accidents		Patients having accidents	
		Num-ber	Per-cent	Num-ber	Per-cent
Both sexes....	588	122	20.75	89	15.14
Men.....	297	63	21.21	45	15.15
Women.....	291	59	20.27	45	15.12

**Table 6. Average length of hospitalization for all patients 50-59 years and those in the same age group who had accidents, Lemuel Shattuck Hospital, 1964**

Sex	Patients	Patient days	
		Number	Average length of hospitalization
<i>Entire group</i>			
Both sexes.....	588	34,216	58.19
Men.....	297	17,185	57.86
Women.....	291	17,031	58.53
<i>Group having accidents</i>			
Both sexes.....	89	14,035	157.69
Men.....	45	6,825	151.66
Women.....	44	7,210	163.85

tion or other factors have on patient accidents? On the accident form, the informant is required to report on whether the patient was normal, disoriented, sedated, or had other conditions such as blindness. Obviously, the classification of the patient necessitates a value judgment by the reporter. What may be "normal" for one patient may be quite different for another. Determining whether a patient is sedated or disoriented is relatively easy, however, and yields more reliable data. In this study the effect of sedation was a rather unimportant factor because only 3.6 percent of all accidents occurred while the patient was sedated. More than

three-fourths (77.4 percent) of all accidents occurred while the patient was considered "normal"; 13.8 percent of the accidents were reported to have occurred while the patient was disoriented. The remaining 5.2 percent of all accidents were sustained under "other" conditions.

### Focusing the Problem

In an attempt to focus further on other factors contributing to accident causation, persons 50-59 years old, who accounted for the greatest number of patients, were selected for study in greater detail. Of the 588 patients in this age group admitted during 1964, 297 were men and 291 were women. Accidents in this age group involved 63 men and 59 women. Table 5 shows the homogeneous nature of the distribution of accidents between men and women, with nearly identical proportions.

The average length of hospitalization for patients sustaining accidents was nearly three times greater than that for the entire 50-59 year age group (table 6). The length of hospitalization appears to be a determinant in accident causation.

The percentages of the totals in regard to the condition of the patients in this group are given in table 7. These do not vary appreciably from the figures presented for the accidents in all age groups.

### Summary and Conclusions

A study of 465 accidents during 1964 to 294 patients in a 400-bed chronic disease hospital revealed a crude accident rate of 23.4 percent.

The differences in accident rates for men and

**Table 7. Condition of patients, 50-59 years at time of accident, by service, Lemuel Shattuck Hospital, 1964**

Service	Normal	Dis-oriented	Sedated	Other
Medicine.....	45	11	3	3
Surgery.....	1	1	2	2
Neurology.....	40	7	0	5
Orthopedic.....	2	0	0	0
Total.....	88	19	5	10
Percent of total.....	72.1	15.5	4.1	8.3

women were negligible. Although the highest rates were in the groups less than 30 years old and among persons more than 70 years old, patients 50-59 years had the greatest number of accidents. Patients who sustained accidents usually were hospitalized three times longer than those who did not.

Accidents in the neurology service more than tripled those for surgical patients both in numbers of persons and days of exposure. Despite their lower person rate, medical patients had greater accident experience than surgical patients.

Seventy percent of the accidents resulted in no injury; none resulted in death. More than one-third of all patients experiencing an accident had had one before, thus indicating the

need for special attention to prevent recurrences.

A more intensive study of patients 50-59 years took into consideration such factors as sex, condition, and period of hospitalization. Length of hospitalization appeared to be the major determinant of the accident rate in this age group.

#### REFERENCES

- (1) Weil, T. P., and Parrish, H. M.: How did it happen? *Hospitals* 32: 43-48, 140, September 1958.
- (2) Stone, E. P.: What is a reasonable standard rate for patient accidents? *Hospitals* 36: 43-46, 114, October 1962.
- (3) Parrish, H. M., Weil, T. P., and Wolfson, B.: Accidents can be prevented. *Amer J Nurs* 58: 679-682, May 1958.

## Education Notes

**Institute for Physicians in Industry.** The program of Continuation Education at Columbia University School of Public Health and Administrative Medicine will hold its 10th annual institute for physicians in industry March 6-10, 1967. The course will be held at the Columbia-Presbyterian Medical Center Complex in New York City.

Designed for physicians practicing occupational medicine, the seminar will also include several sessions on public health subjects. It will be especially useful to candidates for specialty board examinations.

Additional information and applications may be obtained from the Program of Continuation Education—Public Health, Suite 305, 21 Audubon Avenue, New York, N.Y. 10032.

**Center for Environmental Health.** The Kresge Center for Environmental Health has been established recently at the Harvard School of Public Health. The center, which includes departments of industrial hygiene, sanitary engineering, and physiology, offers a wide range of courses leading to master's and doctoral degrees in the biomedical and bioengineering sciences.

Bachelors of science and candidates for baccalau-

reate degrees in chemistry, engineering, physics, biology, mathematics, and pharmacy are also invited to apply. Fellowships which provide a minimum of \$250 a month in addition to tuition and medical fees are available for the 1967-68 academic year.

Further information may be obtained from Dr. Dade W. Moeller, Associate Director, Kresge Center for Environmental Health, Harvard University, 665 Huntington Avenue, Boston, Mass. 02115.

**Summer Preprofessional Traineeships.** The Devereux Schools are offering tax-exempt training stipends of up to \$200 a month plus room and board for 2-3 months during the summer of 1967. Available to junior and senior undergraduates and beginning graduate students who are U.S. citizens, these traineeships are supported in part by the U.S. Vocational Rehabilitation Administration.

Assignments as research or professional aide, day camp tutor, or resident camp counselor are designed to acquaint students with career opportunities for work with mentally retarded and emotionally disturbed children. This work-study program will orient the trainee in special education and vocational rehabilitation, psychological services, mental health disciplines, and related research.

Additional information and application blanks are available from Dr. Henry Platt, Director of Training, Devereux Foundation Institute for Research and Training, Devon, Pa. 19333.