

## The Incidence of Hospitalized Burn Injury In Upstate New York

GERALD FECK, MPA, MARK BAPTISTE, MS, AND PETER GREENWALD, MD, DRPH

Burn injury is an important public health problem and yet the incidence of these injuries is unknown. Most studies have been confined to a limited number of hospitals. Although that type of study is valuable for evaluating treatment, there are no known studies which convincingly provide incidence rates in representative populations. Without such data the true dimensions of the problem cannot be known.

A 100 per cent one-year survey of hospitalized burn injuries in New York State exclusive of New York City has provided a measure of incidence, possibly the only measure of burn injury incidence in a large and representative population in the United States.

### Methods

Trained reviewers collected standardized data from the hospital records of all burn patients discharged in 1974 from each of the 223 State-certified hospitals in upstate New York. The records examined were for patients with discharge diagnoses in ICDA Codes 940-949, the burn codes; 994.0, effects of electricity; and 994.8, effects of lightning.

During analysis cases that proved not to be burn injuries, often those coded as effects of lightning and effects of electricity, were deleted. To be included a case was required to have been admitted to a hospital for at least one day.

In order to ascertain the incidence of hospitalized burn injuries, records were screened so that the final data set consisted exclusively of new burns hospitalized for the first time in 1974. A total of 475 records (14.2 per cent) were excluded because they actually were readmissions.

From the Burn Injury Control Program, New York State Department of Health. Address reprint requests to Gerald Feck, MPA Director, Burn Injury Control Program, Division of Epidemiology, New York State Department of Health, Empire State Plaza, Albany, NY 12237. This paper, submitted to the Journal February 7, 1977, was revised and accepted for publication April 11, 1977.

### Results

In all 3,418 records were collected. After exclusion of errors and readmissions the number of new burn hospitalizations was 2,862. The incidence rate, therefore, was 26.6 per 100,000 per year in a population estimated by this department to be 10,760,700 at the midpoint of 1974.

Age specific incidence rates were highest in the youngest and the oldest for both sexes (see Table 1). Rates for males were higher in every age group, although at the extremes of age the ratio more nearly approached unity.

Nearly 12 per cent of hospitalized burn patients were Black. By comparison, 4.84 per cent of the population was Black. The 1974 incidence rate in the Black population, 67.69 per 100,000, was three times that of the White population.

Table 2 presents the data in regions as defined by Health Service Area within the State. Pronounced differences in incidence rates were found among the regions. These rates ranged from 18.7 to 33.9.

TABLE 1—Age and Sex Specific Rates (per 100,000) of Hospitalization for Burn Injury

Age Groups	Male	Female	Total	Male Rate/ Female Rate	Number of Cases
0-4	75.25	66.96	71.20	1.12	566
5-9	28.68	11.73	20.40	2.45	192
10-14	29.64	7.64	18.90	3.88	208
15-19	35.97	10.70	23.58	3.36	256
20-29	42.40	14.02	27.41	3.02	444
30-39	40.65	12.55	26.12	3.24	322
40-49	29.55	9.49	19.25	3.11	245
50-59	28.89	14.07	21.21	2.05	253
60-69	25.79	14.43	19.67	1.79	167
70-79	28.89	21.24	24.24	1.36	122
80+	48.59	33.49	38.63	1.45	84
TOTAL	36.76	16.82	26.60	2.19	2,859*

\*Three cases had age or sex information missing.

**TABLE 2—Regional Rates of Hospitalization**

Region	Number of Counties	1974 Estimated Population	New Burns	Rate/100,000
Western New York	8	1,766,200	596	33.7
Finger Lakes	9	1,252,900	312	24.9
Central New York	11	1,422,100	399	28.1
*NY-Penn	3	313,000	101	32.3
Northeastern	17	1,339,800	454	33.9
Hudson Valley	7	1,936,500	490	25.3
Nassau-Suffolk	2	2,730,200	510	18.7
All Upstate	57	10,760,700	2,862	26.6

\*Four Pennsylvania counties were not surveyed.

Among new hospitalizations 102 patients died (3.56 per cent). Death certificate data indicate that the total number of burn deaths in the year under study was 289 (2.67/100,000). The range in mortality rate for the years 1972–1975 was 2.66 to 3.17/100,000.

The data describing the severity of the injuries were meager. The percentage of the body surface area injured was recorded in the patient record in the only one-third of the cases. Depth of burn and anatomical location were recorded more frequently, but imprecisely.<sup>1</sup>

### Discussion

Several estimates of the occurrence of hospitalized burn injury are available from the literature. These estimates are now known to both overstate the incidence of burn injury and understate the total volume of burn-related hospitalizations. The National Center for Health Statistics for 1971 estimated 37 hospitalized burns per 100,000 population in the Northeastern United States.<sup>2</sup> The estimated rate derived from a 1972 paper by Greenwald, Crane and Feller was 37.5 per 100,000 for New York State.<sup>3</sup> Clark and Lerner, in a two-year retrospective survey of hospitalized burns in a 15-county area surrounding the City of Syracuse, New York, recently found 33 per 100,000.<sup>4</sup> For that same 15-county area, the present study found a burn-related hospitalization rate of 32.8, and for the entire population studied, 31.0 per 100,000.

In each instance, cases were identified from hospital discharge summaries. Due to great variability in hospital coding practices, many admissions for burn-related procedures are not identifiable as such. After healing of the burn wound, subsequent hospital admissions are often identified as surgical or corrective procedures. For example, cases which should correctly be included are frequently found in ICDA Code 709.0, Cicatrix; Y10.5, Other Surgical Aftercare; and in other codes. The true volume of burn-related hospitalizations are understated when discharge summaries are used as the basis for estimates. The unknown size of the discrepancy should be recognized for facility planning purposes.

The regional data show that the lowest burn incidence rates were found in those counties of highest socioeconomic status. Westchester, Nassau, and Monroe Counties, some of the States' highest socioeconomic areas, had incidence rates of 18.9, 11.5 and 13.2 respectively, among the lowest in the State.

The absence of a measurable indicator of severity is in concurrence with a burn injury study by Linn, Stephenson, and Smith in Florida<sup>5</sup> and with Clark and Lerner's Syracuse area study.<sup>4</sup> This indicates a need for more detailed hospital records and for further study.

### Conclusion

The incidence rate of hospitalized burn injuries in upstate New York in 1974 was 26.6/100,000. Marked variation among regions within the State was found. A minimum estimate of the total volume of burn-related hospitalizations was also derived, and was found to be consistent with other estimates. The absence of a measurable indicator of severity is noted. High incidence rates were found in the young, in males, and in Blacks.

### REFERENCES

1. Feck, G., Baptiste, M. Maslowsky, J. et al., 1974 Upstate New York Survey of Hospitalized Burn Injuries, monograph, Burn Injury Control Program, New York State Department of Health, March 1977.
2. National Center for Health Statistics, Inpatient Utilization of Short-Stay Hospitals by Diagnosis: United States, 1971, Vital and Health Statistics, Series 13, Number 16, July 1974.
3. Greenwald, P., Crane, K. H., and Feller, I. Need for burn care facilities in New York State. *New York State Journal of Medicine*, November 1, 1972.
4. Clark, W., Jr. and Lerner, D. Regional Burn Survey: Two Years of Hospitalized Burns in Central New York, Upstate Medical Center, Syracuse, mimeograph, 1976.
5. Linn, B. S., Stephenson, S. E. and Smith, J. Evaluation of burn care in Florida. *N. Engl. J. Med.*, Volume 296, Number 6, February 10, 1977.