

Morbidity Patterns and Related Variables of 269 Student Nurses

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MORBIDITY DATA are an increasingly urgent requirement of effective community health planning (1, 2). The inherent limitations of mortality statistics now necessitate more information concerning illness experience not only of the principal beneficiaries of rapidly expanding programs but also of the personnel essential for their implementation.

Most morbidity data are derived from population surveys and the registration of reportable diseases. The present study was based on close observation of a comparatively homogeneous group for a period of more than 2 years. Although the data cannot be extrapolated to the general community, they may partly reflect the experience of a significant proportion of the young adult population and, to a greater degree, of a group that contributes a critical component of professional health services.

Method of Procedure

The subjects of this study were 269 nursing students who completed 3-year courses from 1954 through 1958 at The Brooklyn Hospital, a teaching, voluntary general hospital. The subjects represented 73 percent of the students admitted to 5 classes. The average age on entrance into the program was 18.25 years. The youngest was almost 17 years old, and the oldest just over 27; all but 13 (5 percent) were between 17 and 20 years of age. The majority were born in the New York Metropolitan area; 96 percent were of European ancestry. All the students lived in the nurses' residence and dined in the

hospital cafeteria, except during periods of authorized leave, vacation, or assignment to affiliated hospitals.

The reporting of illness among the students was mandatory. Comprehensive health service was provided by the hospital staff. A minimum of medical attention was received from outside sources. Students were admitted to the infirmary for each illness that required absence from duty or class assignment, thus permitting an accurate documentation of total days lost and the clinical diagnosis. Records were kept of all visits to the student health service for conditions that did not entail absence.

We abstracted this specific health information for our study, together with relevant biological, social, and academic data, from the extensive personal records maintained for each student. We also used information from a followup questionnaire completed by 190 nurses (70.6 percent) in 1963, 5 to 9 years after graduation. The illness experience described during this postgraduate interval was assessed ac-

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ording to an arbitrary scale of 1 to 3, based on frequency, severity, and type of conditions indicated. The morbidity experience for the years before entering nursing school was similarly categorized on the basis of past medical histories. Impressions of a consulting psychiatrist, as noted on routine admission interviews, were classified into categories of normal, questionable, and doubtful.

During the 3-year training period, the students were outside the immediate supervision of The Brooklyn Hospital for 8 months (3 months of vacation and 5 months of duty at affiliated institutions). Occasional short-term illnesses on days or weekends off duty probably were unrecorded if the student was able to return to duty on schedule. Fourteen days of absence were permitted without penalty during the 3 years, calculated to be a total of 1,087 duty-days. Absences in excess of this allowance were made up as a requirement for graduation. Three students graduated with a class later than the one in which they entered nursing school. Three others were given leaves of absence for tuberculosis (30 weeks), rheumatic fever (10 weeks), and hepatitis (4½ weeks).

The periods outside the hospital infirmary were not included in the total morbidity figures, for the individuals or the group. The consequent total period of direct observation for each student was 28 months, except for four students who transferred from other nursing schools and

Table 1. Morbidity experience of 269 student nurses during a 3-year training period

Condition	Admissions per person	Days per person	Percent of admissions	Total days
All illnesses	1. 16	5. 40	100. 0	100. 0
Respiratory	. 56	2. 58	48. 4	47. 8
Digestive	. 18	. 51	15. 8	9. 4
Injuries	. 06	. 21	5. 5	3. 8
Infections	. 05	. 28	4. 6	5. 1
Gynecological	. 03	. 12	2. 8	2. 1
Infectious mononucleosis	. 02	. 33	1. 4	6. 2
Appendicitis	. 02	. 24	1. 4	4. 4
Influenza	. 02	. 10	1. 4	1. 9
Abdominal pain	. 02	. 07	1. 9	1. 3
Other	. 19	. 97	16. 8	18. 0

were under observation for periods of 20.2, 18.0, 17.6, and 15.1 months. The total morbidity experience represented in this report therefore is based on a total of 7,448 person-months of observation converted to a 12-month scale, so that our estimated illness rates indicate averages per person per year.

Results

Selected attributes of the 269 student nurses follow; mean and standard deviations are shown except as indicated:

Characteristics	Mean and standard deviations
Height (inches)	64. 3±2. 61
Weight (pounds)	130. 8±6. 55
Paternal age at birth, 266 students	31. 3±6. 32
Maternal age at birth, 262 students	27. 6±5. 83
Age at menarche	12. 5±2. 24
Blood hemoglobin level of 262 students (grams-percent)	14. 2±1. 25
Blood hemoglobin level below 12.5 grams-percent	3.0 percent

The average rate of illness requiring absence, and hence admission to the infirmary, was 1.2 days per student per year. The average length of hospitalization was 4.5 days per admission, or a total mean absence rate of 5.4 days per admission per student per year. Twenty-two students (8.2 percent) were not admitted to the infirmary during the period of observation. The highest rates were 3.9 admissions and 39 days of hospitalization per year. Approximately one-fourth (23 percent) of the students accounted for only 9.5 percent of total admissions. Another fourth (27.1 percent) accounted for nearly half (49.1 percent) of the hospitalizations. Approximately half of the students (51.7 percent) accounted for only 16.7 percent of total days absent, and 10 percent for 35.5 percent of the total.

The average number of "indispositions" (visits to the health service for conditions that did not require hospitalization, excluding repeated dispensary visits for the same condition) was 2.7 per year. Six students had no recorded visits; the highest frequency was 10 visits per year. About one-fifth (19.7 percent) of the students accounted for only 4.5 percent of the indispositions; another fourth (24.2 percent) accounted for 44.2 percent of the group total.

<i>Health status during training period</i>	<i>Mean and standard deviations per year</i>
Absences:	
Number of admissions.....	1.2±0.83
Days lost from duty.....	5.4±5.91
Indispositions (health service visits).....	2.7±1.83

A positive association was noted between the frequency of recorded indispositions and absenteeism because of illness, for both the number of admissions ($P<0.001$) and the total number of days lost ($P<0.001$).

The digestive category (table 1) excluded dental and other oral conditions. The percent distribution of all injuries in terms of admissions and days lost was: fractures, dislocations, and sprains, 29 percent of admissions and 32 percent of days lost; open wounds and lacerations, 17 percent of admissions and 25 percent of days lost; burns, 20 percent of admissions and 11 percent of days lost; contusions and other superficial injuries, 17 percent of admissions and 12 percent of days lost. No specific infections were identified; the skin was principally involved. Fourteen appendectomies were performed, some in conjunction with other conditions; three were performed outside the period of observation and were not included in table 1. Six tonsillectomies were performed during the observation period and were included in the "other" category.

Respiratory conditions, excluding influenza, accounted for 48.4 percent of all admissions to the infirmary and for 47.8 percent of total days lost (table 1). Influenza caused only 1.4 per-

cent of total admissions and 1.9 percent of days lost. Disorders of the digestive system, principally acute, short-term episodes excluding appendicitis, were next in order of frequency (15.8 percent of admissions and 9.4 percent of days lost), followed by injuries (5.5 percent of admissions and 3.8 percent of days lost). Infections, notably abscesses of the skin and subcutaneous tissues, accounted for 4.6 percent of admissions and 5.1 percent of total days. Noninfectious dermatological conditions accounted for only 1.1 percent of admissions and 1.6 percent of total days but were responsible for a high percentage of outpatient visits. Although only 10 admissions (1.4 percent) were attributed to infectious mononucleosis, 6.2 percent of all days lost was assigned to this condition. Gynecologic disorders were a negligible factor in absenteeism.

Among the 269 student subjects, 19.3 percent were regarded as overweight—more than 10 percent above the adult standard for height, or the "desirable weight" but without adjustment for body frame (3)—and 18.2 percent as underweight—more than 10 percent below standard—on admission to nursing school (table 2). Six students (2.2 percent) were below the 5th percentile, and 12 (4.5 percent) above the 95th percentile of average weights for women 18–24 years of age (4); 17 (6.3 percent) were more than two standard deviations above the mean of 125 pounds for American women 20–24 years of age (5). More than half (51.6 percent) gained weight (an average of 8.3 pounds), and 37.2 percent lost weight (a mean of 7 pounds) during the undergraduate period. Of 189 students, 54.0 percent gained weight and 42.9 percent lost weight during the post-training period.

The visual acuity status of students during the nursing school period is outlined in the following tabulation:

<i>Visual acuity</i>	<i>Percent</i>
Less than 20/20 in one or both eyes:	
First year.....	39.9
Third year.....	47.4
Diminished during training.....	16.4
Improved during training.....	9.1
Diminished post training, as reported by 173 students.....	9.2
Improved post training, as reported by 173 students.....	6.9

Table 2. Relative weight status of student nurses

Time of observation	Observed weight: standard weight		Percent	
	Mean	Standard deviation	Underweight	Overweight
First year.....	1.01	0.135	18.2	19.3
Second year.....	1.03	.140	15.2	20.8
Third year.....	1.02	.146	16.7	20.4
Post training, 189 students.....	1.04	.169	14.2	26.3

A total of 39.9 percent of students had visual acuity of less than 20/20 in one or both eyes on entrance to school, and 13.5 percent later showed a reduction in visual acuity below this standard. Approximately 7 percent recorded an apparent improvement in vision.

Eight students (3 percent) had hemoglobin levels below 12.5 grams and two (0.8 percent) had less than 11.5 grams on routine determination. Relations between illness patterns and body weight and stature have been described elsewhere (6). Relations between morbidity and smoking habits will be analyzed in a sub-

sequent report. The relations between selected biosocial variables and morbidity experience are outlined in table 3.

Both infirmary admissions and indispositions were significantly fewer ($P < 0.05$) for students born in the first quarter of the year, and total illness was correspondingly reduced. Significantly fewer ($P < 0.05$) indispositions were recorded for members of the classes of 1956 and 1957, who also experienced fewer admissions and total sick days.

None of the other tabulated associations was significant at the 5 percent level, although a

Table 3. Admissions, absences, and indispositions of 269 student nurses, by selected categories

Category	Number of students	Number per person per year		Percent above median	
		Admissions	Days absent	Absences	Indispositions
All groups	269	1.16	5.40	50.0	50.0
Social class, 254 ¹ students:					
1	57	1.19	5.42	56.1	49.1
2	72	1.03	4.44	41.7	45.8
3	125	1.16	5.72	48.8	52.8
Parents' place of birth:					
United States	178	1.16	5.38	50.6	51.4
British Isles	29	1.19	4.58	44.8	41.4
Northern Europe	28	1.20	6.74	57.1	61.7
Southern Europe	19	.93	5.26	47.4	47.4
Other	15	1.21	4.74	40.0	60.0
Birth rank, 254 ¹ students:					
Singleton	20	1.25	6.12	55.0	55.0
First born	81	1.05	5.27	45.7	46.9
Second born	85	1.20	5.13	51.8	45.9
Third born or later	68	1.23	5.50	50.0	51.5
Season of birth:					
First quarter	71	1.05	4.54	² 39.4	² 39.4
Second quarter	59	1.21	5.44	52.5	57.6
Third quarter	76	1.19	5.92	50.0	50.0
Fourth quarter	63	1.15	6.07	60.3	55.6
Graduation year:					
1954	63	1.17	6.03	53.9	61.9
1955	52	1.28	6.38	55.8	50.0
1956	53	1.10	4.54	39.6	² 35.8
1957	50	1.06	4.55	44.0	² 40.0
1958	51	1.23	5.76	56.9	60.8
Age at menarche:					
Below median	114	1.17	5.20	48.2	48.2
Above median	155	1.19	5.54	51.0	52.3
Maternal age, 263 ³ students:					
Below median	131	1.09	5.31	44.3	51.1
Above median	132	1.22	5.64	55.3	48.5
Psychiatric evaluation:					
Normal	192	1.13	5.06	48.4	49.5
Questionable or doubtful	77	1.24	6.36	58.4	51.9

¹ Information not obtained on 15 students.

² $P < 0.05$.

³ Information not obtained on 6 students.

comparatively strong relation was noted between frequency of illness and social class as estimated from the father's occupation. Students in social class 2 showed a significantly greater frequency ($P < 0.01$) of above-median hemoglobin levels than students in social classes 1 and 3. This was not attributable to uneven distribution among the five class groups. Associations between morbidity experience and paternal age, uncorrected for maternal age, were similar to, though generally smaller than, those noted for maternal age.

The estimated pre- and post-training health status of the students follow:

<i>Health status</i>	<i>Percent</i>
Pre-training:	
Above average.....	28.3
Average.....	56.1
Below average.....	15.6
Post training:	
Good.....	68.4
Fair.....	25.8
Poor.....	5.8

No relation was observed between estimated pre-training illness experience and the morbidity pattern during training. Although the number of indispositions throughout the period of observation also appeared unrelated to the estimated post graduate health status, this status was negatively associated with absenteeism at a level just short of statistical significance ($P > 0.05$ and < 0.10). None of the other tabulated associations was significant at the 5 percent level.

Discussion

Morbidity data derived from different groups and classified according to different criteria obviously are not completely comparable (1, 2, 7). Generally, however, the illness pattern of our student nurse population was of the same order as estimates from other sources (2, 8-12), at least to the extent that infirmary admissions and outpatient visits constituted a reasonable index of health status. While the present sample could not be regarded as representative—in fact was further selected by restriction to those qualified applicants who successfully completed the 3-year training course—the illness pattern simulated those described for much larger populations of women in the late adolescent and

young adult age groups (11-13). Generally comparable figures were noted with respect to both disease-specific rates and total morbidity experience. The apparent concentration of illness in a relatively small proportion of the total study population also was consistent with a variable disposition to morbidity observed in individual members of other relatively homogeneous groups (12, 14-16).

An association might be anticipated between the morbidity pattern observed during the nursing school years and the health experience before this period, although the inexact and arbitrary ranking system used for the health experience would seem to preclude strong statistical support for this relation. Moreover, the unique longitudinal studies of Valadian and associates (17, 18) suggest less consistent patterns in the early age groups than those noted during high school and later years (12, 14-16). A comparatively stronger association between health patterns during and after training was also noted in our study.

Differences in illness rates associated with birth rank and ethnic group appeared to be compatible with the psychological as well as socioeconomic circumstances that are commonly advanced in partial explanation (19). Birth rank and ordinal position in the family have been identified elsewhere as variables in the occurrence of disease, for which conventional psychodynamic mechanisms have also been postulated (20, 21). The greater morbidity noted among the potentially less stable students is consistent with this hypothesis, as are observations recorded for other groups (22-24).

The prevalence of visual acuity of less than 20/20 is in keeping with other observations (25, 26), but it raises questions concerning the standards best suited to ostensibly healthy young adults.

Some of the other associations suggested between illness experience and selected biological variables may be spurious. However, further inquiry seems warranted to evaluate the possible relations, particularly of morbidity, to parental age, season of birth, and menarchal age.

Several practical implications of these observations appear evident. Supposedly, selective factors notwithstanding, the illness pattern of

nursing personnel suggests little special health advantage attributable to the closely supervised hospital experience. Indeed, the added elements of formal protection may be more than counterbalanced by the increased risks of institutional living, especially occupational exposure to virulent agents. The comparatively high frequency of digestive disorders, principally short-term, acute incidents, suggests an enhanced opportunity for dissemination of these conditions among persons using common, large-scale hospital food services.

A frequency of respiratory illness comparable to the high incidence in the general population indicates, beyond considerable, evidently unavoidable loss of professional time, a commensurate hazard to patients less able to cope with these conditions.

Possibly of greater moment is the impressive frequency of pyogenic infections, notably of the skin, among these students. The obvious special risks thereby presented to those for whom they must provide the full range of hospital nursing services should generate concern.

Summary

The morbidity experience of 269 student nurses during a 28-month period of closely supervised training has been observed to be generally comparable with patterns reported for other population groups. The average frequency of illness involving absence from duty was 1.2 per year, representing a mean loss of 5.4 days per year.

Respiratory conditions accounted for 47.8 percent of total absence from duty and digestive disorders for 9.4 percent. Injuries were responsible for 3.8 percent of days lost, and 5.1 percent was attributed to infections, predominantly of the skin. Infectious mononucleosis accounted for 6.2 percent of all absenteeism.

A comparatively small proportion of the students accounted for a relatively large percentage of total group illness, in terms of absenteeism and visits to the student health service. The morbidity experience was significantly lower among students born in the first quarter of the year, as well as among two successive classes of the five represented in this study.

Suggestive although not significant associations were noted between morbidity patterns

and such variables as birth rank, maternal age, age at menarche, psychological status, social class, and ethnic origin.

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Conference Calendar

January 30-February 1, 1967. First Health Physics Society: Midyear Topical Symposium, Chicago, Pick Congress Hotel. Information: Jesse A. Pagliaro, Chairman, Publicity Committee, U.S. Atomic Energy Commission, Chicago Operations Office, 9800 South Cass Avenue, Argonne, Ill. 60439.

March 20-23, 1967. Forty-fourth Annual Meeting of the American Orthopsychiatric Association, Washington, D.C. Washington Hilton Hotel. Information: Dr. Marion Langer, Executive Secretary, American Orthopsychiatric Association, 1790 Broadway, New York 10019.

April 10-13, 1967. American Industrial Health Conference, New York City, Americana Hotel. Information: American Industrial Health Conference, 55 East Washington Street, Chicago 60602.

April 24-26, 1967. National Congress on Environmental Health Management, New York City, Hotel Americana. Information: Department of

Environmental Health, American Medical Association, 535 North Dearborn Street, Chicago.

May 3-4, 1967. Fourth Annual National Colloquium on Information Retrieval, Philadelphia. Information: Lawrence Berul, Auerbach Corporation, 121 North Broad Street, Philadelphia 19107.

May 9-12, 1967. Second Annual Joint Meeting of the Clinical Society and Commissioned Officers Association of the Public Health Service, Atlanta, Dinkler Plaza Hotel. Information: H. W. Richter, Information Office, Communicable Disease Center, Public Health Service, Atlanta 30333.

May 15-18, 1967. Eighteenth Annual Mid-America Symposium on Spectroscopy, Chicago, Sheraton Hotel. Information: Lew Malter and Associates, P.O. Box 252, Morton Grove, Ill. 60053.

Announcements for publication should be forwarded to Public Health Reports 6 months in advance of meeting.

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SIRKEN, MONROE G. (Public Health Service): *The Hospital Discharge Survey. Public Health Reports, Vol. 82, January 1967, pp. 9-16.*

The Hospital Discharge Survey is the most recent program development within the National Center for Health Statistics of the Public Health Service. The objective of the survey is to produce national statistics on hospital patients, on a continuing basis, which are representative of the experience of the civilian population in short-term hospitals. The survey is based on information collected for subsamples of patients discharged from a national sample of several hundred hospitals. The principal sources of information in the survey are existing hospital records. Statistical information on the characteristics of the patient and his hospitalization are abstracted onto forms that are transmitted to the National Center for editing, processing, analysis, and publication.

The statistics derived from the Hospital Discharge Survey will be coordinated with statistics emanating from other programs in the National Center for Health Statistics to produce an integrated set of statistics responsive to the needs for information about the nation's health.

The Hospital Discharge Survey was

planned when the limitations of the existing survey mechanisms of the National Center were recognized in view of the expanded need for hospital patient statistics. The procedures for the survey were developed in a pilot study that was conducted during the latter half of 1964. The statistics collected during calendar year 1965, which represents the first data collection year of the survey, are based on a national sample of about 110,000 discharges from about 300 hospitals. The size of the sample is being increased during 1966 and may be increased further during 1967, so that ultimately the full sample size of 300,000 discharges and 700 hospitals will be attained.

The information collected during 1966 and thereafter will be abstracted from the patients' medical records. In the future, supplementary information pertaining to hospital charges will be abstracted from the patient's billing records. Over the next several years, a substantial amount of methodological work is contemplated to improve the quality of information and to expand the scope of information being collected.

MARTIN, RUSSELL, J. (Illinois Department of Public Health), HANSON, LYLE E., and SCHNURRENBERGER, PAUL R.: *Leptospiral interspecies infections on an Illinois farm. Public Health Reports, Vol. 82, January 1967, pp. 75-83.*

To examine the significance of leptospiral infections in a confined population, the domestic animal, wild animal, and human populations of a northern Illinois farm were studied in 1964. Serums from 98 of 353 dairy animals exhibited microscopic agglutination titers for *Leptospira grippotyphosa*. Forty-nine animals became reactive to *L. grippotyphosa* during the 1-year study period. Twenty-one of 65 dairy cattle in one pasture converted to reactive during a 13-day period in late July 1964. Five isolations of *L. grippotyphosa*, four from blood and one from urine, were made during the outbreak. *Leptospira ballum* antibodies were detected in 4 of 105 serums examined in December. No isolations of *L. ballum* were made from cattle.

Leptospira hardjo antibodies were detected in the serums of 19 of 163 beef cattle. Four animals became reactive during the year. *L. hardjo* was isolated from the kidney of a steer. *L. grippotyphosa* antibodies were detected in the serum of only one beef animal. Seven

of 138 swine reacted with *Leptospira autumnalis* antigen. No signs of leptospirosis or other leptospiral antibodies were detected, and no leptospirae were isolated.

Cultures were made from kidney tissues of 198 wild animals trapped on the farm during March, May, and August. *L. ballum* was isolated, during all trapping periods, from a total of four species. *Leptospira icterohaemorrhagiae* was isolated from three Norway rats. *L. grippotyphosa* was isolated from 3 raccoons and 1 opossum collected during August from the pasture where the cattle outbreak had occurred; 187 of the wild animals were tested serologically. Reactions were found against *L. autumnalis*, *L. ballum*, *Leptospira canicola*, *L. grippotyphosa*, and *L. icterohaemorrhagiae*.

The only evidence of leptospiral infection in the human population was the demonstration of microscopic agglutination titers of 1:100 against *L. autumnalis* antigen in 4 of 103 serums tested.

TUFTS, NORMAN R. (Public Health Service): *Differentiation of sources in a hepatitis outbreak. Public Health Reports, Vol. 82, January 1967, pp. 1-8.*

An outbreak of infectious hepatitis in a village complex of 9,600 people reached a total of 32 reported and 2 symptomatic unreported cases over an 11-month period. An epidemiologic investigation was undertaken to ascertain the sources of infection. Personal contacts, milk, water, and raw shellfish were under suspicion.

About 65 percent of the reported cases were in persons 15 years old or younger. If cases in parents and contacts of school-age children are counted as

school-associated, all but 5 of the 32 reported cases would be placed in this category. Ten of the 20 school-age children with confirmed cases attended a school in which inadequate water pressure presented problems in personal hygiene. Crowded and insanitary conditions prevailed in several of the children's homes.

In no case was sufficient evidence revealed to indicate that the disease had been transmitted by any other means than personal contact.

KENLINE, P. A. (Public Health Service), and CONLEE, C. J.: *Nashville air pollution and health study: A summary. Public Health Reports, Vol. 82, January 1967, pp. 17-29.*

An extensive air pollution study was conducted in Nashville, Tenn., to investigate possible relations between air pollution and health and to gather information on a number of medical, engineering, meteorological, and other phases of air pollution.

Bronchial asthma, anthracosis, morbidity, respiratory disease mortality, and cardiovascular disease mortality were studied in relation to air pollution.

More than 200,000 aerometric observations provided air quality data for use in the medical studies as well as in determining the representativeness of air quality data with respect to number and location of sampling stations, sampling frequency, and sampling time, and evalu-

ating analytical methods, equipment, and procedures. These findings, plus an emission inventory and a discussion of the diurnal variation of carbon monoxide concentrations, have been outlined.

Meteorological factors were studied in relation to air quality. A method of forecasting air pollution levels and a discussion of a mathematical diffusion model have been given along with the meteorological findings.

The findings from miscellaneous studies on design of morbidity surveys and opinions of people indicating their awareness and concern about air pollution have been presented.

A bibliography of papers on the Nashville study was included.

BARSAM, PAUL C. (Massachusetts Department of Public Health), and GANEM, BARBARA T.: *Survey of accident experience in a chronic disease hospital. Public Health Reports, Vol. 82, January 1967, pp. 35-40.*

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 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.

HURLEY, PETER L. (Public Health Service), and CONWELL, MARGARET: Public mental hospital release rates in five States, 1954 and 1960. Public Health Reports, Vol. 82, January 1967, pp. 49-60.

Two groups of patients first admitted to State and county mental hospitals in five States (Arkansas, California, Louisiana, Minnesota, and New York) in 1954 and 1960 were studied. First release rates of cohorts of patients with schizophrenia and diseases of the senium were compared.

The "first significant release" method of analysis was used. It appears that members of the 1960 cohort with schizophrenia or diseases of the senium were released earlier and at a higher rate than members of the 1954 cohort. Since the

years considered represent a time period before and after the widespread introduction of new therapeutic agents and the institution of more intensive treatment modalities, we believe the data reflect the influence of these two factors.

Because this study included only five States, it is impossible to generalize the findings for the United States. It is clear from the data presented that the changes, although general within the five States, did not occur in all age groups, in both sexes, or in all the reporting States.

JOBIN, WILLIAM R. (Public Health Service), and UNRAU, GLADWIN O.: Chemical control of *Australorbis glabratus*. Public Health Reports, Vol. 82, January 1967, pp. 63-71.

In laboratory and field evaluation of 28 chemicals for potential use against the snail *Australorbis glabratus*, intermediate host of *Schistosoma mansoni* in the Americas, 5 of the compounds (Bayer 73, ICI-24223, CuSO₄, NaPCP, and Eelicide-TFM) were toxic enough to warrant extensive testing.

In the laboratory, Bayer 73 was the most toxic of the five compounds to adults and eggs of *A. glabratus*. The concentrations of Bayer 73 which resulted in 99.5 percent mortality (LC_{99.5}) among adult snails were 3.0 mg. per liter for 1-hour applications, 1.0 mg. per liter for 6-hour applications, and 0.26 mg. per liter for 24-hour applications. Bayer 73 was far more stable than the other compounds

in outdoor tests; it required 50 hours to decay to one-half the applied concentration. Five field tests with Bayer 73 further supported its superiority to the other compounds.

CuSO₄ had a 6-hour LC_{99.5} of 1.1 mg. per liter for adult snails and 10 mg. per liter for eggs. It was highly unstable under field conditions, compared to Bayer 73.

ICI-24223 and NaPCP were less toxic than Bayer 73 and CuSO₄, and ICI-24223 gave poor results when tested in the field. Eelicide-TFM had a 6-hour LC_{99.5} of 15 mg. per liter, but it was nontoxic to fish and it may be the best compound for use where fish are of value.

HILLMAN, ROBERT W. (State University of New York College of Medicine), REUTER, MAGDA, DEMAREST, ELSIE, SMITH, VIRGINIA M., and WANZER, RUTH A.: Morbidity patterns and related variables of 269 student nurses. Public Health Report, Vol. 82, January 1967, pp. 85-91.

The morbidity experience of 269 student nurses during a 28-month period of closely supervised training has been observed to be generally comparable with patterns reported for other population groups. The average frequency of illness involving absence from duty was 1.2 per year, representing a mean loss of 5.4 days per year.

Respiratory conditions accounted for 47.8 percent of total absence from duty and digestive disorders for 9.4 percent. Injuries were responsible for 3.8 percent of days lost, and 5.1 percent was attributed to infections, predominantly of the skin. Infectious mononucleosis accounted for 6.2 percent of all absenteeism.

A comparatively small proportion of the students accounted for a relatively large percentage of total group illness, in terms of absenteeism and visits to the student health service. The morbidity experience was significantly lower among students born in the first quarter of the year, as well as among two successive classes of the five represented in this study.

Suggestive though not significant associations were noted between morbidity patterns and such variables as birth rank, maternal age, age at menarche, psychological status, social class, and ethnic origin.