

Staff Meeting Bulletin
Hospitals of the » » »
University of Minnesota

Acute Respiratory
Infections

STAFF MEETING BULLETIN
HOSPITALS OF THE . . .
UNIVERSITY OF MINNESOTA

Volume XI

Friday, November 17, 1939

Number 7

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during the school year, October to May, inclusive.

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William A. O'Brien, M.D.

I. LAST WEEK

Date: November 10, 1939
Place: Recreation Room
 Powell Hall
Time: 12:15 to 1:30 p.m.
Program: Movie: "On the Firing Line"

Amputations
 Bernard Lannin
 John R. Paine

Discussion
 J. R. Paine
 B. G. Lannin
 A. A. Zierold
 A. H. Beard
 O. H. Wangenstein
 G. T. Evans

Present: 146

Gertrude Gunn
 Record Librarian

II. MOVIE

Title: "Ferdinand the Bull"
 A Walt Disney Feature

Released by: R-K-O.

III. ANNOUNCEMENTS1. INTERDEPARTMENTAL SEMINAR

Wednesday, November 22, 1939
 8:00 p.m.
 Eustis Amphitheatre

A New Syndrome of Vascular Headache;
 Treatment with Histamine.

Dr. B. T. Horton and Dr. A. R.
 MacLean, Mayo Clinic.

A New Differential Approach to Mental
 Disorders.

Dr. S. R. Hathaway and Dr. J. C.
 McKinley.

J. C. McKinley, Chairman

2. THE MINNESOTA PATHOLOGICAL
 SOCIETY

The University of Minnesota
 Medical School

Institute of Anatomy
 Tuesday, November 21, 1939
 8:00 p.m.

Adamantinoma of the Tibia.

Dr. Robert Hebbel

Intracranial Tumors.

Dr. A. B. Baker

IV. ACUTE RESPIRATORY TRACT INFECTIONS
INCLUDING PNEUMONIA IN A YOUNG
ADULT GROUP

C. A. McKinlay
 D. W. Cowan
 R. E. Carlson
 P. A. Swenson

As long as acute infections of the respiratory tract have a leading place in morbidity they will challenge interest in all phases of clinical and preventive medicine. A brief survey of these diseases in a young adult group may serve to emphasize the importance of their study and of the significance of investigations such as those of Diehl, Baker, Cowan and others that are concerned in the methods of prevention and treatment of the common cold. The incapacity occasioned by these diseases is shown by the fact that for the school year 1938-39 42 per cent of all hospitalized cases were admitted for acute infections of the respiratory tract, including pneumonia. Moreover the relationship of acute upper respiratory tract infections to pneumonia, a disease which stands as the third most common cause of death, should compel vigilance on the part of all concerned. Of 75 cases of lobar pneumonia studied, 37 gave a history of immediately preceding acute respiratory infection, and 74 per cent of the cases of all other pneumonias studied gave similar preceding history. Furthermore, the relationship of respiratory infection to remote systemic disease should be mentioned. It appears that pathogens sometimes inhabitant in the tract as secondary invaders of the virus initiated common cold may be associated with the onset of reactivation of disease such as glomerulonephritis or rheumatic fever; also that follicular tonsillitis may be the occasion for systemic invasion by hemolytic streptococci. The development of such sequelae has, however, been seen infrequently in this group.

The history of pandemics of influenza makes important the study of sporadic cases as well as of minor epidemics. The recognition of sporadic cases of in-

fluenza is a common difficulty. The emphasis has been placed diagnostically upon the extent of the systemic reaction and upon the minimal local lesion, as contrasted with the marked catarrhal symptoms of the common cold. The prevalent conception of the occurrence of normal or reduced leucocyte counts in influenza may have been a factor in the clinical classification. In the British influenza epidemic of 1936-37, reported by Stuart-Harris¹ and co-workers, normal or slightly elevated leucocyte counts were noted while leucopenia was uncommon. The varying leucocyte counts in the epidemics covered by this report will be noted later. It is apparent that until a clinical method of isolating the causative virus is found or until a specific test is available, differentiation will not always be possible. It is of interest to note that Dr. Niig of the State Board of Health laboratories found positive antibody reactions for the influenza virus in specimens in 14 of 15 clinical cases of influenza of the 1938-39 epidemic studied, and in 2 instances the virus was demonstrated by mouse inoculation.

Data have been collected from the study of hospital cases only, for the school years of 1934-35 to 1938-39; infections such as the common cold without appreciable systemic or febrile reaction are not included. For the purposes of this survey the infections under consideration have been divided into four main groups:

1. Coryza and pharyngitis, usual manifestations of the common cold, together with laryngitis and tracheobronchitis, which are commonly considered to represent infection by various pathogens inhabitant in or invading the respiratory tract, whether secondary to the common cold or not.
2. Follicular tonsillitis and follicular pharyngitis due to the hemolytic streptococcus.
3. Influenza due to the specific virus infection.

4. Pneumonia, with special study of lobar pneumonia from the available records extending from 1930-31 to

1938-39, excepting 1933, for which records were not obtained.

TABLE I

Incidence of Respiratory Infections

	1934-35	1935-36	1936-37	1937-38	1938-39
Coryza, Pharyngitis, Laryngitis, Tracheobronchitis	241	296	271	246	425
Follicular Tonsillitis, Follicular Laryngitis	43	102	55	78	35
Influenza	138	44	160	93	240
Pneumonia	27	44	17	46	53

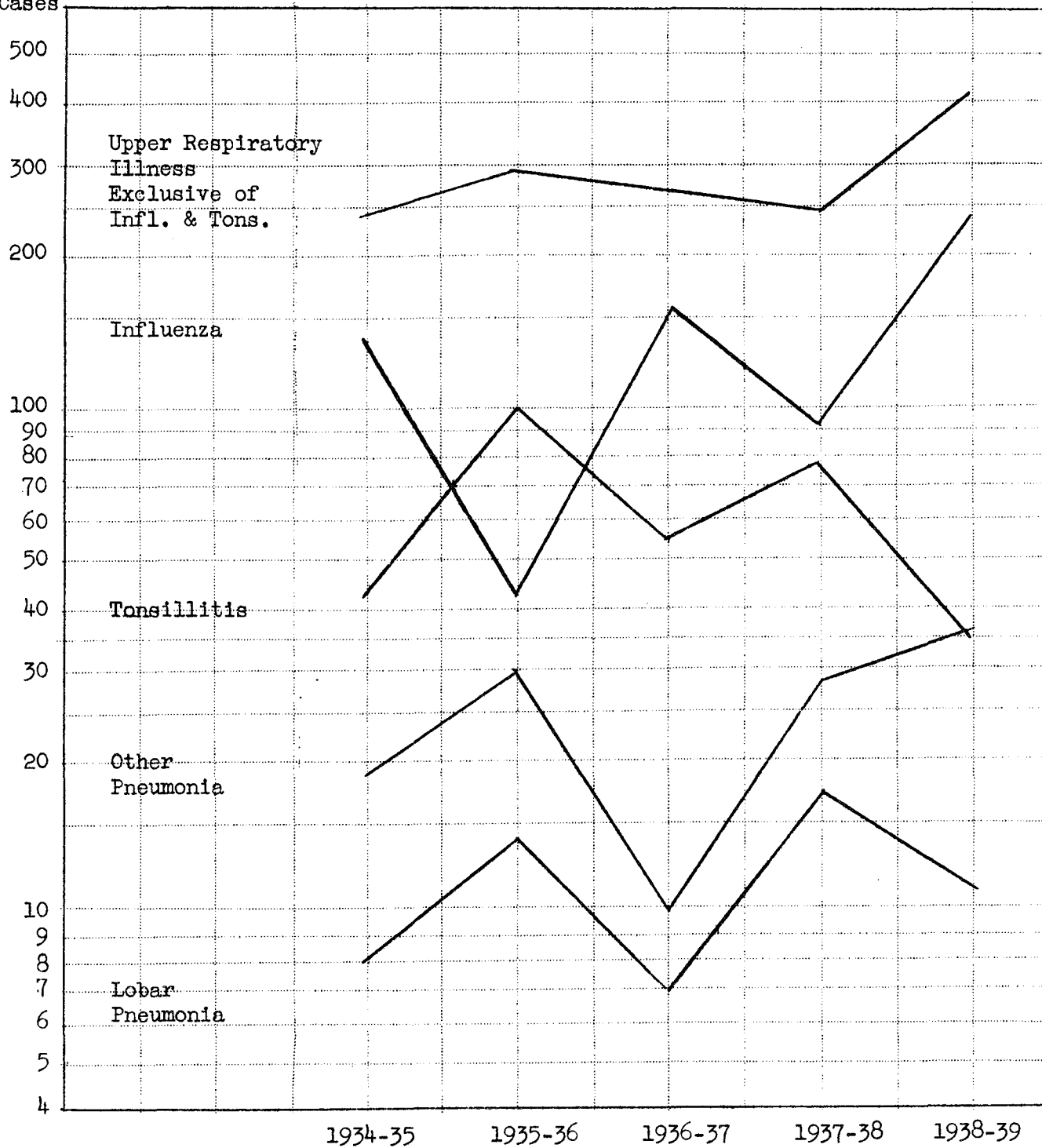
The first group (the common cold, laryngitis and tracheobronchitis) have had a fairly even level of incidence during the 4 year period. Small epidemics of influenza were noted in 1934-35 and in 1936-37 and in 1938-39. Tonsillitis was much less common during the years that epidemics of influenza occurred. In a report by Stuart-Harris¹ and others, of the British epidemic of influenza of 1936-37, they differentiate epidemic influenza from a group of infections designated as febrile catarrh. These include coryza, pharyngitis, tonsillitis, laryngitis and tracheobronchitis. This grouping is similar to that of Group I here reported except that it has here seemed desirable to keep follicular tonsillitis and follicular pharyngitis as a separate entity, recognized as commonly due to hemolytic streptococci. The clinical features of follicular exudate, quite marked prostration and systemic reaction, not infrequently with prompt and sometimes crisis-like defervescence, serve to distinguish follicular tonsillitis starting as such, from the coryza and pharyngitis type of disease; although exudative tonsillitis and complications due to hemolytic streptococci may occur in the latter.

Seventy five cases in 59 males and 16 females presented sufficient criteria with tendency to crisis type defervescence to be classified as lobar pneumonia although pneumococci were demonstrated in the sputum in less than one-half of these cases. Blood cultures were positive in five cases; two Type 1, one each Type 2 and 7, and one Group 4. The x-ray diagnosis has been classified from the conclusion reported by the roentgenologist.

It is noted that the lower lobes, particularly the left, were more commonly involved and that the multiple lobe involvement was uncommon. The lesion was described as lobar pneumonia in 45 instances; as pneumonia, pneumonic process, area of consolidation or density in 24; as bronchopneumonia in 4; and as atypical in 2. The x-ray has furnished the most accurate method of determining early lesions and the extent of their progression. The impression has been gained that occasionally an area of involvement posterior to the heart with definite physical signs may escape detection unless a very careful interpretation is made of anterior-posterior films. Physical signs such as suppression of breath sounds, crepi-

INCIDENCE OF RESPIRATORY INFECTIONS
5-Year Period

No. of
Cases



tant rales or slight impairment of resonance have commonly been present on first observation. In certain cases, as in bronchiolitis, the physical signs of diffuse, medium rales are striking in the stage when x-ray findings are minimal. Speaking of all pneumonia studied, the occurrence of persistent, localized rales most often at one lung base, has

quite commonly indicated the presence of pneumonia as corroborated by x-ray studies. While occasionally small areas of pneumonia are revealed only on x-ray films, we have rarely encountered cases with marked x-ray shadows in which physical signs were entirely negative.

TABLE II

Lobes involved from x-ray findings

	<u>Right</u>		<u>Left</u>	
	Upper	Middle	Lower	Upper
	9	11	24	35

Combined lesions of 2 lobes in 7

<u>X-ray diagnosis</u>	<u>Pneumonia, Pneumonic process or consolidation</u>	<u>Broncho-Pneumonia</u>	<u>Atypical</u>
45	24	4	2

Types of Pneumococci isolated from sputum

<u>Type</u>	<u>1</u>	<u>2</u>	<u>3</u>	(Group <u>4</u>)	<u>7</u>	<u>8</u>	<u>9</u>	<u>16</u>	
<u>No. Cases</u>	6	6	5	5	3	1	2	1	Total 29

Blood Culture Positive

<u>Type</u>	<u>1</u>	<u>2</u>	(Group <u>4</u>)	<u>7</u>
<u>No. Cases</u>	2	1	1	1

Specific anti-pneumococci serum therapy, starting as early as the first day of illness but usually by the third day, was given in 15 cases with benefit - as measured by quite prompt fall in temperature in all adequately treated cases except one. Four of the specifically treated cases had positive blood cultures including one of type 2 pneumococcus with high expected mortality rate in untreated cases. All cases, regardless of specific

treatment, recovered except one male, age 28, with pneumococcus type 3 infection, in whom leukopenia developed. Complications consisted of four cases of empyema and three of delayed resolution. The leucocyte count in 39 of 75 cases was below 14,000 and in 14 cases, 8,000 or below. The leucocyte counts in the remaining cases varied from 14,000 to 49,900. All cases with empyema showed increased leukocytosis with the

complication. All cases with pneumococci demonstrated in the sputum had a leucocyte count of 15,000 or above except in the fatal case reported and in two others. While leukocytosis seemed to be part of a favorable course, normal or only slightly elevated counts in some instances seemed to indicate a relatively mild process and did not imply an unfavorable course.

During this period there were 209 cases of pneumonia other than lobar. It is appreciated that they represent a large group of diseases which will finally be broken down into etiologic entities. During this period one case of pneumonia due to *P.tularensis* has been recognized. Another case was one of extensive migratory pneumonia with high eosinophilia noted. Still another case of bronchiolitis and bronchopneumonia has been reported in which B influenza and later hemolytic streptococci were isolated by Dr. Spink with quite distinctive clinical picture. Dr. Reimann has reported cases from this group due to staphylococci. With more detailed bacteriological studies becoming available, more etiological entities will undoubtedly come to light.

During the past two years variation in pneumonia has been noted, in that typical lobar pneumonia has become less common and pneumococci have been less frequently isolated from the sputum. For one of these two years, that of 1938-39, there were 42 cases diagnosed pneumonia other than lobar, under the terms pneumonia, bronchopneumonia or atypical pneumonia. For the most part the clinical picture presented has been one of relatively mild intensity with fall of temperature usually by lysis. There has been a tendency to multiple and upper lobe involvement. The x-ray findings were described as atypical in nine instances, in others as pneumonia, bronchopneumonia, pneumonic process or density. Pulmonary tuberculosis was mentioned as a possibility in two. The leucocyte count has been variable; 17 have had counts from 5000 to 8000, the others leucocyte counts not above 22,000 except one of 31,400. Streptococci, either hemolytic or viridans,

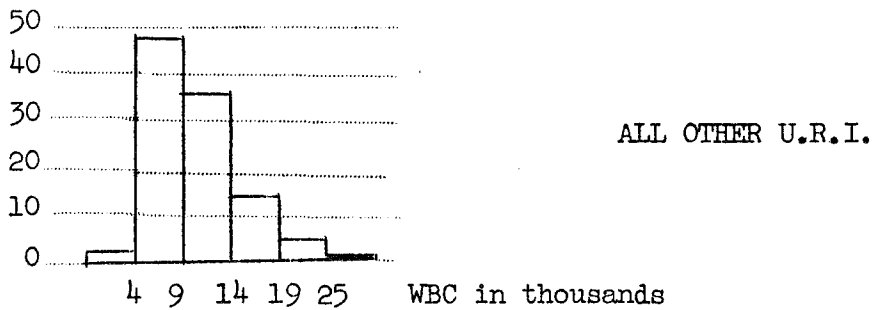
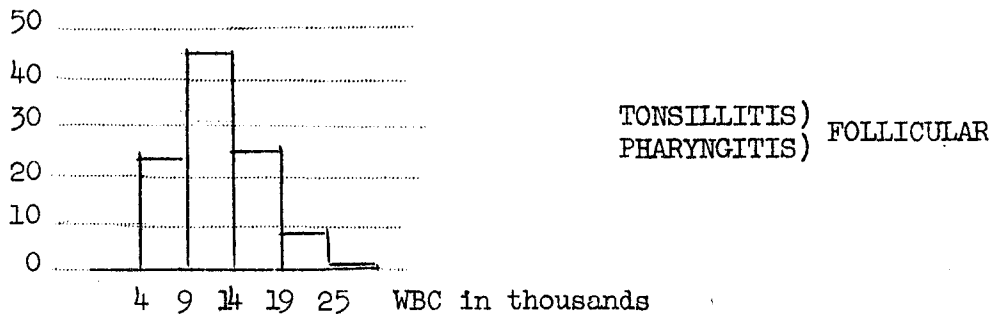
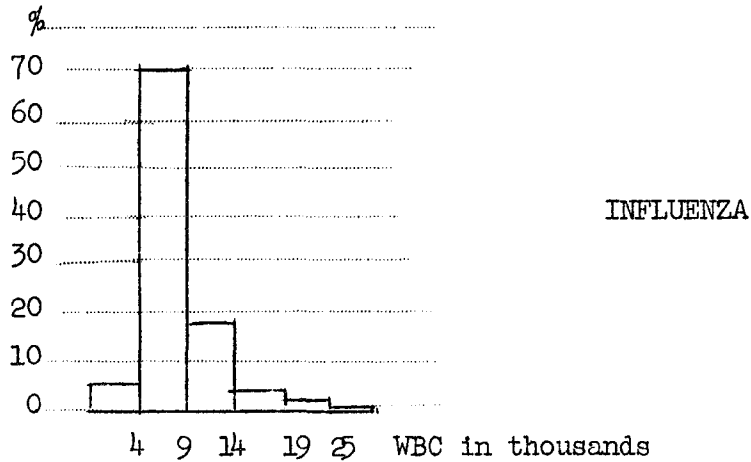
were reported in the sputum in 21 instances and in three were combined with staphylococci. Pneumococcus type 19 and types 20 and 25, and type 7 were found combined with streptococci in three instances. The type 7 case received anti-pneumococcus serum. Sulfanilamide was given in eight cases. One death occurred in a case of hemolytic streptococcus pneumonia in which empyema and later extension of pneumonia developed.

Almost all of the cases of upper respiratory infection studied had white counts made on the day of admission to the hospital. For the first three years of this study the average white count for each group was surprisingly consistent. In the year 1937-38 all of the white counts for each of the groups were higher and in 1938-39, lower than in the other three years of the study. There were, of course, wide individual variations in these leucocyte counts, but a few generalizations might be permissible.

As would be expected the highest white counts were found in cases of follicular tonsillitis and follicular pharyngitis. These ranged from 11,260 for 1938-39 to 13,300 in 1937-38. Most of the individual white counts of this group were between 9,000 and 13,000, although a few ran over 25,000. The lowest average white count was found in the influenza group; the averages for the years ranging from 6,220 in 1938-39 to 10,590 in 1937-38. The average white count for all other upper respiratory infections ran very close to 10,000 except in the year 1938-39, when the average white count for this group was 8,630. The highest average again was found in 1937-38 when it was 10,590.

The percentage distribution of the leucocyte count for the various types of upper respiratory infection is shown in the accompanying chart.

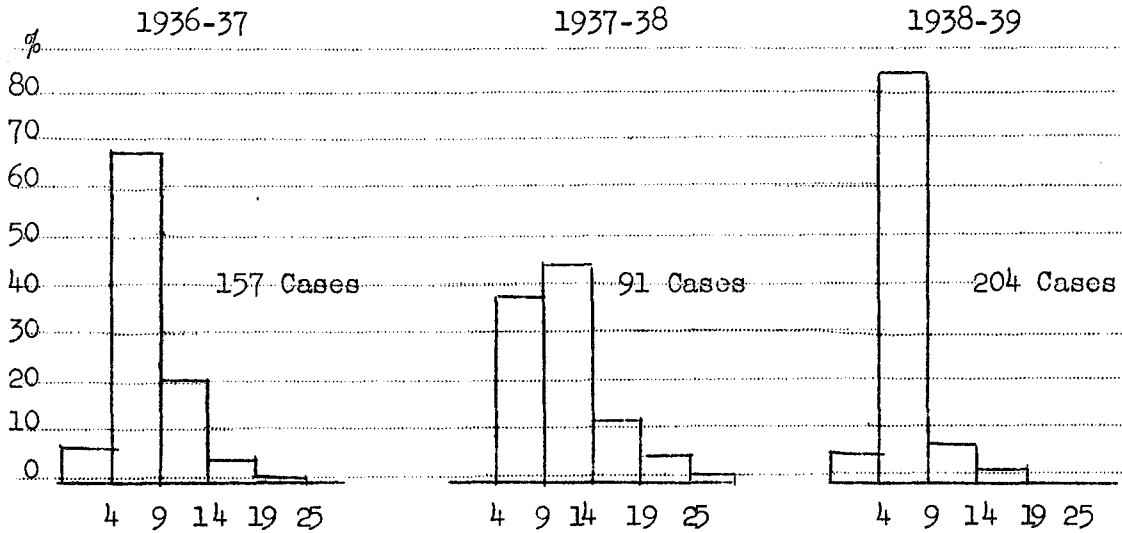
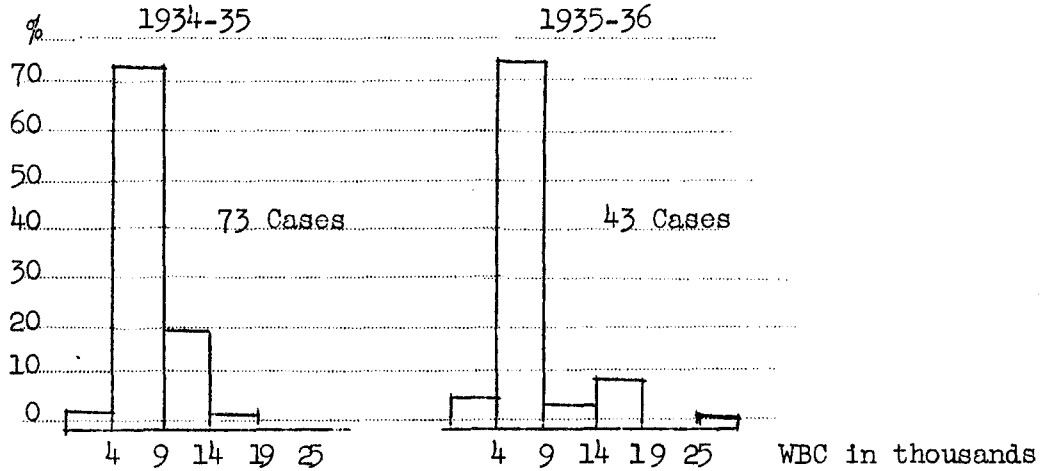
PERCENTAGE DISTRIBUTION OF LEUCOCYTE COUNTS
1934-1939



When the influenzal cases are broken down into individual years, it will be seen that the percentage distribution of count was quite consistent except

in 1937-38 when the biggest percentage of cases of influenza had white counts in the range 8,000 to 13,000.

LEUCOCYTE COUNTS IN INFLUENZA



Critical analysis of the data showed that a true statistical difference exists between the white counts for influenza this year as compared with the white counts of other years in our study.

The precise demonstration of specific virus causation of the 1938-39 influenza epidemic has enabled us to compare its features with that reported of the epidemic of 1936-37 in England. The average leucocyte count of 6,220 in the

1938-39 epidemic here reported contrasts with the normal or slightly elevated counts there reported. This variation taken with our finding in 1937-38 of white count range from 8,000 to 13,000 indicates that leucocyte counts are not consistent and are not diagnostic.

Atypical pneumonia has been reported from various parts of the country. Reimann² reported a series of cases in which he considered that an unidentified

virus infection might be responsible. Bowen⁴, Allen⁵, Rainey and Burbridge⁶, Smiley⁷ and co-workers described atypical cases for which the term pneumonitis is used. These cases were relatively mild in intensity, had prominent x-ray findings and the absence of significant physical signs and suggested association with influenza. Undoubtedly value accrues in the effort to delineate clinical entities in the mass of various diseases called broncho-pneumonia, in that the study of etiology may be enhanced. It seems of doubtful value to use the term pneumonitis, which was not found in texts of pathology, such as those of Bell and McCallum, among descriptions of atypical forms. McCallum⁸ remarks that in the World War pandemic of influenza, different types of lobular pneumonia developed according to the prevalent bacteria, capable of producing secondary infections. It also seems worth while in this connection to call attention to the statement by Bullowa⁹ and Wilcox that the endemic pneumonias are a series of diseases which vary as to their occurrence from year to year and month to month, that they differ in respect to the age of the patients, incidence, mortality, tendency to involve the blood stream and other characteristics.

The low mortality rate as shown by one death in 75 cases of lobar pneumonia and one other death in 209 cases of other pneumonia suggests the very favorable reaction of presumably healthy young adults to respiratory infection, including pneumonia due to pneumococci or other prevalent pathogens of the respiratory tract. Debilitating diseases and alcoholism common as contributory factors in a general hospital service were absent. Such factors and older age were noted by Rosenbluth¹⁰ and Block as the chief causes of death in pneumococcus type I pneumonia in specifically treated cases. With then due appreciation of the favorable expectancy in such a selected age group early hospitalization of cases of respiratory infections with systemic and febrile reactions, is considered an ideal procedure which would in any age group reduce the average severity of infection and tend to lessen the mortality rate. Early hospitalization is of particular

value in a group whose individuals are often away from home, who live in dormitories, fraternity or rooming houses and who would therefore show greater hazard of contact infection of companions.

The average duration of hospitalization did not seem to vary much from year to year nor was there very much difference between the various groups of respiratory infection studied. The average hospital stay for each type, exclusive of pneumonia, and for all five years, is as follows:

Upper respiratory infections exclusive of follicular tonsillitis and pharyngitis and influenza (1,479 cases)	3.9 days
Follicular tonsillitis and follicular pharyngitis (313 cases)	4.6 days
Influenza (675 cases)	4.0 days

The relative importance of the infections of the upper respiratory tract among students as expressed in percentage of total hospital admissions due to these infections is shown in the accompanying table.

<u>Year</u>	<u>Total Admissions</u>	<u>No. of Upper Resp. Infections</u>	<u>%</u>
1934-35	2,166	412	19
1935-36	1,519	442	29
1936-37	1,518	486	32
1937-38	1,306	417	31
1938-39	1,661	700	42

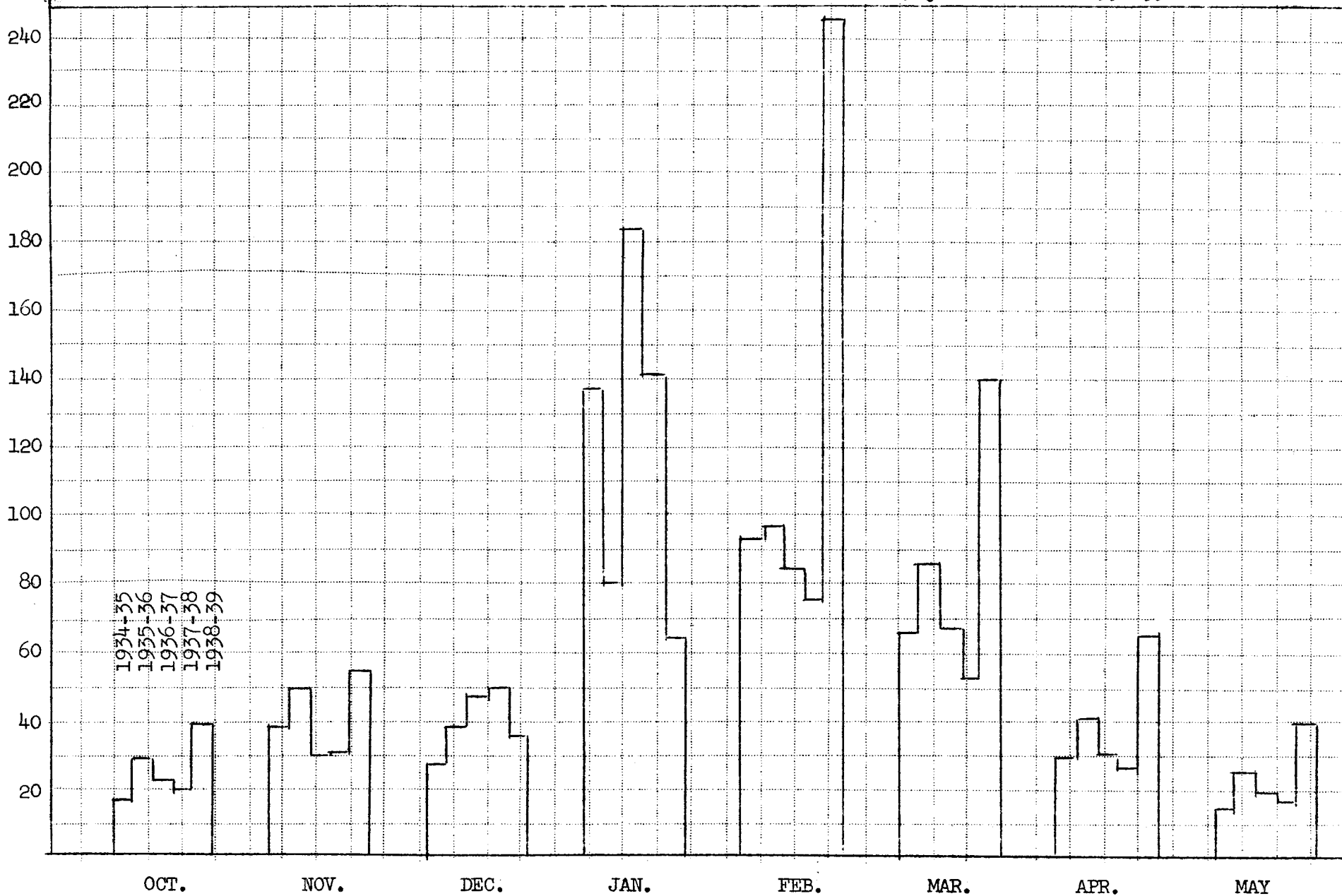
It is interesting to note that the total hospital admissions are about the same for each of the five years studied, excepting divergence in 1934-35 due to German measles.

The chart below shows the seasonal variation of the occurrence of upper respiratory infections. The peak occurs in February.

Cases
260

INCIDENCE OF RESPIRATORY INFECTIONS BY MONTHS

5-year Period - 1934-39



Conclusions

1. Acute infections of the respiratory tract are the chief cause of illness in the young adult group studied, and comprise from 19 to 42 per cent of all hospitalized cases during the years surveyed.
2. Lobar pneumonia was preceded by acute upper respiratory infection in 49 per cent of the cases. In all other pneumonia noted during 1938-39 such preceding infection occurred in 74 per cent of cases.
3. Pneumonia, atypical in its clinical aspects, has been noted during the past two years with streptococci as the prevailing organism demonstrated in the sputum. Notation of variation in pneumonia following the World War pandemic of influenza has been cited as well as current impressions that variations recently noted are related to influenza. No particular value would seem to accrue from the use of non-etiologic terms, as pneumonitis.
4. During epidemics of influenza the incidence of follicular tonsillitis has definitely fallen.
5. Leucocytosis has been variable by years in all infections. In influenza normal and slightly elevated leucocyte counts have been noted. Leucocyte counts do not appear to have diagnostic value.
6. The great resiliency of a young healthy adult group to these infections is emphasized by the very low mortality rate and suggests that the age factor should be emphasized in evaluating results of special therapy of pneumonia in large groups.
7. Early hospitalization of acute respiratory infections with adequate medical and nursing supervision is considered to be important in lessening severe reactions and complications as well as in reducing contact infections.

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V. GOSSIP

The Continuation Course in Neurologic Roentgenology which was held at the Center for Continuation Study November 13-15 was successful. Enrollment was limited to radiologists. They came from many states -- Montreal on the east, Seattle on the west, Moose Jaw on the north, and St. Louis on the south. The 53 radiologists included a larger number of local specialists than have attended any other course. The subject matter is rather recent in development. John D. Camp, Mayo Foundation, Merrill C. Sosman, Harvard, and Cornelius G. Dyke, Columbia, are the shining lights in this field. There were two symposiums; one on brain tumors and the other on protruded intervertebral discs. On the second afternoon Drs. Baker, Peterson, and Peyton trotted out a series of puzzlers for the visitors to solve. The dinner on Wednesday evening after the course, was given by the Radiological Society. A large number attended to hear the distinguished guests in a lighter vein. One of the better quips had to do with Dorothy Reed's son, who was a medical student in an Eastern University. He was asked to discuss Hodgkin's Disease, probably because of his mother's contribution to the subject. In reply he stated that he was probably the only authentic example of a "wandering, Dorothy Reed coll." Like many another eastern star, the guests were midwestern in origin. Dr. Sosman came from Ohio and attended Wisconsin, and Dr. Dyke is from Iowa. Dr. Camp reversed the order of business by being a native of the east. The neurosurgical intervertebral disc team reported on 500 consecutive disc operations. One of the busiest teachers in the course was Neuroanatomist Rasmussen, who arranged an amazing collection of material in the library. The study book for the group included the complete section on Outlines of Neurology from the departmental opus on "Outlines of Neuropsychiatry" by Dr. McKinley and staff. The next course which will be of interest to our group will be held next week on the subject "Rehabilitation." A group from the medical faculty will discuss the medical aspect of various disabilities. The technical phases of

training and the psychological handling will be discussed by representatives from the University and other centers. The course for medical, hospital, and institutional librarians, scheduled for the end of the month, has been postponed until later because of the difficulty in arranging faculty representation at this time. The 1940 series will open with "Hospital Administration" on January 15, for six days...There is much talk these days of Cancer control. Minnesota is gradually joining those states with a higher mortality rate, undoubtedly due in part to the ageing of our population. Minnesota still claims the distinction of being the only one (or one of the very few) in which the number of male deaths exceeds that of the female. The Women's Field Army of the American Society for the Control of Cancer, continues to develop along satisfactory lines. Started as an experiment to provide an effective lay contact between the medical profession and the women of the United States, it now numbers several hundred thousand workers who collected nearly \$175,000 last year in membership dues. Unique in organization, its sole purpose is to disseminate information about cancer. Minnesota men and women who present authentic evidence that they have been cured of cancer (at least five years) will be admitted to honorary membership if they so desire. Last fall at the Fair the winning essay was written by a woman who qualifies under this heading. It was a personal message to the general public from one who had suffered from a feeling that her presence would not be welcome if it was known that she was a former cancer patient. Surveys indicate an average adult fears cancer more than any other disease problem. It joins the parental fear of poliomyelitis which again is perhaps first in its list. The difficulty in securing cooperation in early diagnosis and treatment of cancer is obvious. Greatest barrier is lack of interest because of infrequent occurrence of successful treatment in the practice of an average physician. Studies indicate one cancer death and two living patients a year as ratio for each physician.