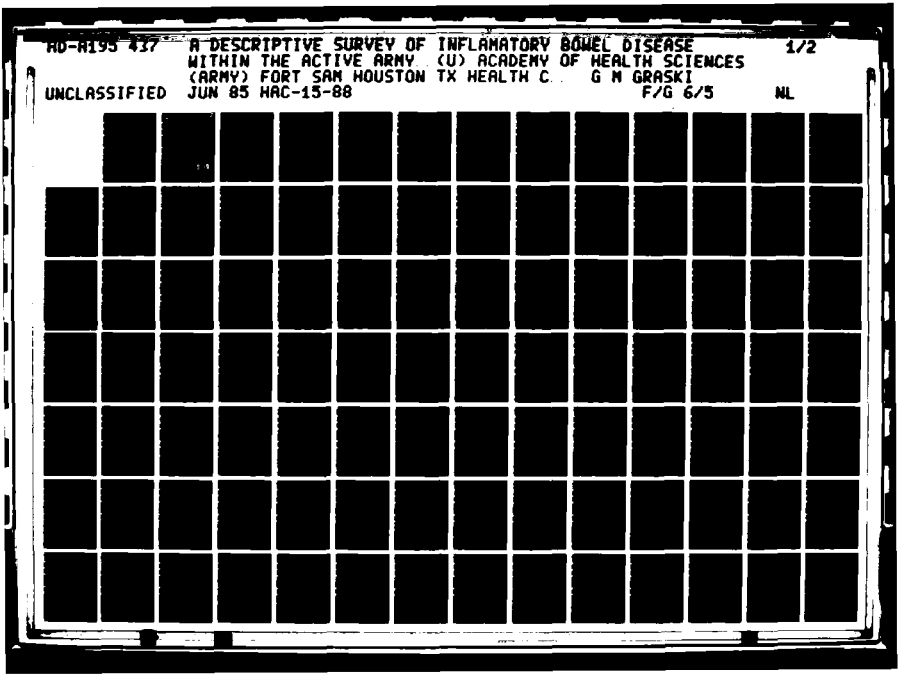
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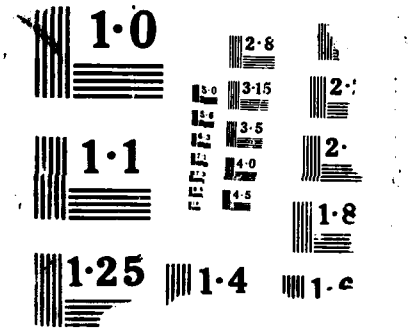
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This study was an attempt to identify significant epidemiologic factors which contribute to the incidence of inflammatory bowel disease within the active army population.

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A DESCRIPTIVE SURVEY OF INFLAMMATORY BOWEL DISEASE WITHIN THE ACTIVE ARMY POPULATION (1971-1982)

A Graduate Research Proposal

Submitted to the Faculty of

Baylor University

In Partial Fulfillment of the

Requirements for the Degree

of

Master of Health Administration

by

Major George M. Graski, MSC

June 1985

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I. INTRODUCTION

Due to the technical nature of the subject matter, many readers will not be familiar with the terminology used in this study. In addition, a number of definitions used are unique and must be understood to place the results of this study in a proper perspective. Definitions for this study are contained in Appendix A.

Conditions Which Prompted the Study

The term "inflammatory bowel disease" is often used to encompass Crohn's disease as well as ulcerative colitis. The search for the causes of inflammatory bowel disease has been and is one of the most perplexing problems in gastroenterology today. In the United States alone, it is estimated that over half a million people suffer from these diseases. To compound this problem, recent evidence has shown that the incidence and prevalence of inflammatory bowel disease is also increasing.[1] Results of existing studies have been limited to the establishment of the epidemiologic characteristics of the disease and to document rising rates.

Crohn's disease and ulcerative colitis are severe inflammatory disorders that affect the alimentary tract from

the mouth to the anus. While having many similarities, these diseases exhibit differences that warrant additional description.

Ulcerative colitis can be characterized by the physiological areas it affects. These areas include inflammation of the rectum (proctitis), inflammation of the rectum and sigmoid colon (proctosigmoiditis), and inflammation of the bowel extending to the splenic flexure ("left-sided colitis").[2] The disease is characterized most prominently by rectal bleeding, weight loss, diarrhea, occasional abdominal pain, and jaundice. Additional complications can also include dermatological problems and anal fissures or fistulas. In the majority of cases, the disease and its symptoms are diagnosed after a slow period of onset. Conversely, some cases have been diagnosed only after a severe life-threatening emergency.

Crohn's disease (regional enteritis) is a relatively new disease, having been diagnosed by Crohn and Ginsburg in 1932.[3] The disease itself consists of an inflammatory condition of the bowel which extends through the gut to adjoining tissue. While normally found in the distal ileum and the colon, it can affect any part of the alimentary canal. The most common symptoms of the disease are abdominal pain, diarrhea and low grade fever.[4] Associated

conditions of the disease include small bowel obstruction, fistula formation, arthritis and inflammatory disorders of the eye, skin and mucous membranes.[5] The onset of Crohn's disease is often the result of a slow and insidious process in young adults. Although violent episodes have been noted, they are not as common.

The following table displays a partial list of the clinical features of inflammatory bowel disease based on a study of 858 patients at the Cleveland Clinic between 1955 and 1974:[6]

Table 1-1

Clinical Features of Inflammatory Bowel Disease

Feature	Crohn's Patient	UC Patient
Perianal involvement	27%	1.8%
Intestinal obstruction	25%	3.3%
Internal fistula	16%	0.9%
Growth retardation	8%	2%
Surgery	63%	36%
Death	2.4%	5.4%
Cancer	0%	2.7%
Arthritis	7%	7%
Skin disorders	4.4%	4.8%

The etiology of inflammatory bowel disease continues to be a perplexing problem. Numerous scientific studies have

been attempted with little success. Perhaps the reason for these failures is due to the lack of readily recognizable pathognomonic feature.

Due to the inflammatory nature of IBD, early attempts to determine a causal agent were centered around isolating an infectious organism.[7] Attempts to culture bacteria to include mycobacteria from tissue have been repeatedly unsuccessful. Animal experiments have produced a limited number of positive cultures that show similarities with inflammatory bowel disease tissue; however, these results have been difficult to duplicate. Additionally, no transmissible agent has been isolated. Pathogenic viruses have also been studied. Occasional viral pathogens have been isolated, but their link to the diseases is extremely questionable. In no case has conclusive evidence been uncovered by electron microscopy.

The possibility of genetic influence on inflammatory bowel disease has been widely investigated. While no specific abnormalities have been identified in conjunction with chromosomal irregularities, there are enough cases of familial occurrence to suggest a possible link. Past studies have shown an increased incidence of inflammatory bowel disease in populations with the following characteristics:

psychological response to stress has an impact on the disease once it is established. This includes the recurrence of the disease as well as its severity. An underlying question that remains is: Which is the causal agent, the disease or the psychological response to the disease?

The inflammatory process of the disease along with its close relationship to many immunosuppressive related manifestations such as arthritis and skin disorders has led to speculation that the diseases are caused by failures in the immunologic mechanisms.[10] Studies in this area have centered around a cell-mediated immunity defect and an immunogenetic weakness in the human chromosome structure. Although there are many ongoing studies in this area, the significance and relationships of their findings have yet to be determined. In conjunction with other studies, there is no evidence to show that an immunologic response is present for any environmental agent or that family members show any common immunological characteristic.

While no avenue of research has shown any conclusive results, it is quite possible that individuals with inflammatory bowel disease share a combination of characteristics that allow the disease to continue on its chronic and insidious course. Perhaps a defective immune response is initiated by an infectious, dietary, or

psychological factor. Only with increased knowledge of their epidemiologic factors will researchers begin to understand the basis for these devastating diseases.

Statement of the Problem

A statement of the problem is dependent upon two basic facts. First and foremost is that little if any research has been conducted about the Incidence of inflammatory bowel disease in the Active Army population. Secondly, since no retrospective descriptive survey has been conducted, there has been no attempt to determine if any of the population characteristics are related. Therefore, the stated purpose of this study is to determine what epidemiologic characteristics have an effect on the Incidence of inflammatory bowel disease in the Active Army population.

Objectives of the Study

The major objectives identified for this study are:

1. To determine a source for acquisition of Active Army data regarding inflammatory bowel disease.

2. To determine those epidemiologic and demographic factors that are available for research and, of those factors, the ones that are germane to the study.

3. To obtain data on the factors available for study and translate it into useful information concerning the distribution of inflammatory bowel disease.

4. To determine significant epidemiologic factors which contribute to the Incidence of inflammatory bowel disease in the population. Factors will be analyzed by applying nonparametric statistical techniques to determine significant relationships.

Criteria

In describing a population by its demographic and epidemiologic characteristics, the researcher is limited by the data that is available and his ability to collect new data. If the scope and span of the problem are large enough, a retrospective analysis of existing data may be the only means available to describe the population. Since this is the case in the problem as stated, it is felt that the criteria that must be used are those that are supported by the available data base. For this study, the factors used in the description of the Active Army population (CY 1971-1982) are based on inpatient data supplied by the United States Army Patient Administration Systems and Biostatistics Activity (PASBA) and categorized by:

1. Age
2. Sex

3. Race

4. Rank

5. Sick days per admission.

In order to adjust this data for variations in the population, rates will be expressed per 100,000. Nonparametric analysis at the .05 level of significance will be used to determine which factors are significant.

Assumptions

The following assumptions are made for the purpose of this study:

1. The required data obtained from PASBA is assumed to be accurate in terms of diagnosis and coding, regardless of year.

2. Although mild inflammatory bowel disease may be treated on an outpatient basis, eventually all patients with the disease will require hospitalization for studies and care.

Limitations

Several limitations have been identified in this study of inflammatory bowel disease. The data base for the study is limited by the data collecting methods utilized by PASBA. Data is available only for the years 1971-1982 on an inpatient basis. While the vast majority of beneficiaries

receive treatment at military hospitals, a few receive treatment at civilian facilities and are not counted in the study data. In addition, complete data for some factors for the entire period of the study is not available due to PASBA collection procedures. Parameters for each factor analysis are described in the data base that supports each analysis. Data available is additionally limited to those items coded on DA Form 2985, Cards A, B, and C (Appendix B). While analysis of factors within a population can be tested utilizing nonparametric analysis, any statistical comparison with studies that utilize a civilian data base was unwarranted. Since the populations are not similar, only "soft" comparisons of the population characteristics were attempted.

Review of the Literature

Since the cause of inflammatory bowel disease remains obscure, numerous nonmilitary epidemiologic studies have been conducted to determine what epidemiologic factors contribute to the disease. A review of past and present literature will reveal that inflammatory bowel disease, in particular Crohn's disease, is increasing. The following is a summary of selected civilian studies dealing with the incidence of inflammatory bowel disease.

Table 1-3
Selected Reports of Average Annual Incidence of Inflammatory Bowel Disease.[11]

		Average Annual Incidence per 10^5					
		Crohn's Disease			Ulcerative Colitis		
Place	Year	Male	Fem.	Tot.	Male	Fem.	Tot
Oxford, UK	1951-60	0.8	0.8	0.8	5.8	7.3	6.5
Baltimore, USA	1960-63	2.5	1.2	1.8	3.9	5.2	4.6
Uppsala, Sweden	1955-61	1.8	1.9	1.8			
	1962-68	3.4	2.4	2.9			
Norway	1956-60				2.0	2.1	2.1
	1961-69	1.0	1.0	1.0	3.2	3.2	3.2
Aberdeen, Scotland	1955-61	1.4	1.9	1.7			
	1967-68	1.6	3.0	2.6			
Minnesota, USA	1935-64			4.5			3.4
	1965-75			6.6			
Malmo, Sweden	1970			5.5			6.4
Baltimore, USA	1973 (Whites)	3.6	3.8	3.7	3.8	5.4	4.7
Spokane, USA	1971			5.9			
	1981			8.8			
Nottingham, UK	1958-60			0.73			
	1970-72			3.63			

While worldwide incidence and prevalence rates are not well established, it is most likely that rates are increasing due to improved diagnostic techniques.[12] Therefore, the more recent a study, the closer we come to the true rate in the population.

Mortality rates for inflammatory bowel disease have also been difficult to determine primarily due to low numbers. Kirsner found that the rate for general purposes is approximately 1 per 100,000 cases at ages 45-54. The rates then continue to slowly rise until the end of life.[13]

Studies of factors of the population at risk have generally centered around age, sex, race, ethnic background, urban-rural distribution, socio-economic factors, and familial features.[14] Of these, age has been shown to be a significant factor.

Inflammatory bowel disease is believed to have a bimodal incidence curve with a primary rise at age 20-30[15] and a secondary rise in incidence at age 55-60. A study on inflammatory bowel disease in Denmark (1970-1978) illustrates this factor.[16] (See Graph 1-1, Appendix D.)

While there are no definite answers, a theory for the bimodality displayed is centered around a second disease entity in the population or the possibility that two sub-populations exist within the total population.[17]

Early studies of inflammatory bowel disease indicated that male/female incidence rates were roughly equal in the population. Recent studies have shown that there is an increasing incidence of inflammatory bowel disease in females with a male to female ratio of 1:1.6.[18]

Numerous studies have attempted to analyze incidence rates of inflammatory bowel disease in terms of racial background or origin. In countries with a homogenous population such as Japan, only limited data is available. The few studies which have originated in the United States, with its heterogenous population, have produced only rough incidence estimates.[19] This data shows that Black and American Indian populations enjoy a lower risk when compared to the White population. It is estimated that the non-white population is one-third as likely to develop ulcerative colitis and one-fifth as likely to develop Crohn's disease.

Studies of ethnic background all indicate that the frequency of inflammatory bowel disease among Jews living in the United States was 3.5 to 6 times the rate of non-Jews. Of particular interest is the fact that the rates for inflammatory bowel disease in Israel are unremarkable. Initially, this higher incidence rate was attributed to the larger number of Jewish hospitals and patients participating in studies. However, subsequent studies have served to

dilute this effect with little change in rates among American and European Jews. Further efforts are needed to study the factors that contribute to the Incidence of IBD in this vulnerable population.

Another factor in a number of these studies has been socio-economic background.[20] While this term is often times difficult to define, numerous studies have tried to characterize upper and lower class patients. Although limited in their application, these studies have shown that the upper class portion of the population is slightly more vulnerable to inflammatory bowel disease.

Although investigative studies have not shown any common transmissible or chromosomal factor, there appears to be a genetic mechanism at work in the epidemiology of inflammatory bowel disease.[21] Despite the difficulties inherent in such investigations, early studies have estimated that up to 10 per cent of patients have a family history of inflammatory bowel disease, while more recent studies suggest that up to 30 per cent may have a family history. These studies also show that Crohn's disease, as well as ulcerative colitis, are frequently intermingled within the same family. Also reported has been a higher incidence of inflammatory bowel disease among siblings, but only minimal incidence among husband and wife. It would

appear from the evidence presented that certain families are peculiarly susceptible to the development of inflammatory bowel disease.

Since the cause and pathogenesis of the diseases remain elusive, epidemiologic studies that examine the mosaic of their natural history become increasingly important in the search for a possible solution to inflammatory bowel disease. Now that it is apparent that inflammatory bowel disease is on the rise worldwide, health care providers must be aware of its implications in order to provide for the impact that it will have on their health care delivery system. While limited numbers of civilian studies are available on the epidemiology of inflammatory bowel disease, no current study of any United States Army population was found. Since a principal goal of any epidemiologic study is to gain some insight into the cause of the disease, it becomes important that the Active Army, with its captive population and comprehensive reporting system, be studied to provide insight into these insidious diseases. The need for this study is apparent and has received support from physicians in the Army Medical Department (Appendix C).

Research Methodology

The theoretical framework of this study was based on an analysis of retrospective data of the population at risk.

The agency for data capture and retrieval was identified as PASBA. A review of the literature revealed that the PASBA data base is generally more comprehensive and complete than those used by other studies (military or civilian) to date. Contact with PASBA was established with approval for release of the material being granted by the Office of the Surgeon General.

Epidemiologic and demographic characteristics of the population in the PASBA data base were generally limited to the data obtained from reporting Medical Treatment Facilities (MTFs) on DA Form 2985 (Appendix B). The following codes from the International Classification of Diseases (ICD) coding system (Edition 8/9) were used for this study:[22,23]

1.	ICD code (8th ed, 1971-79)	Disease
	563	Crohn's Disease Ulcerative Colitis
	569	Nonspecific Colitis
2.	ICD code (9th ed, 1980-82)	
	555	Crohn's
	556	Ulcerative Colitis

The only feasible way to study the Incidence of inflammatory bowel disease in the population was by tabulation of the number of first hospitalizations for a

diagnosis. Since PASBA did not provide Incidence rates based on DA Form 2985, a method had to be devised to produce this information. A solution to this problem was based on the patients' Social Security number. By programming the computer to recognize and count a particular Social Security number only once for a diagnosis of IBD in the initial year it appeared, an Incidence rate could be obtained.

Based on discussions with PASBA analysts, it was found that data on the following factors concerning inpatient visits for the Active Army population (1971-82) could be generated:

1. Incidence by:
    a. Age
    b. Sex
    c. Race (white/non-white)
    d. Rank (officer/enlisted)
    e. Calendar year.
2. Number of hospitalizations by:
    a. Age
    b. Sex
    c. Race (white/non-white)
    d. Rank (officer/enlisted)
    e. Calendar year.

The use of a sample size for the purposes of the study was not considered, as the data available allowed the use of all cases reported between 1971 and 1982.

Once the available data was retrieved and categorized, an analysis was conducted to determine what epidemiological factors were significant contributing factors to the IBD Incidence and Hospitalization rates in the population at risk. All data displayed was in the form of rates per 10^5.

Incidence rates were calculated to gain an appreciation for the first time occurance of IBD in the population at risk. The definition of Incidence used in this study can vary from the traditional definition of incidence used in other studies due to ICD 8/9 coding procedures or the manner in which data was collected (see glossary, page 101, Incidence). Hospitalization rates were calculated to gain an appreciation for IBD disease activity in the population at risk. The definition of Hospitalization is unique to this study (See Appendix A, page 85, paragraph 4).

An analysis of these rates was conducted utilizing nonparametric statistical techniques that included the Wilcoxon signed-rank test for factors that had two subpopulations (i.e., sex, male/female) and the Friedman two-way analysis of variance by ranks for factors that had more than two subpopulations.[24] All analysis was conducted at the .05 level of significance.

Analyzed data sets are also displayed in graphic form to allow for enhanced visual analysis.

Once the significant contributing factors were identified, they were compared in general terms to previously conducted studies to gain an appreciation for impact on the population.

FOOTNOTES

[1]Medical Clinics of North America, Vol 64, No 6, November 1980, p. 1221.

[2]Richard G. Farmer, "Inflammatory Bowel Disease," Clinics in Gastroenterology, Vol 9, No 2 (May 1980), W. B. Saunders Company, Philadelphia, 1980, pp. 55-57.

[3]Ibid., p 58.

[4]Bryan N. Brooke, "Crohn's Disease," Clinics in Gastroenterology, Vol 1, No 2 (May 1972, W. B. Saunders Company, Philadelphia, 1972, pp. 942-956.

[5]Ibid.

[6]Medical Clinics of North America, Vol 64, No 6, November 1980, p. 1113.

[7]Marvin H. Sleisenger, Gastrointestinal Disease, W. B. Saunders Company, Philadelphia, 1983, pp. 1095-1123.

[8]Joseph B. Kirsner, Inflammatory Bowel Disease, Lea & Febiger, Philadelphia, 1980, pp. 18-20.

[9]Ibid., pp. 19-21.

[10]Discussion based on Clinics in Gastroenterology, Vol 9, No 2, May 1980, written by Richard G. Farmer, W. B. Saunders Company, London, pp. 236-238.

[11]Joseph B. Kirsner, Inflammatory Bowel Disease, Lea & Febiger, Philadelphia, 1980, p. 10.

[12]Ibid., pp. 12.

[13]Ibid., PP. 12-13.

[14]Based on Henry L. Bockus, Gastroenterology, W. B. Saunders Company, London, 1976, p. 543.

[15]Geoffrey C. Nunes, "Inflammatory Bowel Disease in Copenhagen," The American Journal of Surgery, Vol 145, May 1983, p. 565.

[16]Table from Vibeke and Binder, "Incidence and Prevalence of Ulcerative Colitis and Crohn's Disease in the County of Copenhagen, 1962-1978," Gastroenterology, 1982, Vol 83, No 3, September 1983, 83: 563-568.

[17]Joseph B. Kirsner, "The Epidemiologic and Demographic Characteristics of Inflammatory Bowel Disease: An Analysis of a Computerized File of 1400 Patients," Journal of Chronic Diseases, Vol 24, 1971, pp. 743-773.

[18]Geoffrey C. Nunes, "Increasing Incidence of Crohn's Disease," The American Journal of Surgery,, Vol 145, May 1983, p. 579.

[19]Joseph B. Kirsner, Inflammatory Bowel Disease, Lea & Febiger, Philadelphia, 1980, pp. 15-17.

[20]Based on Henry L. Bockus, Gastroenterology, W. B. Saunders Company, London, 1976, p. 545.

[21]Marvin H. Sleisenger, Gastrointestinal Disease, W. B. Saunders Company, Philadelphia, 1983, p. 1094.

[22]United States Department of Health, Education and Welfare, Public Health Service, International Classification of Diseases, adapted for use in the United States, 8th revision, Washington, D.C.: U.S. Government Printing Office, 1967.

[23]United States Department of Health, Education and Welfare, Public Health Service, International Classification of Diseases, adapted for use in the United States, 9th revision, Washington, D.C.: U.S. Government Printing Office, 1968.

[24]Wayne W. Daniel, Applied Nonparametric Statistics, Houghton Mifflin Company, Boston, 1978, pp. 130-146, 223-241.

II. DISCUSSION

General Overview

One of the major obstacles in a comprehensive study of any problem is to obtain access to a database that supports the objectives of the study. Once the use of this database has been obtained, the data available must be analyzed to identify those specific factors that are available for use and germane to the study. By utilizing appropriate statistical techniques, raw data can be translated into information that can be used to determine significant contributing factors to the problem. The following discussion is based on this process and is directed towards a survey of Inflammatory Bowel Disease within the active United States Army population from 1971 through 1982.

Analysis of Observations

During the years of the study (1971-82), 1,737 Incidence cases were reported. Analysis of the number of Incidence cases reported indicated that:

1. 1,559 were male; 178 were female.
2. 1,449 were white; 288 were nonwhite.
3. 303 were officers/warrant officers; 1,434 were enlisted.

A breakdown by age group indicates the following distribution:

Age Group (Incidence)							
15/19	20/24	25/29	30/34	35/39	40/44	45/49	49+
215	760	341	165	134	71	27	24

During the same years of study (1971-1982), an analysis of 2,094 Hospitalizations was made and indicated that:

1. 1,869 were male; 225 were female.
2. 1,715 were white; 379 were nonwhite.
3. 404 were officers/warrant officers; 1,690 were enlisted.

A breakdown by age group for Hospitalizations indicates the following distribution:

Age Group (Hospitalizations)							
15/19	20/24	25/29	30/34	35/39	40/44	45/49	49+
225	855	445	231	178	98	34	28

The total number of Sick Days attributed to IBD for the study period was 97,185.

Analysis of Objectives 1 and 2

PASBA has been determined to be the primary source for data concerning IBD in the Active Army Population, thereby fulfilling the first objective of establishing a source of the data base for the study.

A review of the literature indicates that the following factors are most commonly examined when studying the epidemiological characteristics of IBD:

1. Age.
2. Sex.
3. Race.
4. Year.
5. Religion.

It was found that all of these characteristics were available through PASBA except for religion. An additional factor which could be of interest to the military and is available through PASBA was rank (officer/enlisted).

Analysis of Objectives 3 and 4

The third objective of the study was to obtain data on the significant epidemiological factors contributing to IBD, and to produce information from the data. The first generation of data from PASBA was produced in the form of raw numbers for Incidence and Hospitalizations. Since the population under study is skewed by its own selecting process, it was decided that, in order to produce meaningful information, raw counts would have to be converted to a rate per 10^5. This source unique information was produced by PASBA in the form of population rates. This information is displayed in conjunction with analysis of the last objective.

The final objective can be achieved by analyzing the contributing factors of IBD in the Active Army Population and determine which are statistically significant. The first relationship to be considered for analysis is the IBD Incidence rate during the years of the study.

Null Hypothesis HO: There is no difference between the IBD component Incidence rate populations during the years of the study.

Alternative Hypothesis HA: There is a difference between IBD component Incidence rates during the years of the study.

TABLE 2-1

CONTINGENCY TABLE
IBD INCIDENCE BY DIAGNOSIS

	REG ENT	ULC COL	NONSPECIFIC COLITIS	TOTAL
1971	6.70	9.69	10.78	27.17
1972	8.12	7.41	7.41	22.94
1973	6.71	9.19	8.32	24.22
1974	5.53	4.50	8.61	18.64
1975	4.79	5.05	7.90	17.75
1976	7.24	4.26	4.26	15.76
1977	5.81	6.32	4.77	16.90
1978	5.10	4.71	6.68	16.49
1979	4.79	3.86	5.59	14.23

Degrees of Freedom = 2

Computed Friedman Statistic = 1.556

Critical Value for 2 Degrees of Freedom = 5.991

Conclusion: The null hypothesis is not rejected. The test data does not provide evidence for rejection. Therefore, it may be true that there is no difference between IBD component incidence rates when matched by calendar year.

This information is represented at Graph 2-1, Appendix D.

An analysis of the graph indicates that, while we have found no statistical relationship between IBD Component Incidence rates during the period of the study, the Incidence rate in the Active Army Population is declining from a high of 27.17×10^5 in 1971 to 14.23×10^5 in 1979. The Incidence rate for regional enteritis during the period of the study ranged from a high of 8.12×10^5 to a low of 4.79×10^5 with a mean Incidence rate of 6.09×10^5.

The ulcerative colitis Incidence rates ranged from a high of 9.69×10 to a low of 3.85×10^5 with a mean Incidence rate of 6.11×10^5. Nonspecific colitis Incidence rates ranged from a high of 10.78×10^5 to a low of 4.26×10^5 with a mean rate of 6.11×10^5.

The second relationship to be considered is the IBD component Hospitalization rate when matched by calendar year.

Null Hypothesis HO: There is no difference between the IBD component Hospitalization rates during the years of the study.

Alternative Hypothesis HA: There is a difference between IBD component Hospitalization rates during the years of the study.

TABLE 2-2

CONTINGENCY TABLE
IBD COMPONENT HOSPITALIZATION RATES

	IBD HOSPITALIZATIONS BY YEAR/DIAGNOSIS			
	REG ENT	ULC COL	NONSPECIFIC COLITIS	Total
1971	6.34	7.79	9.24	23.37
1972	8.94	7.76	6.71	23.41
1973	9.07	11.43	8.82	29.32
1974	8.48	6.68	9.38	24.55
1975	5.57	6.61	8.81	20.98
1976	9.82	5.17	5.04	20.03
1977	7.48	7.10	5.42	20.00
1978	6.81	6.28	7.20	20.29
1979	7.98	5.72	6.38	20.08

Degrees of Freedom = 2

Computed Friedman Statistic = 1.556

Critical Value for 2 Degrees of Freedom = 5.991

Conclusion: The null hypothesis is not rejected. The test data does not provide evidence for rejection. Therefore, it may be true that there is no difference between IBD component Hospitalization rates when matched by calendar year.

This information is represented at Graph 2-2, Appendix D.

An analysis of the graph will show that the Hospitalization rate for regional enteritis ranged from a high of 9.82×10^5 to a low of 5.57×10^5 with a mean rate of 7.83×10^5. The rate for ulcerative colitis ranged from a high of 11.43×10^5 to a low of 5.17×10^5, with a mean rate of 7.17×10^5. Non Specific Colitis ranged from a high of 9.38×10^5 to a low of 5.04×10^5, with a mean rate of 7.44×10^5.

A comparison of the two rates (Hospitalizations/ Incidence) is as follows:

TABLE 2-3

IBD HOSPITALIZATIONS/INCIDENCE RATES

	HOSPITALIZATIONS	INCIDENCE
1972	23.41	22.94
1973	29.32	24.22
1974	24.55	18.64
1975	20.98	17.75
1976	20.03	15.76
1977	20.00	16.90
1978	20.29	16.49
1979	20.08	14.23

A graphic representation of this information is at Graph 2-3, Appendix D.

Between 1972 and 1976, the decline in admissions generally follows the decline in Incidence rate. From 1976 to 1979, it appears that, while the Incidence rate tends to decline, the corresponding Hospitalization rate, in general, remains the same.

The third relationship to be considered is the Incidence rate by sex during the years of the study.

Null Hypothesis HO: There is no difference between the IBD Incidence rates by sex during the years of the study.

Alternative Hypothesis HA: There is a difference between the IBD Incidence rates by sex during the years of the study.

TABLE 2-4

CONTINGENCY TABLE
IBD INCIDENCE RATE BY SEX

	MALE	FEMALE	TOTAL
1971	27.07	33.33	27.17
1972	22.40	41.61	22.94
1973	23.03	65.22	24.22
1974	17.00	58.06	18.64
1975	17.12	28.57	17.75
1976	14.23	38.78	15.80
1977	16.16	27.45	16.90
1978	14.95	36.36	16.49
1979	13.56	22.03	14.23
1980	9.57	28.36	11.23
1981	10.27	22.22	11.38
1982	12.61	21.62	13.46

n = 12

d = 18

d for n and q = .046

Computed Wilcoxon value (T-) = 0

Conclusion: The null hypothesis is rejected. The data on which the test is based does provide sufficient evidence to cause rejection. Therefore, it may be true that there is a difference between the IBD Incidence rates by sex when matched by calendar year.

This information is represented at Graph 2-4, Appendix D.

An analysis of the graph will show that the Incidence rate for males ranged from a high of 27.07×10^5 to a low of 9.57×10^5 with a mean rate of 16.49×10^5. The female rate ranged from a high of 65.22×10^5 to a low of 21.62×10^5, with a mean rate of 35.30×10^5.

The fourth relationship to be considered is the Hospitalization rate by sex during the years of the study.

Null Hypothesis HO: There is no difference between the IBD Hospitalization rates by sex during the years of the study.

Alternative Hypothesis HA: There is a difference between the IBD Hospitalization rates by sex during the years of the study.

TABLE 2-5

CONTINGENCY TABLE
IBD HOSPITALIZATION RATE BY SEX

	MALE	FEMALE	TOTAL
1971	23.30	27.78	23.73
1972	23.00	37.50	23.41
1973	28.01	73.91	29.32
1974	22.62	70.97	24.55
1975	20.68	26.19	20.98
1976	17.68	55.10	20.08
1977	19.06	33.33	20.00
1978	18.48	43.64	20.29
1979	19.19	30.51	20.08
1980	14.14	40.30	16.45
1981	15.55	31.94	17.08
1982	21.10	33.78	22.31

n = 12

d = 18

d for n and q = .046

Computed Wilcoxon Value (T-) = 0

Conclusion: The null hypothesis is rejected. The data on which the test is based provides sufficient evidence to cause rejection. Therefore, it may be true that there is a difference between the IBD Hospitalization rates by sex when matched by calendar year.

This information is presented at Graph 2-5, Appendix D.

An analysis of this graph will show that the Hospitalization rate for males ranged from a high of 28.01 x

10^5 to a low of 14.14 x 10^5, with a mean rate of 20.03 x 10^5. The female rate ranged from a high of 70.97 x 10^5 to a low of 26.19 x 10^5, with a mean rate of 42.08 x 10^5. The total rate ranged from a high of 29.32 x 10^5 to a low of 16.45 x 10^5, with a mean rate of 21.52 x 10^5.

The fifth relationship considered for this analysis is the Incidence rate by race (white/nonwhite). Due to the limitations of the data base, information was available only for the years 1974-81.

Null Hypothesis HO: There is no difference between the IBD Incidence rates by race during the years of the study.

Alternative Hypothesis HA: There is a difference between the IBD Incidence rates by race during the years of the study.

TABLE 2-6

CONTINGENCY TABLE
IBD INCIDENCE RATE BY RACE

	WHITE	NONWHITE	TOTAL
1974	20.87	10.06	18.64
1975	18.08	16.57	17.75
1976	17.23	11.05	15.80
1977	18.20	13.13	16.90
1978	19.60	8.72	16.49
1979	16.21	10.00	14.23
1980	12.11	9.45	11.23
1981	12.75	8.75	11.38

n = 8

d = 7

d for n and q = .055

Computed Wilcoxon Value (T-) = 0

Conclusion: The null hypothesis is rejected. The data on which the test is based does provide sufficient evidence to cause rejection. Therefore, it may be true that there is a difference between the IBD Incidence rate by race when matched by calendar year.

This information is represented at Graph 2-6, Appendix D.

An analysis of the graph shows that the Incidence rates for whites is consistently higher than nonwhites. Over the study years, the white Incidence rate has ranged from a high of 20.87×10^5 to a low of 12.11×10^5, with a mean rate of 16.88×10^5. During the same period, the nonwhite Incidence rate ranged from a high of 16.57×10^5 to a low of 8.72×10^5, with a mean rate of 10.97×10^5. The total mean rate for the period was 15.30×10^5.

The sixth relationship to be analyzed is the Hospitalization rate by race during the years of the study.

Null Hypothesis HO: There is no difference between IBD Hospitalization rates by race during the years of the study.

Alternative Hypothesis HA: There is a difference between IBD Hospitalization rates by race during the years of the study.

TABLE 2-7

CONTINGENCY TABLE
IBD HOSPITALIZATION RATES BY RACE

	WHITE	NONWHITE	TOTAL
1974	26.86	15.72	24.55
1975	21.72	18.34	20.98
1976	21.96	13.81	20.08
1977	21.32	16.16	20.00
1978	23.99	11.01	20.29
1979	22.46	15.00	20.08
1980	17.38	14.57	16.45
1981	18.24	14.83	17.08

n = 8

d = 7

d for n and q = .055

Computed Wilcoxon Value (T-) = 0

Conclusion: The null hypothesis is rejected. The data on which the test is based does provide sufficient evidence to cause rejection. Therefore, it may be true that there is

a difference between the IBD Hospitalization rates by race when matched by calendar year.

This information is represented at Graph 2-7, Appendix D.

An analysis of the graph shows that the Hospitalization rates of whites is consistently higher than nonwhites. During the study period, the Hospitalization rates for whites ranged from a high of 26.86×10^5 to a low of 17.38×10^5, with a mean rate of 21.74×10^5. Nonwhites ranged from 18.34×10^5 to 11.01×10^5, with a mean rate of 14.93×10^5. The combined total rate ranged from a high of 24.55×10^5 to a low of 16.45×10^5, with a mean rate of 19.93×10^5.

The seventh relationship to be analyzed is the Incidence rate by rank (officer/enlisted) during the years of the study.

Null Hypothesis HO: There is no difference between IBD Incidence rates by rank during the years of the study.

Alternative Hypothesis HA: There is a difference between IBD Incidence rates by rank during the years of the study.

TABLE 2-8

CONTINGENCY TABLE
IBD INCIDENCE RATES BY RANK

	OFFICER	ENLISTED	TOTAL
1971	44.30	24.29	27.17
1972	29.46	21.36	22.94
1973	38.60	21.85	24.22
1974	22.64	17.86	18.64
1975	17.65	17.76	17.75
1976	18.37	15.43	15.80
1977	30.61	14.92	16.90
1978	19.05	16.18	16.49
1979	10.31	14.81	14.23
1980	16.49	10.45	11.23
1981	11.88	11.33	11.38

n = 11

d = 15

d for n and q = .051

Computed Wilcoxon Value (T-) = 6

Conclusion: The null hypothesis is rejected. The data on which the test is based does provide sufficient evidence to cause rejection. Therefore, it may be true that there is a difference between the IBD Incidence rates by rank when matched by calendar year.

This information is represented at Graph 2-8, Appendix D.

An analysis of the graph will show that the IBD Incidence rate for officers is generally higher than

enlisted. Officer Incidence rates ranged from a high 44.30×10^5 to a low of 10.31×10^5, with a mean rate of 23.58×10^5. The enlisted Incidence rate ranged from a high of 24.29×10^5 to a low of 10.45×10^5, with a mean rate of 16.93×10^5. The mean total rate was 17.89×10^5.

The eighth relationship to be analyzed is the Hospitalization rate by rank (officer/enlisted) during the years of the study.

Null Hypothesis HO: There is no difference between IBD Hospitalization rates by rank during the years of the study.

Alternative Hypothesis HA: There is a difference between IBD Hospitalization rates by rank during the years of the study.

TABLE 2-9

CONTINGENCY TABLE
IBD HOSPITALIZATION RATES BY RANK

	OFFICER	ENLISTED	TOTAL
1971	42.28	20.21	23.37
1972	28.68	22.19	23.41
1973	52.63	25.47	29.32
1974	31.13	23.21	24.55
1975	31.37	19.40	20.98
1976	24.49	19.44	20.08
1977	37.76	17.43	20.00
1978	29.76	19.12	20.29
1979	16.49	20.61	20.08
1980	29.90	14.48	16.45
1981	24.75	15.95	17.08

n = 11

d = 15

d for n and q = .051

Computed Wilcoxon Value (T-) = 0

Conclusion: The null hypothesis is rejected. The data on which the test is based does provide sufficient evidence to cause rejection. Therefore, it may be true that there is a difference between the IBD Hospitalization rates by rank when matched by calendar year.

This information is represented at Graph 2-9, Appendix D.

An analysis of the graph will show that the Hospitalization rate for officers generally was higher than for enlisted and ranged from a high of 52.63×10^5 to a low of 16.45×10^5, with a mean rate of 31.75×10^5.

Enlisted rates ranged from a high of 25.47×10^5 to a low of 14.48×10^5, with a mean rate of 19.78×10^5. The mean total rate was 21.42×10^5.

The ninth relationship to be considered is the Incidence rate by rank (officer/enlisted) and race (white/nonwhite) during the years of the study.

Null Hypothesis HO: There is no difference between IBD Incidence rates by rank and race during the years of the study.

Alternative Hypothesis HA: There is a difference between IBD Incidence rates by rank and race during the years of the study.

TABLE 2-10

CONTINGENCY TABLE
IBD INCIDENCE RATES BY RANK/RACE

	W OFFICER	W ENL	NW OFFICER	NW ENL
1974	23.00	20.30	18.50	9.70
1975	18.80	18.00	*	17.10
1976	18.50	17.00	15.60	10.90
1977	30.80	15.80	28.20	12.60
1978	19.50	19.60	15.40	8.50
1979	11.20	17.30	*	10.30
1980	18.20	10.90	*	9.80
1981	13.30	12.60	*	9.10
1982	11.00	15.90	9.10	10.60

* No data available.

Degrees of Freedom = 3

Computed Friedman Statistic = 9.867

Critical value for 3 Degrees of Freedom = 7.815

Conclusion: The null hypothesis is rejected. The data on which the test is based does provide sufficient evidence to cause rejection. Therefore, it may be true that there is a difference between the IBD Incidence rates by rank and race when matched by calendar year.

This information is represented at Graph 2-10, Appendix D.

An analysis of this graph will show that the Incidence rates for white officers were generally higher and ranged from a high of 30.80×10^5 to a low of 11.00×10^5, with a mean rate of 18.26×10^5. The white enlisted rate ranged from a high of 20.30×10^5 to a low of 10.90×10^5, with a mean rate of 16.38×10^5. The nonwhite officer rate ranged from a high of 28.20×10^5 to a low of 0.00×10^5, with a mean rate of 9.64×10^5, and the nonwhite enlisted rate ranged from a high of 17.10×10^5 to a low of 8.50×10^5, with a mean rate of 10.96×10^5.

The tenth relationship to be considered is the Hospitalization rate by rank and race during the period of the study.

Null Hypothesis HO: There is no difference between IBD Hospitalization rates by rank and race during the years of the study.

Alternative Hypothesis HA: There is a difference between IBD Hospitalization rates by rank and race during the years of the study.

TABLE 2-11

CONTINGENCY TABLE
IBD HOSPITALIZATION RATES BY RANK/RACE

	W OFFICER	W ENL	NW OFFICER	NW ENL
1974	31.00	25.70	37.00	14.90
1975	33.30	19.50	*	18.90
1976	25.00	21.40	15.60	13.80
1977	38.50	18.10	28.20	15.70
1978	29.90	23.00	30.80	10.40
1979	18.00	23.40	*	15.50
1980	33.00	14.20	*	15.10
1981	27.80	16.20	*	15.50
1982	24.20	24.20	9.10	19.10

* No data available.

Degrees of Freedom = 3

Computed Friedman Statistic = 14.100

Critical value for 3 Degrees of Freedom = 7.815

Conclusion: The null hypothesis is rejected. The data on which the test is based does provide sufficient evidence to cause rejection. Therefore, it may be true that there is a difference between the IBD Hospitalization rates by rank and race when matched by calendar year.

This information is represented at Graph 2-11, Appendix D.

An analysis of the graph will show that the IBD Hospitalization rates for white officers was generally higher and ranged from a high of 38.50×10^5 to a low of 18.00×10^5, with a mean rate of 28.98×10^5. The Hospitalization rates for white enlisted ranged from a high of 25.70×10^5 to a low of 14.20×10^5, with a mean rate of 10.64×10^5. The Hospitalization rates for nonwhite officers ranged from a high of 37.00×10^5 to a low of 0.00×10^5, with a mean rate of 13.41×10^5, while the Hospitalization rates for nonwhite enlisted ranged from a high of 19.10×10^5 to a low of 10.40×10^5, with a mean rate of 15.44×10^5.

The eleventh relationship to be considered is the Incidence rate by diagnostic group and race during the years of the study.

Null Hypothesis HO: There is no difference between IBD Incidence rates by diagnostic group and race during the years of the study.

Alternative Hypothesis HA: There is a difference between IBD Incidence rates by diagnostic group and race during the years of the study.

TABLE 2-12

CONTINGENCY TABLE
IBD INCIDENCE RATES BY DIAGNOSTIC GROUP/RACE

	W REG ENT	NW REG ENT	W ULC COL	NW ULC COL
1974	6.60	1.30	4.80	3.10
1975	5.60	1.80	4.80	5.90
1976	7.80	5.50	4.70	2.80
1977	6.10	5.10	7.40	3.00
1978	6.00	2.80	5.50	2.80
1979	5.10	2.10	4.70	2.10

Degrees of Freedom = 3

Computed Friedman Statistic = 9.400

Critical Value for 3 Degrees of Freedom = 7.815

Conclusion: The null hypothesis is rejected. The data on which the test is based does provide sufficient evidence to cause rejection. Therefore, it may be true that there is a difference between the IBD Incidence rates by diagnostic group and race when matched by calendar year.

This information is represented at Graph 2-12, Appendix D.

An analysis of the graph will show that the IBD Incidence rate for white regional enteritis was generally higher and ranges from a high of 7.80×10^5 to a low of 5.10×10^5, with a mean rate of 6.20×10^5. Nonwhite regional enteritis ranged from a high of 5.50×10^5 to a low of 1.30×10^5, with a mean rate of 3.10×10^5. White ulcerative colitis ranged from a high of 7.40×10^5 to a low of 4.70×10^5, with a mean rate of 5.32×10^5. The nonwhite ulcerative colitis rate ranged from a high of 5.90×10^5 to a low of 2.10×10^5, with a mean rate of 3.28×10^5.

The twelfth relationship to be considered is the IBD Hospitalization rate by diagnostic group and race during the years of the study.

Null Hypothesis HO: There is no difference between the IBD Hospitalization rates by diagnostic group and race during the years of the study.

Alternative Hypothesis HA: There is a difference between the IBD Hospitalization rates by diagnostic group and race during the years of the study.

TABLE 2-13

CONTINGENCY TABLE
IBD HOSPITALIZATION RATE BY DIAGNOSTIC GROUP/RACE

	W REG ENT	NW REG ENT	W ULC COL	NW ULC COL
1974	9.90	3.10	7.30	4.40
1975	6.30	3.00	6.80	6.00
1976	10.50	7.70	5.70	3.30
1977	7.60	7.10	8.50	3.00
1978	8.40	2.80	7.10	4.10
1979	8.40	7.10	6.40	4.20

Degrees of Freedom = 3

Computed Friedman Statistic = 13.10

Critical Value for 3 Degrees of Freedom = 7.815.

Conclusion: The null hypothesis is rejected. The data on which the test is based does provide sufficient evidence to cause rejection. Therefore, it may be true that there is a difference between IBD Hospitalization rates by diagnostic group and race when matched by calendar year.

This information is represented at Graph 2-13, Appendix D.

An analysis of the graph will show that the IBD Hospitalization rates for white regional enteritis are generally higher and range from a high of 10.65×10^5 to a low of 6.30×10^5, with a mean rate of 8.52×10^5. The

Hospitalization rate for nonwhite regional enteritis ranged from a high of 7.70×10^5 to a low of 2.80×10^5, with a mean rate of 5.13×10^5. The white ulcerative colitis Hospitalization rate ranged from a high of 8.50×10^5 to a low of 6.40×10^5, with a mean rate of 6.97×10^5. The nonwhite ulcerative colitis Hospitalization rate ranged from a high of 6.00×10^5 to a low of 3.00×10^5, with a mean rate of 4.17×10^5.

The thirteenth relationship to be considered is the IBD Incidence rates by diagnostic group and rank during the years of the study.

Null Hypothesis HO: There is no difference between the IBD Incidence rates by diagnostic group and rank during the years of the study.

Alternative Hypothesis HA: There is a difference between the IBD Incidence rates by diagnostic group and rank during the period of the study.

TABLE 2-14

CONTINGENCY TABLE
IBD INCIDENCE RATE BY DIAGNOSTIC GROUP/RANK

	OFF REG ENT	ENL REG ENT	OFF ULC COL	ENL ULC COL
1974	10.40	4.80	4.70	4.50
1975	6.90	4.50	3.90	5.20
1976	6.10	7.40	6.10	4.00
1977	6.10	5.80	14.30	5.20
1978	10.20	4.00	7.10	4.90
1979	3.10	5.00	3.10	4.00

Degrees of Freedom = 3

Computed Friedman Statistic = 3.40

Critical Value for 3 Degrees of Freedom = 7.815

Conclusion: The null hypothesis is accepted. The data on which the test is based does not provide sufficient evidence to cause rejection. Therefore, it may be true that there is no difference between the IBD Incidence rates by diagnostic group and rank when matched by calendar year.

This information is represented at Graph 2-14, Appendix D.

An analysis of the graph will show that the IBD Incidence rate for officers with regional enteritis ranged from a high of 10.40×10^5 to a low of 3.10×10^5, with a mean rate of 7.13×10^5. The Incidence rate for enlisted with regional enteritis ranged from a high of

7.40 x 10^5 to a low of 4.00 x 10^5, with a mean rate of 5.25 x 10^5. The rate for officers with ulcerative colitis ranged from a high of 14.30 x 10^5 to a low of 3.10 x 10^5, with a mean rate of 6.53 x 10^5. The enlisted ulcerative colitis rate ranged from a high of 5.20 x 10^5 to a low of 4.00 x 10^5, with a mean rate of 4.63 x 10^5.

The fourteenth relationship to be considered is the IBD Hospitalization rate by diagnostic group and rank during the years of the study.

Null Hypothesis HO: There is no difference between the IBD Hospitalization rates by diagnostic group and rank during the years of the study.

Alternative Hypothesis HA: There is a difference between the IBD Hospitalization rates by diagnostic group during the years of the study.

TABLE 2-15

CONTINGENCY TABLE
IBD HOSPITALIZATION RATE BY DIAGNOSTIC GROUP/RANK

	OFF REG ENT	ENL REG ENT	OFF ULC COL	ENL ULC COL
1974	16.00	7.10	6.60	6.70
1975	10.80	4.80	10.80	6.80
1976	11.20	9.60	0.60	5.00
1977	9.20	7.20	18.40	5.50
1978	9.50	6.50	9.50	5.90
1979	7.20	8.10	5.20	5.80

Degrees of Freedom = 3

Computed Friedman Statistic = 3.50

Critical Value for 3 Degrees of Freedom = 7.815

Conclusion: The null hypothesis is accepted. The data on which the test is based does not provide sufficient evidence to cause rejection. Therefore, it may be true that there is no difference between the IBD Hospitalization rates by diagnostic group and rank when matched by calendar year.

This information is represented at Graph 2-15, Appendix D.

An analysis of the graph will show that the IBD Hospitalization rate for officers with regional enteritis ranged from a high of 16.00×10^5 to a low of 7.20×10^5, with a mean rate of 10.65×10^5. The enlisted regional enteritis rate ranged from a high of 9.60×10^5

to a low of 4.80×10^5, with a mean rate of 7.22×10^5. The officers' ulcerative colitis rate ranged from a high of 18.40×10^5 to a low of 0.60×10^5, with a mean rate of 8.43×10^5. The enlisted ulcerative colitis rate ranged from a high of 6.80×10^5 to a low of 5.00×10^5, with a mean rate of 5.95×10^5.

The fifteenth relationship to be considered is the Incidence rate by sex and race during the years of the study.

Null Hypothesis HO: There is no difference between the IBD Incidence rate by sex and race during the years of the study.

Alternative Hypothesis HA: There is a difference between the IBD Incidence rate by sex and race during the years of the study.

TABLE 2-16

CONTINGENCY TABLE
IBD INCIDENCE RATE BY SEX/RACE

	W MALE	NW MALE	W FEMALE	NW FEMALE
1974	18.90	9.80	73.90	16.10
1975	1.80	15.60	17.00	33.70
1976	15.50	10.00	48.50	27.30
1977	17.30	13.00	30.80	11.10
1978	17.80	7.90	43.60	20.00
1979	15.60	9.10	23.10	20.00
1980	10.00	8.80	36.60	15.40
1981	11.90	6.90	22.50	21.90
1982	14.40	9.00	21.40	21.20

Degrees of Freedom = 3

Computed Friedman Statistic = 20.47

Critical Value for 3 Degrees of Freedom = 7.815

Conclusion: The null hypothesis is rejected. The data on which the test is based does provide sufficient evidence to cause rejection. Therefore, it may be true that there is a difference between the IBD Incidence rates by sex and race when matched by calendar year.

This information is represented at Graph 2-16, Appendix D.

An analysis of the graph will show that the IBD Incidence rate for white females generally was higher and ranged from a high of 73.90×10^5 to a low of 17.00×10^5, with a mean rate of 35.27×10^5. Ranges

for nonwhite females were also high and ranged from a high of 27.30×10^5 to a low of 11.10×10^5, with a mean rate of 20.75×10^5. The white male rate ranged from a high of 18.90×10^5 to a low of 1.80×10^5, with a mean rate of 13.69×10^5. The nonwhite male rate was lowest and ranged from a high of 15.60×10^5 to a low of 6.90×10^5, with a mean rate of 10.01×10^5.

The sixteenth relationship to be considered is the IBD Hospitalization rate by sex and race during the years of the study.

Null Hypothesis HO: There is no difference between the IBD Hospitalization rates by sex and race during the years of the study.

Alternative Hypothesis HA: There is a difference between the IBD Hospitalization rates by sex and race during the years of the study.

TABLE 2-17

CONTINGENCY TABLE
IBD HOSPITALIZATION RATE BY SEX/RACE

	W MALE	NW MALE	W FEMALE	NW FEMALE
1974	25.00	13.70	78.30	64.50
1973	2.20	17.50	15.10	33.70
1976	19.90	10.60	60.60	63.60
1977	20.30	15.70	35.90	16.70
1978	22.10	9.40	48.70	33.30
1979	21.60	14.10	33.30	25.00
1980	14.80	12.70	46.30	30.80
1981	16.80	12.90	35.00	28.10
1982	23.90	15.40	26.20	42.40

Degrees of Freedom = 3

Computed Friedman Statistic = 19.00

Critical Value for 3 Degrees of Freedom = 7.815

Conclusion: The null hypothesis is rejected. The data on which the test is based does provide sufficient evidence to cause rejection. Therefore, it may be true that there is a difference between the IBD Hospitalization rates by sex and race when matched by calendar year.

This information is represented at Graph 2-17, Appendix D.

An analysis of the graph will show that the IBD Hospitalization rates for white females generally was higher and ranged from a high of 78.30×10^5 to a low of 15.10×10^5, with a mean rate of 42.16×10^5. The

Hospitalization rate for nonwhite females was also high and ranged from a high of 64.50×10^5 to a low of 16.70×10^5, with a mean rate of 35.57×10^5. The white male rate ranged from a high of 25.00×10^5 to a low of 2.20×10^5, with a mean rate of 18.51×10^5. The nonwhite male rate was lowest and ranged from a high of 17.50×10^5 to a low of 9.40×10^5, with a mean rate of 13.56×10^5.

The seventeenth relationship to be considered is the IBD Incidence rate by diagnostic group and sex during the years of the study.

Null Hypothesis HO: There is no difference between IBD Incidence rates by diagnostic group and sex during the years of the study.

Alternative Hypothesis HA: There is a difference between IBD Incidence rates by diagnostic group and sex during the years of the study.

TABLE 2-18

CONTINGENCY TABLE
IBD INCIDENCE RATE BY DIAGNOSTIC GROUP/SEX

	MALE REG ENT	FEM REG ENT	MALE ULC COL	FEM ULC COL
1974	5.10	16.10	3.80	22.60
1975	4.40	11.90	5.10	4.80
1976	6.60	16.30	3.40	16.30
1977	5.90	3.90	6.10	9.80
1978	4.50	12.70	4.60	5.40
1979	4.50	8.50	3.50	8.50

Degrees of Freedom = 3

Computed Friedman Statistic = 8.19

Critical Value for 3 Degrees of Freedom = 7.815

Conclusion: The null hypothesis is rejected. The data on which the test is based does provide sufficient evidence to cause rejection. Therefore, it may be true that there is a difference between IBD Incidence rates by diagnostic group and sex when matched by calendar year.

This information is represented at Graph 2-18, Appendix D.

An analysis of the graph will show that the IBD Incidence rate for female regional enteritis was generally higher and ranged from a high of 16.30×10^5 to a low of 3.90×10^5, with a mean rate of 11.57×10^5. The female ulcerative colitis rate was also high and ranged from a high

of 22.60×10^5 to a low of 4.80×10^5, with a mean rate of 11.23×10^5. The male regional enteritis rate ranged from a high of 6.60×10^5 to a low of 4.40×10^5, with a mean rate of 5.17×10^5. The male ulcerative colitis rate was lowest and ranged from a high of 6.10×10^5 to a low of 3.40×10^5, with a mean rate of 4.42×10^5.

The eighteenth relationship to be considered is the IBD Hospitalization rate by diagnostic group and sex during the years of the study.

Null Hypothesis HO: There is no difference between IBD Hospitalization rates by diagnostic group and sex during the years of the study.

Alternative Hypothesis HA: There is a difference between IBD Hospitalization rates by diagnostic group and sex during the years of the study.

TABLE 2-19

CONTINGENCY TABLE
IBD HOSPITALIZATION RATE BY DIAGNOSTIC GROUP/SEX

	MALE REG ENT	FEM REG ENT	MALE ULC COL	FEM ULC COL
1974	7.80	25.80	6.00	22.60
1975	8.80	22.60	5.30	9.50
1976	8.70	26.50	4.10	20.40
1977	7.70	3.90	6.60	13.70
1978	6.50	10.90	5.80	12.70
1979	7.60	11.90	5.10	13.60

Degrees of Freedom = 3

Computed Friedman Statistic = 12.00

Critical Value for 3 Degrees of Freedom = 7.815

Conclusion: The null hypothesis is rejected. The data on which the test is based does provide sufficient evidence to cause rejection. Therefore, it may be true that there is a difference between IBD Hospitalization rates by diagnostic group and sex when matched by calendar year.

This information is represented at Graph 2-19, Appendix D.

An analysis of the graph will show that the IBD Hospitalization rate for female regional enteritis was generally higher and ranged from a high of 26.50×10^5 to a low of 3.90×10^5, with a mean rate of 16.93×10^5. Female ulcerative colitis rates were similar and ranged from

a high of 22.60×10^5 to a low of 9.50×10^5, with a mean rate of 15.42×10^5. Male regional enteritis rates were somewhat lower and ranged from a high of 8.80×10^5 to a low of 7.60×10^5, with a mean rate of 7.85×10^5. Male ulcerative colitis rates were lowest and ranged from a high of 6.60×10^5 to a low of 4.10×10^5, with a mean rate of 5.48×10^5.

The nineteenth relationship to be considered is IBD Incidence rates by age and diagnostic group during the years of the study.

Null Hypothesis HO: There is no difference between IBD Incidence rates by age and diagnostic group during the years of the study.

Alternative Hypothesis HA: There is a difference between IBD Incidence rates by age and diagnostic group during the years of the study.

TABLE 2-20

CONTINGENCY TABLE
IBD INCIDENCE RATE BY AGE/DIAGNOSTIC GROUP

	REG ENT	ULC COL	NONSPECIFIC COLITIS
15/19	6.30	4.77	3.32
20/24	6.39	5.90	5.97
25/29	5.35	4.89	7.17
30/34	4.00	5.35	6.44
35/39	4.00	4.05	5.37
40/44	4.80	3.25	8.60
45/49	4.42	0.00	13.27
49+	3.79	3.79	22.97

Degrees of Freedom = 2

Computed Friedman Statistic = 5.688

Critical Value for 2 Degrees of Freedom = 5.991

Conclusion: The null hypothesis is accepted. The data on which the test is based does provide sufficient evidence ($x = .95$) to be accepted. Therefore, it may be true that there is no difference between IBD Incidence rates by age and diagnostic group when matched by calendar year.

This information is represented at Graph 2-20, Appendix D.

An analysis of the graph will show that the IBD Incidence rate for regional enteritis was highest in the 20/24 age group at 6.39×10^5 and lowest at age group 49+ at 3.75×10^5. Ulcerative colitis Incidence was highest

in the 20/24 age group at 5.90×10^5 and lowest at age group 45/49 at 0.00×10^5. Other 2 were highest at age group 49+ at 22.97×10^5 and lowest at age group 15/19 at 3.32×10^5.

The twentieth relationship to be considered is the IBD Hospitalization rate by age and diagnostic group during the years of the study.

Null Hypothesis HO: There is no difference between IBD Hospitalization rates by age and diagnostic group during the years of the study.

Alternative Hypothesis HA: There is a difference between IBD Hospitalization rates by age and diagnostic group during the years of the study.

TABLE 2-21

CONTINGENCY TABLE
IBD HOSPITALIZATION RATE BY AGE/DIAGNOSTIC GROUP

	REG ENT	ULC COL	NON SPEC COL
15/19	6.64	4.84	3.27
20/24	7.17	6.59	6.47
25/29	7.85	8.50	7.74
30/34	7.12	7.59	8.32
35/39	8.34	6.45	10.55
40/44	7.34	7.49	8.10
45/49	5.94	2.79	13.15
49+	7.57	3.79	22.97

in the 20/24 age group at 5.90×10^5 and lowest at age group 45/49 at 0.00×10^5. Other 2 were highest at age group 49+ at 22.97×10^5 and lowest at age group 15/19 at 3.32×10^5.

The twentieth relationship to be considered is the IBD Hospitalization rate by age and diagnostic group during the years of the study.

Null Hypothesis HO: There is no difference between IBD Hospitalization rates by age and diagnostic group during the years of the study.

Alternative Hypothesis HA: There is a difference between IBD Hospitalization rates by age and diagnostic group during the years of the study.

TABLE 2-21

CONTINGENCY TABLE
IBD HOSPITALIZATION RATE BY AGE/DIAGNOSTIC GROUP

	REG ENT	ULC COL	NON SPEC COL
15/19	6.64	4.84	3.27
20/24	7.17	6.59	6.47
25/29	7.85	8.50	7.74
30/34	7.12	7.59	8.32
35/39	8.34	6.45	10.55
40/44	7.34	7.49	8.10
45/49	5.94	2.79	13.15
49+	7.57	3.79	22.97

Degrees of Freedom = 2

Computed Friedman Statistic = 1.00

Critical Value for 2 Degrees of Freedom = 5.991

Conclusion: The null hypothesis is accepted. The data on which the test is based does not provide sufficient evidence to cause rejection. Therefore, it may be true that there is no difference between IBD Hospitalization rates by age and diagnostic group when matched by calendar year.

This information is represented at Graph 2-21, Appendix D.

An analysis of the graph will show that the IBD Hospitalization rate for regional enteritis was highest in the 35/39 age group at 8.34×10^5 and lowest at age group 45/49 at 5.94×10^5. Ulcerative colitis Incidence was highest in the 25/29 age group at 8.50×10^5 and lowest age group 45/49 at 2.79×10^5. Other 2 were highest at age group 49+ at 22.97×10^5 and lowest at age group 15/19 at 3.27×10^5.

The twenty first relationship to be considered is the IBD Incidence rate by sex and age group during the years of the study.

Null Hypothesis HO: There is no difference between IBD Incidence rates by sex and age group during the years of the study.

Alternative Hypothesis HA: There is a difference between IBD Incidence rates by sex and age group during the years of the study.

TABLE 2-22

CONTINGENCY TABLE
IBD INCIDENCE RATE BY SEX/AGE GROUP

	MALE	FEMALE
15/19	11.67	31.63
20/24	16.46	30.90
25/29	15.48	23.08
30/34	12.97	40.73
35/39	14.06	17.07
40/44	13.81	*
45/49	14.99	*
49+	21.39	*

* No data available.

n = 5

d = 1

d for n and q = .031

Computed Wilcoxon Value (T-) = 0

Conclusion: The null hypothesis is rejected. The data on which the test is based does provide sufficient evidence to cause rejection. Therefore, it may be true that there is

a difference between IBD Incidence rates by sex and age group when matched by calendar year.

This information is represented at Graph 2-22, Appendix D.

An analysis of this graph shows that the IBD Incidence rate for females was generally higher and ranged from a high of 47.12×10^5 (for 30/34) to a low of 17.07×10^5 (for 35/39), with a mean rate of 29.26×10^5. The rate for males ranged from a high of 16.46×10^5 (for 19/24) to a low of 11.67×10^5 (for 15/19), with a mean rate of 14.13×10^5.

The twenty-second relationship to be considered is the IBD Hospitalization rate by sex and age group during the years of the study.

Null Hypothesis HO: There is no difference between IBD Hospitalization rates by sex and age group during the years of the study.

Alternative Hypothesis HA: There is no difference between IBD Hospitalization rates by sex and age group during the years of the study.

TABLE 2-23

CONTINGENCY TABLE
IBD HOSPITALIZATION RATE BY SEX/AGE GROUP

	MALE	FEMALE
15/19	12.50	74.10
20/24	19.80	25.90
25/29	23.14	23.30
30/34	25.96	133.30
35/39	25.54	*
40/44	19.67	*
45/49	22.99	*
49+	31.85	*

* No data available.

n = 4

d = 1

d for n and q = .063

Computed Wilcoxon Value (T-) = 0

Conclusion: The null hypothesis is rejected. The data on which the test is based does provide sufficient evidence to cause rejection. Therefore, it may be true that there is a difference between IBD Hospitalization rates by sex and age group when matched by calendar year.

This information is represented at Graph 2-23, Appendix D.

An analysis of this graph will show that the lower male Hospitalization rates ranged from a high of 31.85×10^5 (for 49+) to a low of 12.50×10^5 (for 15/19), with a mean rate of 20.35×10^5. The higher female rates ranged from

a high of 42.72×10^5 (for 15/19) to a low of 26.61×10^5 (for 25/19), with a mean rate of 35.36×10^5.

SUMMARY OF CONTRIBUTING FACTORS

The results of the factor analysis are as follows:

TABLE 2-24

IBD FACTOR ANALYSIS TABLE

	Factor	Statistical Significance
a.	Component Incidence rate	No
b.	Component Hospitalization rate	No
c.	Incidence rate by sex	Yes
d.	Hospitalization rate by sex	Yes
e.	Incidence rate by race	Yes
f.	Hospitalization rate by race	Yes
g.	Incidence rate by rank	Yes
h.	Hospitalization rate by rank	Yes
i.	Incidence rate by rank/race	Yes
j.	Hospitalization rate by rank/race	Yes
k.	Incidence rate by race/diagnostic group	Yes
l.	Hospitalization rate by race/diagnostic group	Yes

m.	Incidence rate by rank/diagnostic group	No
n.	Hospitalization rate by rank/diagnotic group	No
o.	Incidence rate by sex/race	Yes
p.	Hospitalization rate by sex/race	Yes
q.	Incidence rate by sex/diagnostic group	Yes
r.	Hospitalization rate by sex/diagnostic group	Yes
s.	Incidence rate by age/diagnostic group	No
t.	Hospitalization rate by age/diagnostic group	No
u.	Incidence rate by sex/age	Yes
v.	Hospitalization rate by sex/age	Yes

Of the twenty-two factors analyzed, sixteen were statistically significant at the .05 level of significance.

Significant Factor Comparisons

The first group of significant relationships is the Incidence/Hospitalization rate by sex. The mean male Incidence rate during the study (1971-1982) was 16.50×10^5, with a mean female Incidence rate of 35.30×10^5. The total rate has fallen from a high of 27.17×10^5 in 1971 to 13.46×10^5 in 1982. Comparing total IBD rates to other studies is difficult due to the varying definitions of IBD. However, Gilat[1] reports that component rates of IBD

are increasing worldwide. The results of this study show a declining rate, but may be explained by the fact that the US Army is placing increased emphasis on physical fitness and, as such, has artificially reduced the Incidence rate by enforcing more rigorous physical examination standards prior to entry into active duty.[2] The total rate has plateaued over the last three years and may be close to the true rate of the population. The high rates in the early part of the study may be credited to some unknown environmental or stress factor(s) induced by the Army's active combat role in Vietnam during this time.

Hospitalization rates during this same period have, for the most part, paralleled the declining Incidence rates (Graph 2-3). However, during the latter part of the study, Incidence rates have continued to fall, without a corresponding decline in Hospitalization rates. This could indicate that either IBD cases are becoming more severe and require more treatment or that once identified as having IBD, patients are being eliminated from active service at a slower rate.

The Incidence and Hospitalization rates for females are, on the average, almost twice that for males. In his study, Garland indicates that a rate ratio of approximately 1:1 exists between males and females.[3] In his Stanford

University study, Gelpi has also shown a 1:1 ratio.[4] The disparity between the study rates and the preceding observers indicates a need for further study into this area, possibly concentrating on isolating those factors that are unique to the study population, such as high stress or unusual living conditions.

The second group of significant relationships is the Incidence/Hospitalization rate by race. Incidence rates for whites ranged from a high of 20.87×10^5 and have plateaued out around a low of 12.11×10^5. Nonwhites follow a similar but somewhat lower overall pattern with a high rate of 16.57×10^5 and a low rate of 8.72×10^5. Comparative civilian studies are similar in that whites are more likely than nonwhites to have IBD, although no specific ratio is mentioned.[5] The mean white/nonwhite Incidence rate ratio for this study (1974-1981) is 1.53:1.

Hospitalization rates for whites ranged from 26.86×10^5 to 17.38×10^5, while rates for nonwhites ranged from 18.34×10^5 to 11.01×10^5. The mean Hospitalization rate ratio between whites/nonwhites is 1.46:1. The disparity between the white/nonwhite Incidence rate ratio (1.53:1) and the white/nonwhite Hospitalization rate ratio (1.46:1) could indicate that nonwhites have more

severe cases or that some undetermined socioeconomic factor requires more frequent hospitalizations.

The third set of significant relationships to be explored is the Incidence and Hospitalization rate by rank. The officer Incidence rate ranged from a high of 44.30×10^5 (1971) to a low of 11.88×10^5 (1980). Enlisted Incidence followed similar declining trends with a high of 24.29×10^5 in 1971 to a low of 10.45×10^5 in 1980. The mean Incidence rate ratio between officers and enlisted is 1.41:1. Since rank is unique to the military, there are no civilian studies that identify or mention rank as a significant factor. There are, however, studies by Kirschner[6] who indicates an association of IBD with level of educational achievement and also points to an increased level of IBD in those who are in higher socioeconomic groups. Since officers generally have attained a higher level of education and, by virtue of their rank, receive more compensation than enlisted, it would appear that the significant factor of rank could support other studies that propose higher educational achievement and socioeconomic status as being IBD significant Incidence factors.

Hospitalization rates by rank follow the same declining trend as Incidence rates with a high of 29.32×10^5 in

1973 to 16.45 x 10^5 in 1980. The mean Hospitalization rate ratio, officer/enlisted, is 1.61:1. Officer Hospitalization rates have declined rapidly to a point where they are beginning to approach enlisted rates. This rapid decline could reflect a reduction in the level of personal stress for officers in the Active Army as it assumes a peacetime posture. Overall, high officer Hospitalization rates can also reflect increased disease severity or be an indication of an unofficial attitude that allows officers to remain on active duty, while enlisted are eliminated from service with less delay, given the same diagnosis.

The fourth significant relationship is the Incidence rate by rank/race. The mean Incidence rate ratio between white officers, white enlisted, nonwhite officers, and nonwhite enlisted is 1.89:1.70:1.00:1.14. The significant factor relationships previously discussed (rank and race) are generally supported by this analysis. Whites have a higher risk than nonwhites, officers higher than enlisted. The mean Incidence rate for nonwhite officers is considerably lower than that for white officers. If the years that had no cases reported are eliminated, the nonwhite officer mean Incidence rate is 17.36 x 10^5 as compared to the white officer rate of 18.26 x 10^5. Given

this, it would appear that rank can exert more of an influence on Incidence rates than race.

The Hospitalization rate by rank and race has a mean rate ratio between white officers, white enlisted, nonwhite officers and nonwhite enlisted of 2.16:1.54:1:1.15 and generally follows the pattern established by the Incidence rate although at a higher rate. If the null report years for nonwhite officers are eliminated from the mean rate calculations, the new rate would be 24.14×10^5, as compared to the white officer rate of 28.97×10^5. Higher rates for officers could indicate a higher degree of severity or more involved and prolonged course of treatment than generally afforded or required by enlisted.

The fifth significant relationship is the Incidence and Hospitalization rate by race/diagnostic group. The mean Incidence rate ratio between white regional enteritis and nonwhite regional enteritis is 2.00:1.00; white ulcerative colitis and nonwhite ulcerative colitis is 1.62:1. These ratios are in agreement with Janowitz[7] who implies a higher regional enteritis rate in whites than nonwhites and Gray[8] who indicates higher ulcerative colitis rates for whites than nonwhites. An interesting comparison of rates is offered by Acheson and Nefzger[9] who, in their 1944

study of ulcerative colitis in the US Army, give rates for white and Negro enlisted and white officers as 6.60, 5.50, and 11.0 per 100,000 respectively. Although definitions and methodologies are different in this study, the rates for the same categories are 5.32×10^5, 3.28×10^5, and all officers with ulcerative colitis as 6.53×10^5. It would appear that the same trends hold true in the study population.

Hospitalization rates follow the patterns established by the Incidence rates. The mean Hospitalization rate ratio for white regional enteritis and nonwhite regional enteritis is 1.66:1. The ratio for white ulcerative colitis and nonwhite ulcerative colitis is 1.67:1. Given the same diagnosis, whites have a higher Hospitalization rate than nonwhites. By comparing mean Incidence/Hospitalization ratios for regional enteritis (2.00:1, 1.66:1), we find that, while whites have a higher Incidence rate, they do not have a proportionately high Hospitalization rate, which could indicate that whites require less treatment per case than nonwhites for a diagnosis of regional enteritis. The ulcerative colitis mean Incidence/Hospitalization ratio is approximately equal (1.62:1, 1.67:1). This could imply that ulcerative colitis is equally severe between whites and nonwhites.

The sixth significant relationship is the Incidence and Hospitalization rate by sex/race. The mean Incidence rate ratio for white/nonwhite males is 1.37:1. The mean Incidence rate ratio for white/nonwhite females is 1.70:1. The white female/white male ratio is 2.58:1, and the nonwhite female/nonwhite male ratio is 2.07:1. This information is in agreement with the earlier analysis by sex only and indicates that females, and in particular white females, have a higher Incidence rate. These trends are in agreement with Binder[10] who shows a higher female incidence rate for regional enteritis and ulcerative colitis. During the study period (1974-1982), white females have shown a dramatic decline in Incidence rates to a point where they are approaching nonwhite female rates. The declining white female Incidence rate may be reflective of an unknown environmental factor, changing methods of treatment, or evolutionary changes in public and personal attitudes that influence those psycho-social factors that may be causal agents for IBD.

The mean Hospitalization rate ratio for white/nonwhite males was 1.37:1, for white/nonwhite females 1.12:1, for white female/males 2.28:1, and for nonwhite females/males 2.77:1. Increased female Hospitalization rates may indicate a higher level of a disease severity or, assuming equal

disease severity, sociological or psychological conditions that require additional support in the form of increased hospitalizations.

The seventh significant relationship is the Incidence and Hospitalization rate by sex and diagnostic group. The mean Incidence rate ratio between female/male regional enteritis is 2.24:1, and female/male ulcerative colitis 2.54:1. Binder supports the results of this study.[11] Although his Incidence rates are somewhat lower, the general distribution between male and female for a specific diagnosis is similar.

The mean Hospitalization rate ratio between female/male regional enteritis is 2.16:1, while the female/male ulcerative colitis rate is 2.81:1. The mean Hospitalization rate ratio between male regional enteritis/ulcerative colitis is 1.43:1, and the female regional enteritis/ulcerative colitis rate ratio is 1.10:1. Hospitalization rates generally follow the pattern established by the Incidence rates, although at a higher level.

The eighth significant relationship is the Incidence and Hospitalization rate by sex/age. The IBD Incidence rate for

males appears to have a bimodal age distribution with peaks at age groups 20/24 and 49+. Female Incidence rates are also bimodal, with peaks at ages 20/24 and 30/34. Both male and female populations are limited on each end of the age scale due to the self limiting and selective characteristics of the study population. The mean rate ratio between female/male is approximately 2:1. In contrast, Binder, in his study of IBD in Denmark, reports a similar bimodal pattern for regional enteritis and ulcerative colitis at ages 20/29 and 60+, with a female/male incidence ratio for ulcerative colitis of 1.5:1 and for regional enteritis of 1.5:1.[12]

Hospitalization rates by sex/age follow a pattern somewhat similar to those established by the corresponding Incidence rates. Males have bimodal peaks, one at age 30/39 and a second at the end of a rising slope at age 49+. When compared to corresponding Incidence rates, it appears that the Hospitalization rate is disproportionately high in the 30/39 age group, which could indicate increased disease severity. Female Hospitalization rates generally follow the Incidence rate with a mean Hospitalization/Incidence rate ratio of 1.23:1 as compared to a male mean Hospitalization/Incidence rate ratio of 1.51:1.

In analyzing and comparing any of the statistics produced by this study to those of other studies, the populations that supported the studies must be considered. Since the population used in this study has its own unique characteristics and attributes, no strong statistical comparisons can be made to any other study. However, general trends and comparisons can and should be made as long as underlying population differences are not forgotten in the analysis.

FOOTNOTES

[1]Tuvia Gilat, "Incidence of Inflammatory Bowel Disease: Going Up or Down?", Gastroenterology, 1983, Vol 85, No 1, July 1983, p. 2.

[2]Army Regulation 40-501, "Standards of Fitness," Chapter 2, dated 1 December 1983.

[3]Frank C. Garland, "Incidence Rates of Ulcerative Colitis and Crohn's Disease in Fifteen Areas of the United States," Gastroenterology, 1981, Vol 81, No 6, pp 1117-1118.

[4]Armand P. Gelpi, "Inflammatory Bowel Disease Among College Students," The Western Journal of Medicine, November 1978, p. 371.

[5]Joseph B. Kirsner, "The Epidemiologic and Demographic Characteristics of Inflammatory Bowel Disease: An analysis of a Computerized File of 1400 Patients," Journal of Chronic Diseases, 1971, Vol 24, p. 753.

[6]Joseph B. Kirsner, "The Epidemiologic and Demographic Characteristics of Inflammatory Bowel Disease: An analysis of a Computerized File of 1400 Patients," Journal of Chronic Diseases, 1971, Vol 24, p. 753.

[7]Henry D. Janowitz, "Crohn's Disease - 50 Years Later," The New England Journal of Medicine, Vol 304, No 26, June 1981, p. 1600.

[8]Gary M. Gray, "Inflammatory Bowel Disease," Gastro, p. 1.

[9]E. D. Acheson and M. Dean Nefzger, "Ulcerative Colitis in the United States Army in 1944," Gastroenterology, Vol 44, No 1, June 1963, p. 14.

[10]Vibeke Binder, "Incidence and Prevalence of Ulcerative Colitis and Crohn's Disease in the County of Copenhagen, 1962 to 1978," Gastroenterology, 1982, Vol 83, No 3, September 1982, p. 565.

[11]Vibeke Binder, "Incidence and Prevalence of Ulcerative Colitis and Crohn's Disease in the County of Copenhagen, 1962 to 1978,," Gastroenterology, 1982, Vol 83, No 3, September 1982, p. 563.

[12]Vibeke Binder, "Incidence and Prevalence of Ulcerative Colitis and Crohn's Disease in the County of Copenhagen, 1962 to 1978,," Gastroenterology, 1982, Vol 83, No 3, September 1982, p. 565.

III. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The purpose of this study was to determine those factors which may have an impact on the Incidence of inflammatory bowel disease in the Active Army population. The study was accomplished by conducting a retrospective analysis of all hospitalizations during the study period (1971-1982). One thousand seven hundred and thirty-seven cases were reported during this period. Data collection was conducted by PASBA based on 11 specifically identified factors. Nonparametric statistical analysis at the .05 level of significance was used to analyze these factors.

Results of the statistical analysis showed that eight factors were found to be significant. They are as follows:

1. Sex
2. Race
3. Rank
4. Rank/Race
5. Race/Diagnostic Group
6. Sex/Race
7. Sex/Diagnostic Group
8. Sex/Age

In addition to Incidence cases, Hospitalizations were analyzed by the same factors to give an appreciation for the

total number of yearly hospitalizations for a particular diagnosis. These numbers in turn provided the basis for making generalized conclusions about disease activity or severity within the population. Factor analysis showed that Hospitalizations were significant for all cases where Incidence factors were significant. The following table summarized the significant factor analysis.

TABLE 3-1

IBD SIGNIFICANT FACTOR ANALYSIS SUMMARY

Factor	Incidence/Hospitalization Rate x 10^5 High	Low	Mean
Sex			
Male	27.07/28.01	9.57/14.14	16.50/20.03
Female	65.22/73.91	21.62/26.19	35.30/42.08
Race			
White	20.87/26.85	12.11/17.38	16.88/21.74
Nonwhite	13.13/18.34	8.72/11.01	10.97/14.93
Rank			
Officer	44.30/52.63	10.31/16.49	23.85/31.75
Enlisted	24.29/25.47	10.45/14.48	16.93/19.78
Rank/Race			
W Officer	30.80/38.50	11.00/18.00	18.26/28.97
* NW Officer	28.20/37.00	9.10/9.10	17.36/24.14
W Enlisted	20.30/25.70	10.90/14.20	16.38/20.64
NW Enlisted	17.10/19.10	8.50/10.40	10.96/15.44
Race/DG			
W Reg Ent	7.80/10.45	5.10/6.30	6.20/8.52
NW Reg Ent	5.50/7.70	1.30/2.80	3.10/5.13
W Ulc Col	7.40/7.30	4.70/5.70	5.32/6.97
NW Ulc Col	5.90/6.00	2.10/3.00	3.28/4.17

Race/Sex			
W Male	18.90/25.00	1.80/2.20	13.69/18.51
W Female	73.90/78.30	15.00/17.00	35.27/42.16
NW Male	15.60/17.50	6.90/9.40	10.01/13.56
NW Female	33.70/64.50	11.10/16.70	20.75/37.57
Sex/DG			
Male Reg Ent	6.60/8.80	4.40/6.50	5.17/7.85
Female Reg Ent	16.30/26.50	3.90/3.90	11.57/16.93
Male Ulc Col	6.10/6.60	3.40/4.10	4.42/5.48
Female Ulc Col	22.60/22.60	4.80/9.50	11.23/15.42

Sex/Age	15/19	20/24	25/29	30/34
Male	11.67/12.50	16.46/19.80	15.48/23.14	12.97/25.96
Female	31.63/42.72	30.78/30.90	23.08/26.61	40.73/47.12

	35/39	40/44	45/49	49+
Male	14.06/25.54	13.81/19.67	14.99/22.99	21.39/31.85
Female	17.07/36.00	-----	-----	-----

* Null report years eliminated from denominator.

Based on general comparisons with studies conducted in other populations most results were expected except for the following exceptions:

a. Overall Incidence rates for both sexes werc high when compared with studies conducted in other populations.

b. Rank/race analysis could indicate that, adjusting for rank, nonwhites experience almost the same rates as whites.

c. Race/sex analysis has shown that Hospitalization/ Incidence mean ratios are approximately 1.3:1 for all categories except for the nonwhite female ratio of 1.81:1, indicating a greater need for more frequent hospitalizations in nonwhite females.

d. Overall, female Incidence and Hospitalization rates are higher. However, total Hospitalization/Incidence rate ratios for males and females are roughly equal, with male ratios higher in the 30/34 age group and female ratios higher in the 35/39 age group.

e. Overall Incidence and Hospitalization rates are higher for whites than nonwhites.

Recommendations

By analyzing the results of this study and comparing them to results of similar studies on different populations, as previously cited, the following recommendations are made:

1. The PASBA data base is extensive, yet incomplete. It is realized that it would be impossible to satisfy all demands for information, yet a basic factor such as religion is not available. Methods of collection as well as report formats (DA Form 2985) should be reviewed by the Armed Forces Epidemiology Board to consider what basic data should be available to meet the needs of the Army as well as for research.

2. This study should be extended for at least five more years. Much of the data that was reported was incomplete

due to the changes in the population or collection procedures. This is especially true in the case of females who began to enter the Army in larger numbers in the mid 1970s. The effects of military life and their interaction with factors such as age and rank cannot be accurately measured until there is broader repesentation by the female population in all age groups and ranks.

3. Based on the significant factor analysis it appears that Incidence/Hospitalization rates are high for females and officers in comparison to mean Incidence rates by sex and rank. Further investigation should be conducted in an attempt to isolate factors which might contribute to these high rates. Health care providers should be made aware of these high risk groups to help facilitate an earlier diagnosis of these diseases.

APPENDIX "A"

Definitions

DEFINITIONS

Basic definitions used in this study, and which may be unique to this study, are as follows:

1. Age: Expressed in rates and graphs as inclusive age groups of five year increments, starting with group 15/19 and ending with 49+.

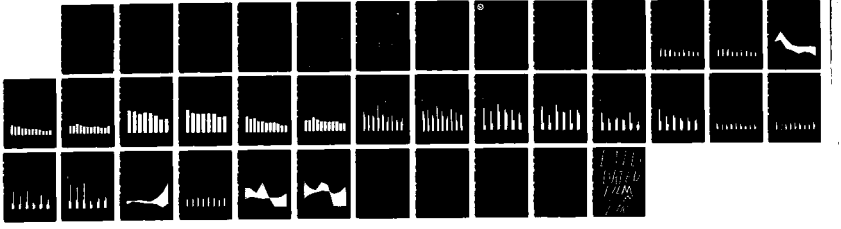
2. Crohn's Disease: Regional enteritis. Classified in the Eighth Revision of the International Classification of Diseases (ICDA-8), for calendar years 1971-79, as 563.0. Classified in the Ninth Revision of the International Classification of Diseases (ICD-9), for calendar years 1980-82, as 555.

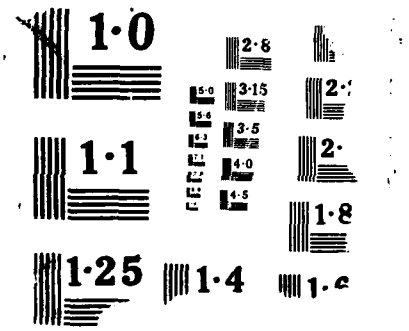
3. Hospitalizations: The total number of final discharges for the Active Army population with a specific IBD diagnosis, counted in the year of discharge.

4. Hospitalization rate: Hospitalizations expressed as a rate per 100,000 active duty US Army strength. Hospitalization rate should equal or exceed the corresponding Incidence rate. Hospitalization rate is used as a measure of disease activity within the population. "Hospitalization" is always capitalized in this study to differentiate it from the traditional definition of disposition.

AD-A193 437 A DESCRIPTIVE SURVEY OF INFLAMATORY BOWEL DISEASE WITHIN THE ACTIVE ARMY (U) ACADEMY OF HEALTH SCIENCES (ARMY) FORT SAM HOUSTON TX HEALTH C... G M GRASKI

UNCLASSIFIED JUN 85 HAC-15-88 F/G 6/5 NL




1·0
1·1
1·25
1·4
2·8
3·15
3·5
4·0
4·5
1·8

5. Incidence: Patients are counted one time, with the count given to the first year the patient was discharged with the specified diagnosis.

6. Incidence Rate: Incidence expressed as a rate per 100,000 active duty U.S. Army strength. Rates are adjusted to specific factors under study (i.e., age group, race, sex, rank) and not overall active duty US Army strengths. Incidence is used as a measure of disease occurance within the population. "Incidence" is always capitalized in this study to differentiate it from the traditional definition of incidence.

7. Inflammatory Bowel Disease (IBD): For the period of the study (1971-82) consists of ICD-8 (1971-79) codes 563.0 and 569.0; and ICD-9 (1980-82) codes 555.0 and 556.0.

8. IBD Components: See Inflammatory Bowel Disease.

9. Nonspecific Colitis: Classified in the Eighth Revision of the International Classification of Diseases (ICD-8), for calendar years 1971-79, as chronic colitis (563.9) and proctitis (569.0). Because of a revision in classification procedures, Nonspecific Colitis cannot be isolated for 1980-82.

10. Rank: Expressed in rates and graphs as officer (officer/warrant officer) and enlisted.

11. Total Sick Days: Number of Hospitalizations x Mean Sick Days for a specific diagnosis. All specific diagnosis totals are added to give a total number of sick days.

12. Ulcerative colitis: Classified in the Eighth Revision of the International Classification of Diseases (ICD-8), for calendar years 1971-79, as 563.1. Classified in the Ninth Revision of the International Classification of Diseases (ICD-9), for calendar years 1980-82, with idiopathic proctocolitis, and as such cannot be separated from other elements of the classification.

APPENDIX "B"

DA Form 2985; A, B, and C

1. MTF CODE			
1	2	3	4

ADMISSION AND CODING INFORMATION

For use of this form, see AR 40-400; the proponent agency is the office of The Surgeon General.

PLATE LINE

1.

2. REGISTER NUMBER (5 6 7 8 9 10 11)

NAME (*Last, first, middle initial*)

3. GRADE (12 13)

2.

4. SEX (14)

5. AGE (15 16)

6. RACE (17)

RELIGION

7. LENGTH OF SVC (18 19)

ETS

PREVIOUS ADMISSION ____ YR ☐ NO

3.

8. FMP (20 21)

9. SSN (22 23 24 25 26 27 28 29 30)

ORGANIZATION

WARD

C 4.

FLYING STATUS

RATING/DESIGNATION

10. BENEFICIARY CAT. (31 32 33)

BRANCH/CORPS

11. UIC/ZIP (34 35 36 37 38)

12. TYPE OF CASE (39)

A 5.

13. SOURCE OF ADMISSION/AUTHORITY FOR ADMISSION (40)

HOUR OF ADMISSION

14. CLINIC SVC (41 42)

R 6.

NAME/RELATIONSHIP OF EMERGENCY ADDRESSEE

15. DISPOSITION TYPE (43)

16. DATE OF DISPOSITION (44 45 46 47 48)

D 7.

ADDRESS OF EMERGENCY ADDRESSEE (*Include Zip Code*)

TELEPHONE NO.

17. DATE OF THIS ADMISSION (49 50 51 52 53)

A/X 8.

NAME AND LOCATION OF MEDICAL TREATMENT FACILITY

18. DATE OF INITIAL ADMISSION (54 55 56 57 58)

19. ABS SK BED DAYS THIS MTF (59 60 61)

20. OTHER DAYS THIS MTF (62 63 64)

21. CONV LV/ COOP CARE DAYS THIS MTF (65 66 67)

22. SUPPL CARE DAYS THIS MTF (68 69 70)

23. BED DAYS THIS MTF (71 72 73)

24. TOTAL SICK DAYS THIS MTF (74 75 76)

MTF OF INITIAL ADMISSION (CODE B CARD)

25. TRF TO VA HOSP/ AUTOPSY (77)

26. DO NOT USE THIS SPACE (78 79)

CARD IDENTITY (80) A/X

FOR LOCAL USE

ADMITTING OFFICER (*Signature, as required*)

SIGNATURE OF ADMITTING CLERK

CARD B

KEY PUNCHER WILL DUPLICATE COLUMNS 1 - 11 FROM CARD A	27. MTF OF INITIAL ADMISSION	28. TOTAL ABS SICK BED DAYS	29. TOTAL OTHER DAYS TO DATE	30. TOTAL CONV LV/ COOP CARE DAYS TO DT	31. TOTAL SUPPLEMENTAL CARE DAYS TO DT	32. TOTAL BED DAYS TO DATE	33. TOTAL SICK DAYS TO DATE	34. PRE-OP DAYS	35. CAUSE OF INJURY
	12 13 14 15	16 17 18	19 20 21	22 23 24	25 26 27	28 29 30	31 32 33	34 35	36 37 38

36. UNDERLYING CAUSE	37. CORRECTED RECORD	38. FIRST DIAGNOSIS	39. SECOND DIAGNOSIS	40. THIRD DIAGNOSIS
39	40	41 42 43 44 45 46 47	48 49 50 51 52 53 54	55 56 57 58 59 60 61

46. FIRST OPERATION	47. SECOND OPERATION	48. THIRD OPERATION	CARD ID
62 63 64 65 66 67	68 69 70 71 72 73	74 75 76 77 78 79	80 B

CARD C

KEY PUNCHER WILL DUPLICATE COLUMNS 1 - 11 FROM CARD A	41. FOURTH DIAGNOSIS	42. FIFTH DIAGNOSIS	43. SIXTH DIAGNOSIS
	12 13 14 15 16 17 18	19 20 21 22 23 24 25	26 27 28 29 30 31 32

44. SEVENTH DIAGNOSIS	45. EIGHTH DIAGNOSIS	49. FOURTH OPERATION	50. FIFTH OPERATION
33 34 35 36 37 38 39	40 41 42 43 44 45 46	47 48 49 50 51 52	53 54 55 56 57 58

51. SIXTH OPERATION	52. SEVENTH OPERATION	53. EIGHTH OPERATION	54. RESIDUAL DISABILITY	CARD ID
59 60 61 62 63 64	65 66 67 68 69 70	71 72 73 74 75 76	77 78 79	80 C

☆U.S.GPO:1980-0-310-981/8950

APPENDIX "C"

Letter, Physician Support.

DEPARTMENT OF THE ARMY
ARMY MEDICAL DEPARTMENT PERSONNEL SUPPORT AGENCY
WASHINGTON, DC 20324

REPLY TO ATTENTION OF

SGPE-MC

27 JUL 1983

Captain George Graski
207 Research Drive
Manhattan, Kansas 66502

TO WHOM IT MAY CONCERN

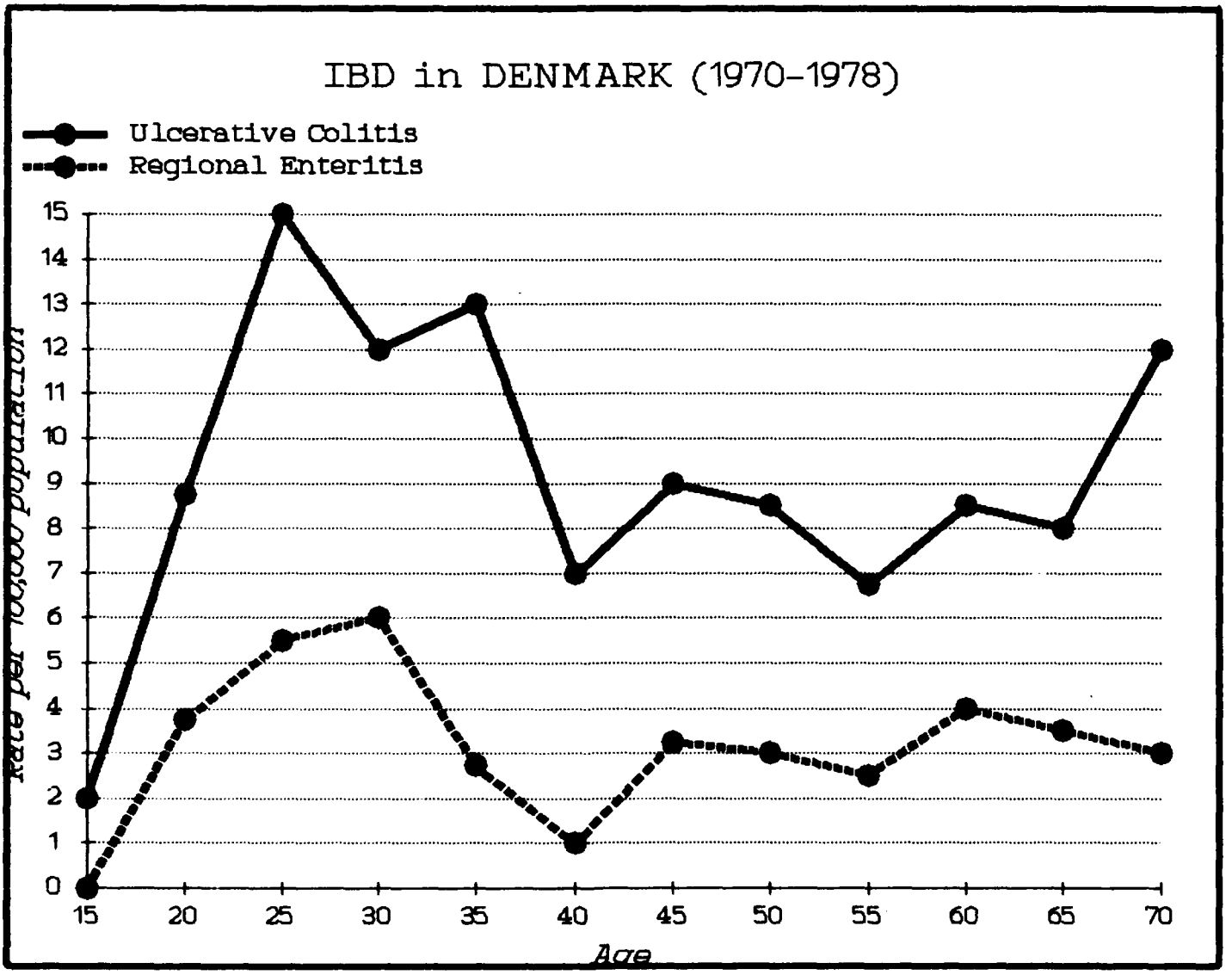
In my opinion, a study of inflamatory bowel desease in the military population would be a very valuable and useful set of data. I know of no similar study; and having information on the incidence in this population, cost to the military, and other effects may well lead to new procurement standards, screening programs and otherwise focus attention on what seems to me to be a frequently seen disease process. I certainly support this effort and look forward to the results.

Ronald R. Blanck
Colonel, Medical Corps
Chief, Medical Corps Career
Activities Office

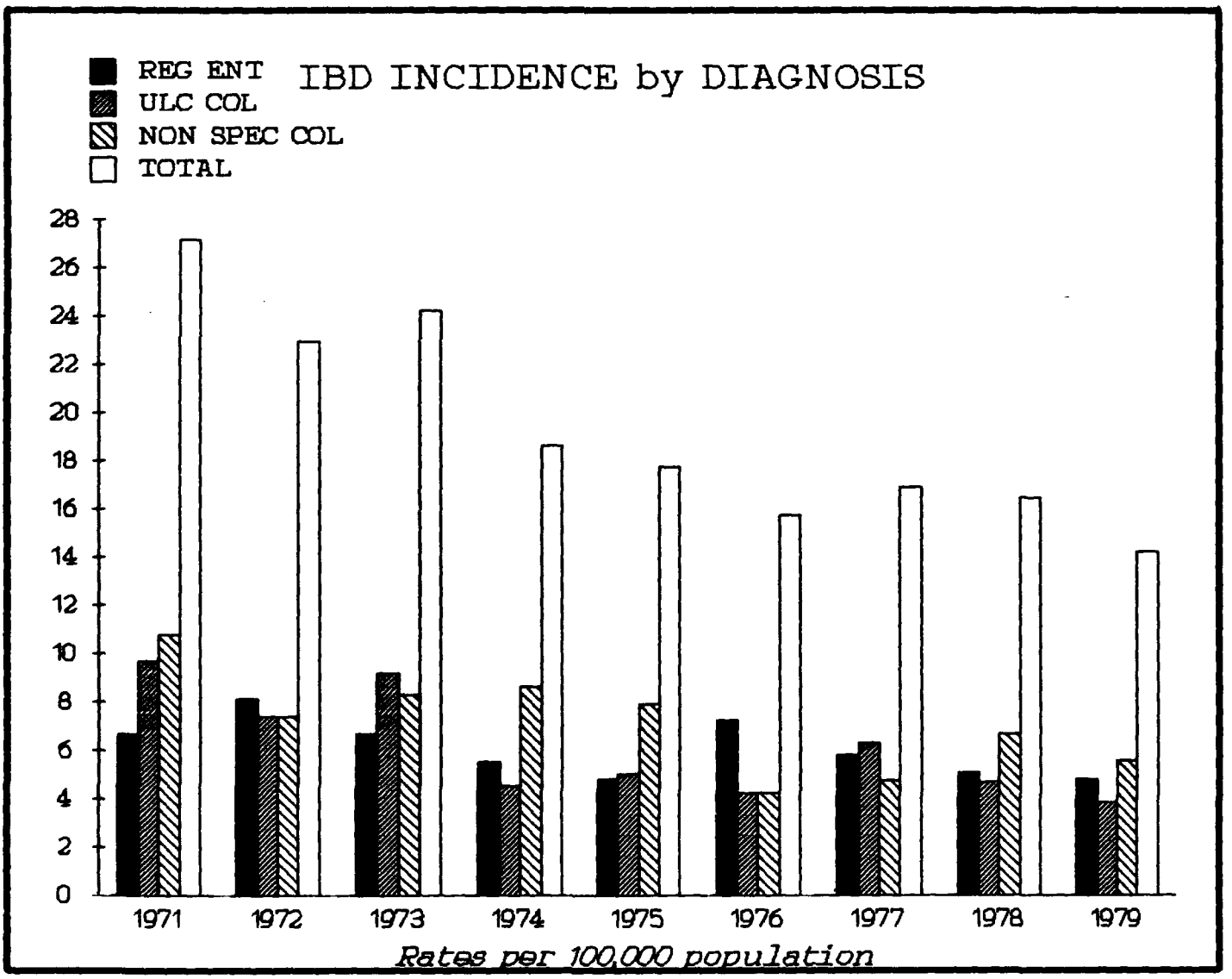
APPENDIX "D"

IBD Graphs.

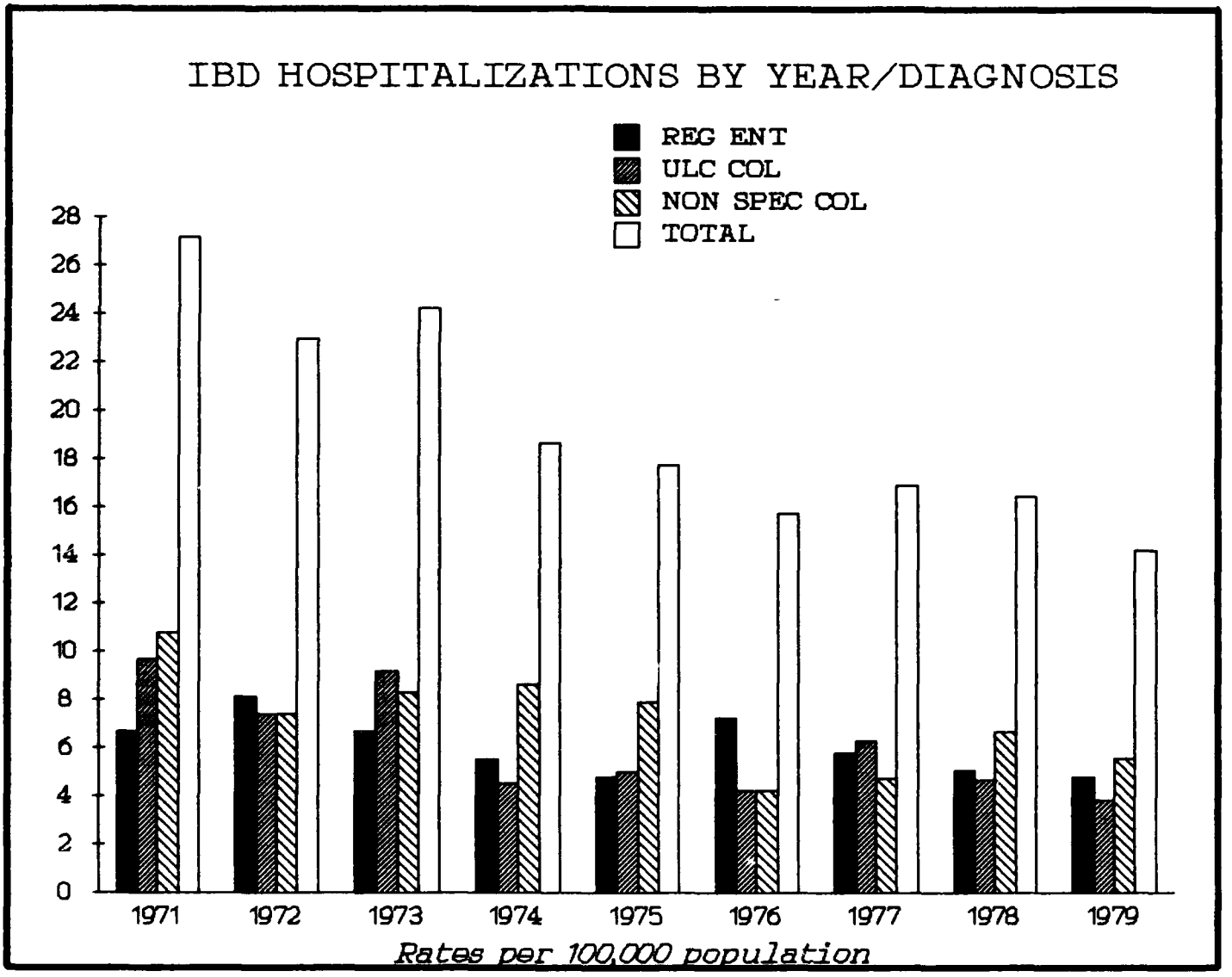
GRAPH 1-1


IBD in DENMARK (1970-1978)
Ulcerative Colitis
Regional Enteritis
Incidence per 100,000 per year
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
15
20
25
30
35
40
45
50
55
60
65
70
Age

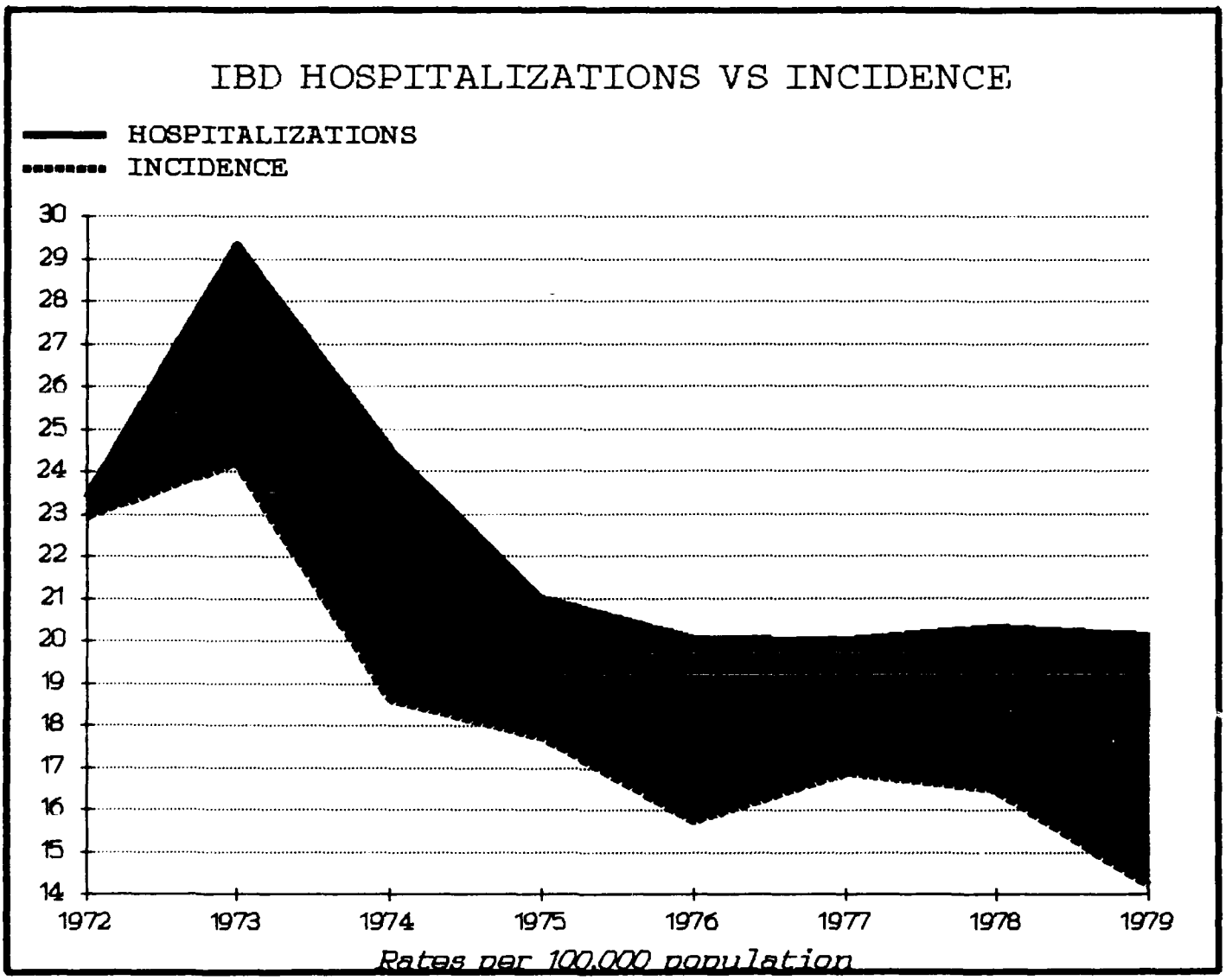
GRAPH 2-1


REG ENT
ULC COL
NON SPEC COL
TOTAL
IBD INCIDENCE by DIAGNOSIS
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
1971
1972
1973
1974
1975
1976
1977
1978
1979
Rates per 100,000 population

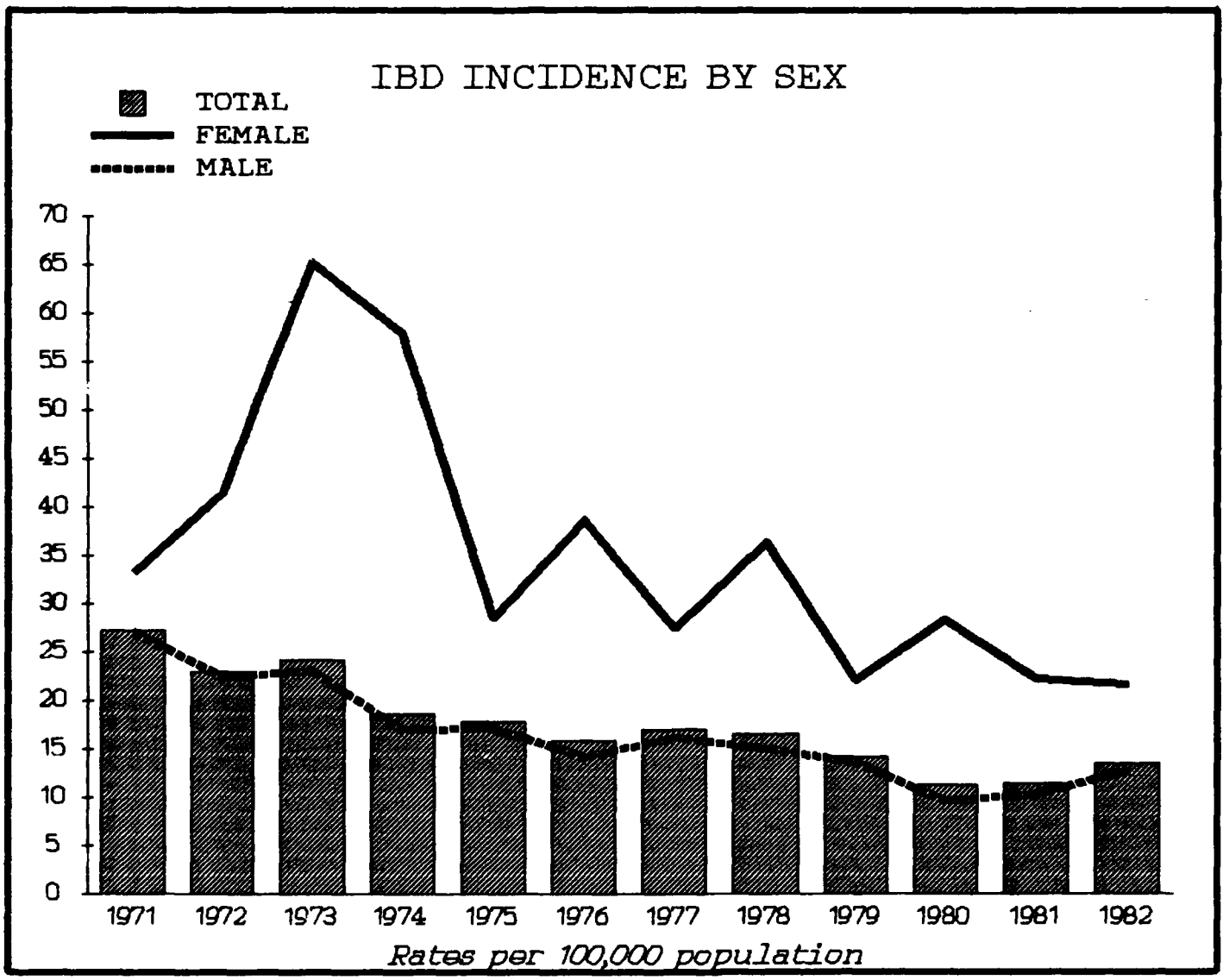
GRAPH 2-2


IBD HOSPITALIZATIONS BY YEAR/DIAGNOSIS
REG ENT
ULC COL
NON SPEC COL
TOTAL
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
1971
1972
1973
1974
1975
1976
1977
1978
1979
Rates per 100,000 population

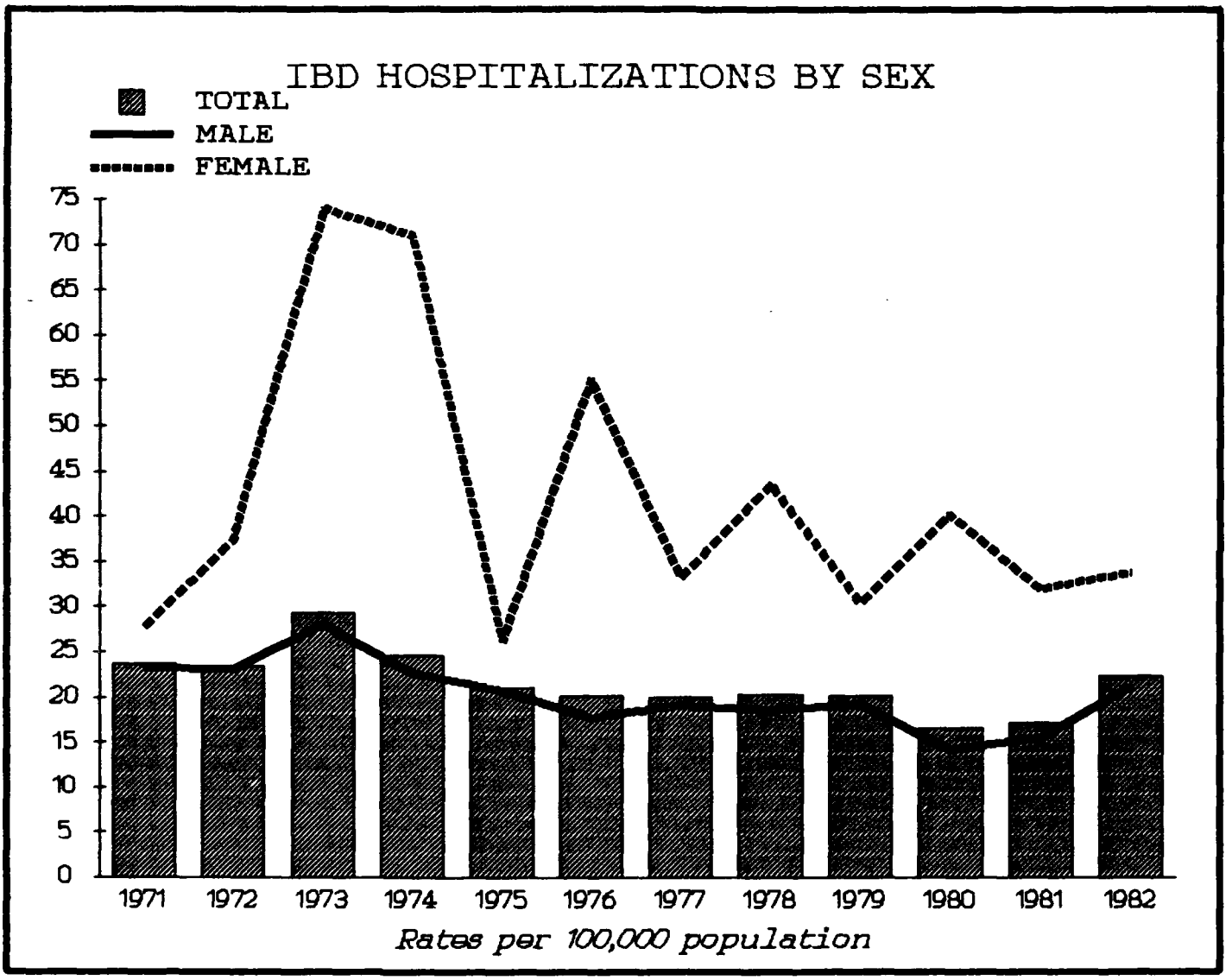
GRAPH 2-3


IBD HOSPITALIZATIONS VS INCIDENCE
HOSPITALIZATIONS
INCIDENCE
30
29
28
27
26
25
24
23
22
21
20
19
18
17
16
15
14
1972
1973
1974
1975
1976
1977
1978
1979
Rates per 100,000 population

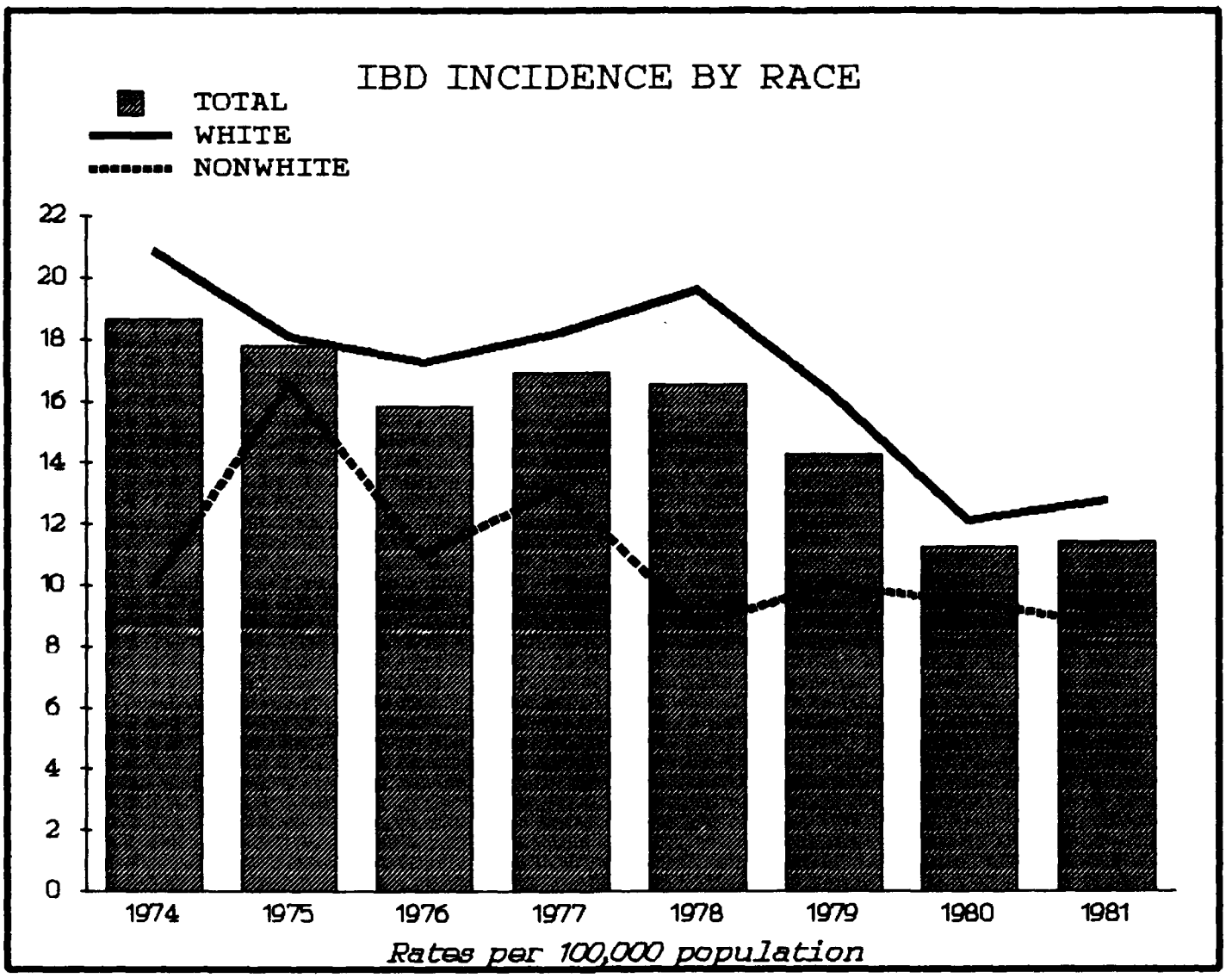
GRAPH 2-4


IBD INCIDENCE BY SEX
TOTAL
FEMALE
MALE
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
Rates per 100,000 population

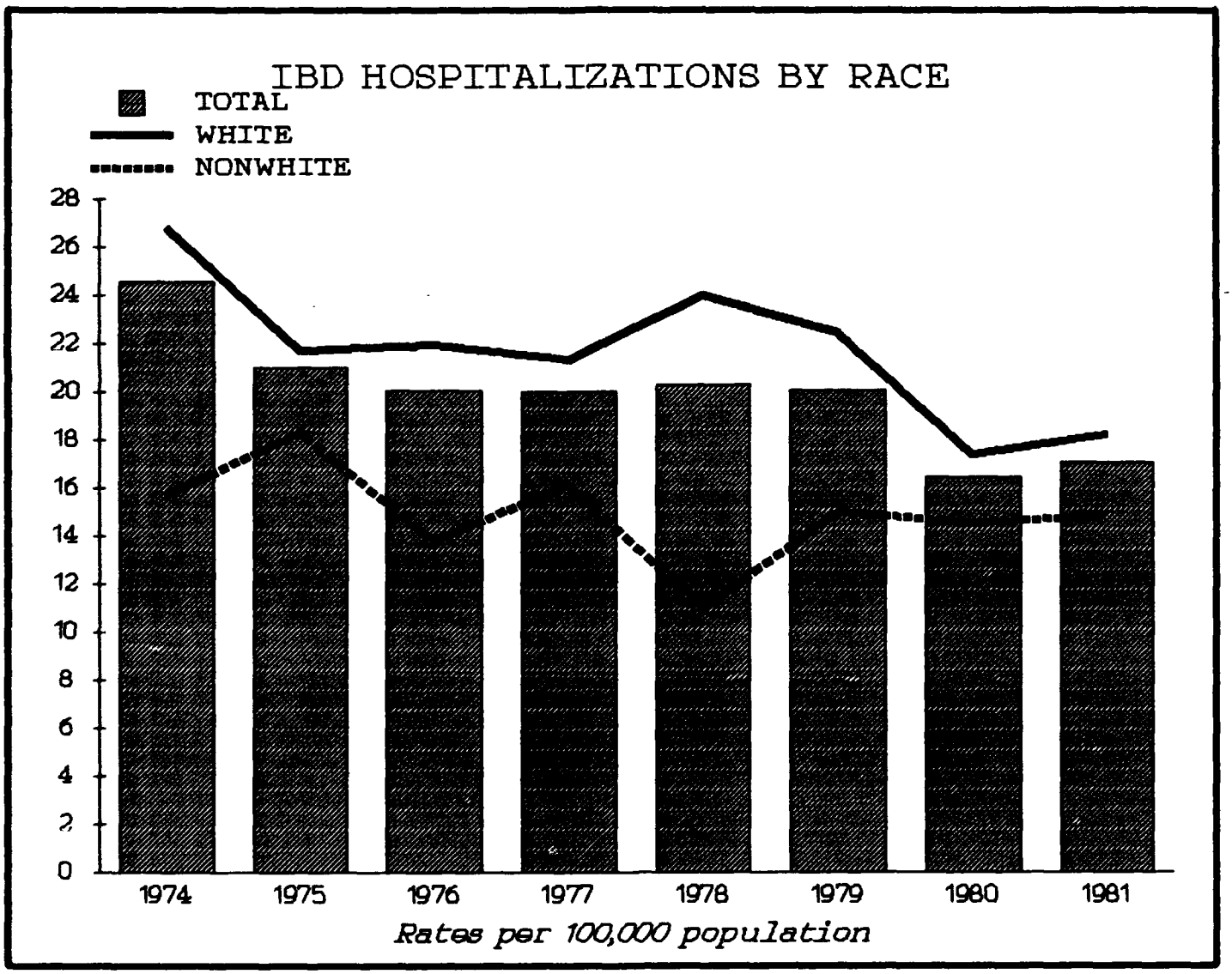
GRAPH 2-5


IBD HOSPITALIZATIONS BY SEX
TOTAL
MALE
FEMALE
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
Rates per 100,000 population

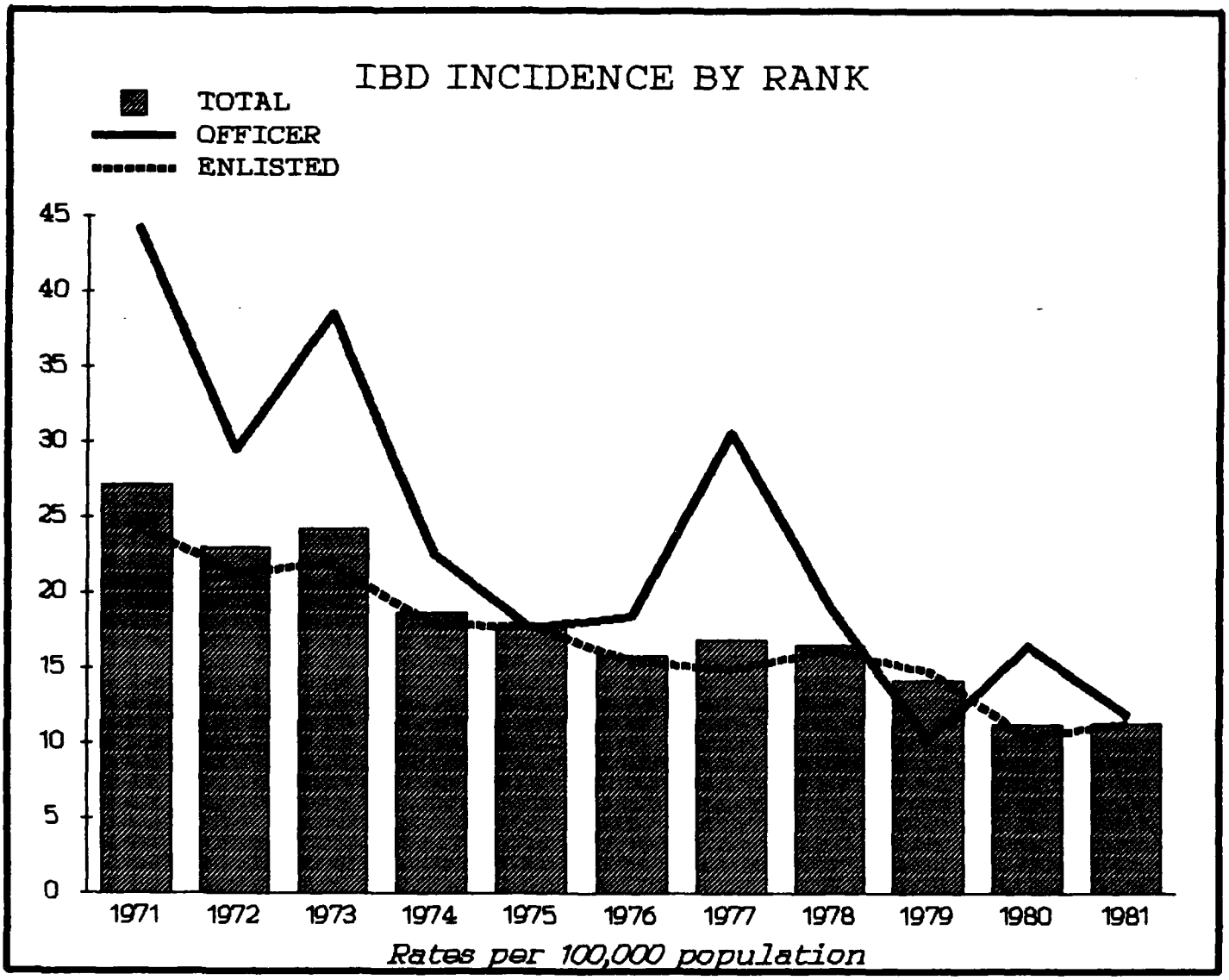
GRAPH 2-6


IBD INCIDENCE BY RACE
TOTAL
WHITE
NONWHITE
22
20
18
16
14
12
10
8
6
4
2
0
1974
1975
1976
1977
1978
1979
1980
1981
Rates per 100,000 population

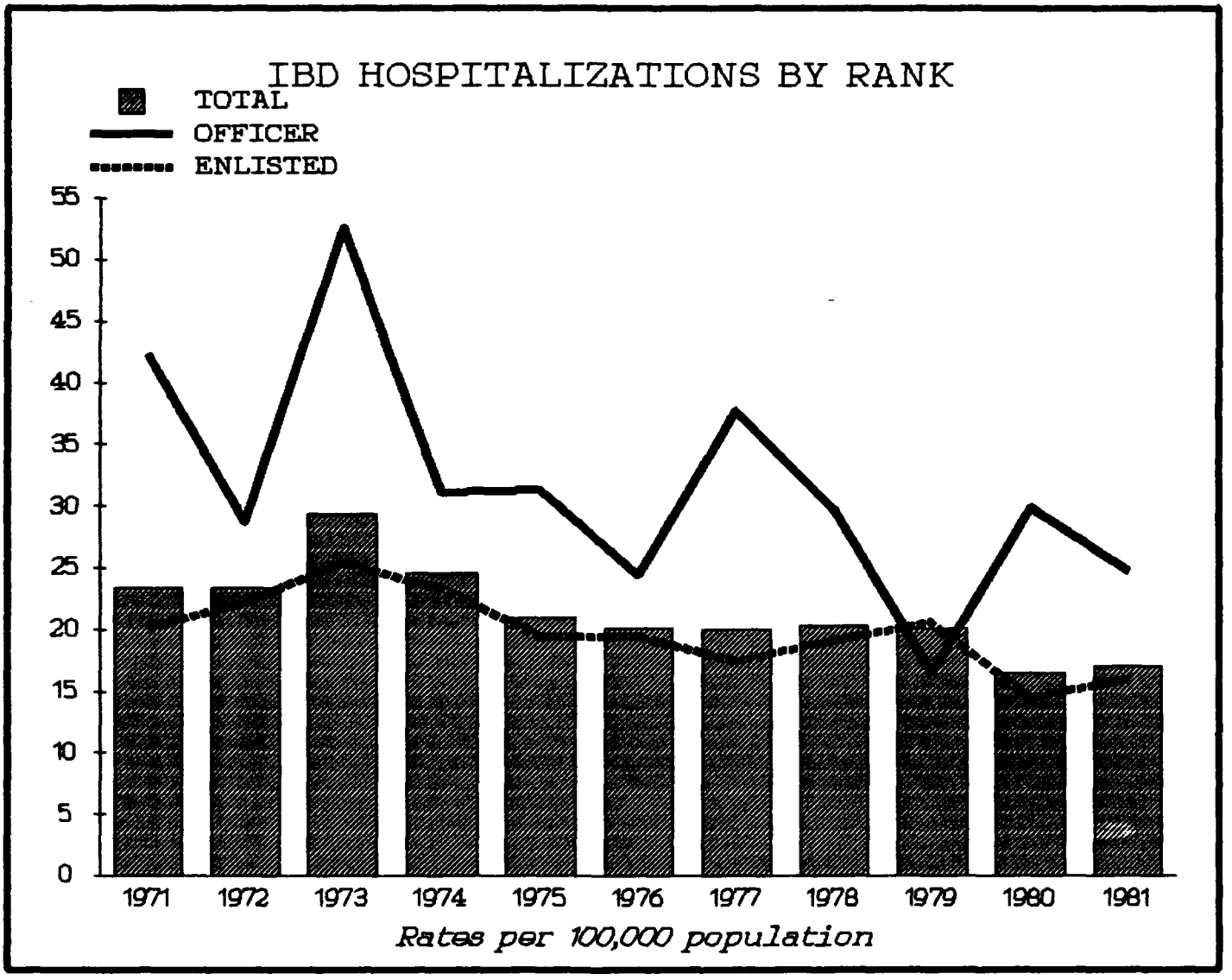
GRAPH 2-7


IBD HOSPITALIZATIONS BY RACE
TOTAL
WHITE
NONWHITE
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
1974
1975
1976
1977
1978
1979
1980
1981
Rates per 100,000 population

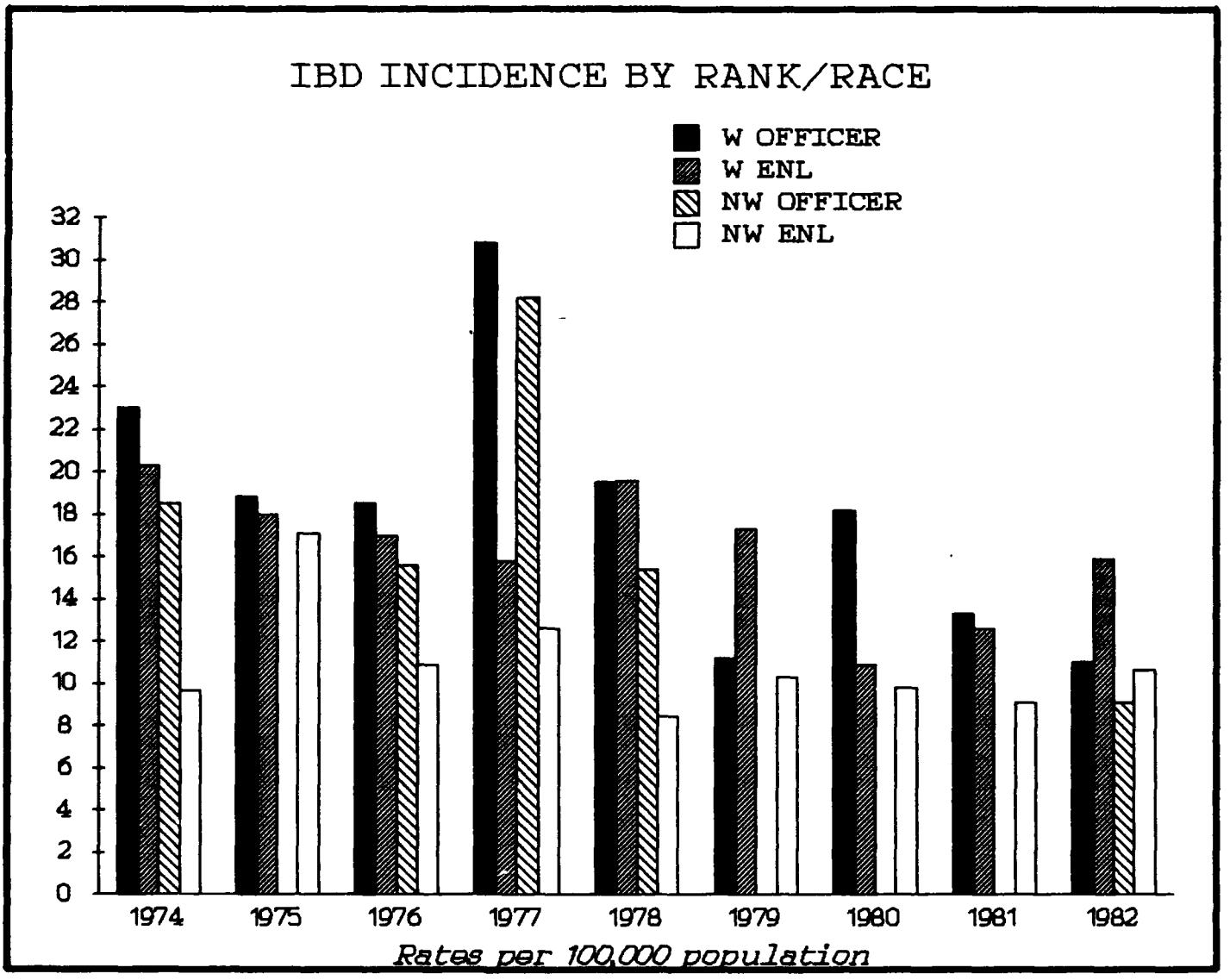
GRAPH 2-8


IBD INCIDENCE BY RANK
TOTAL
OFFICER
ENLISTED
45
40
35
30
25
20
15
10
5
0
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
Rates per 100,000 population

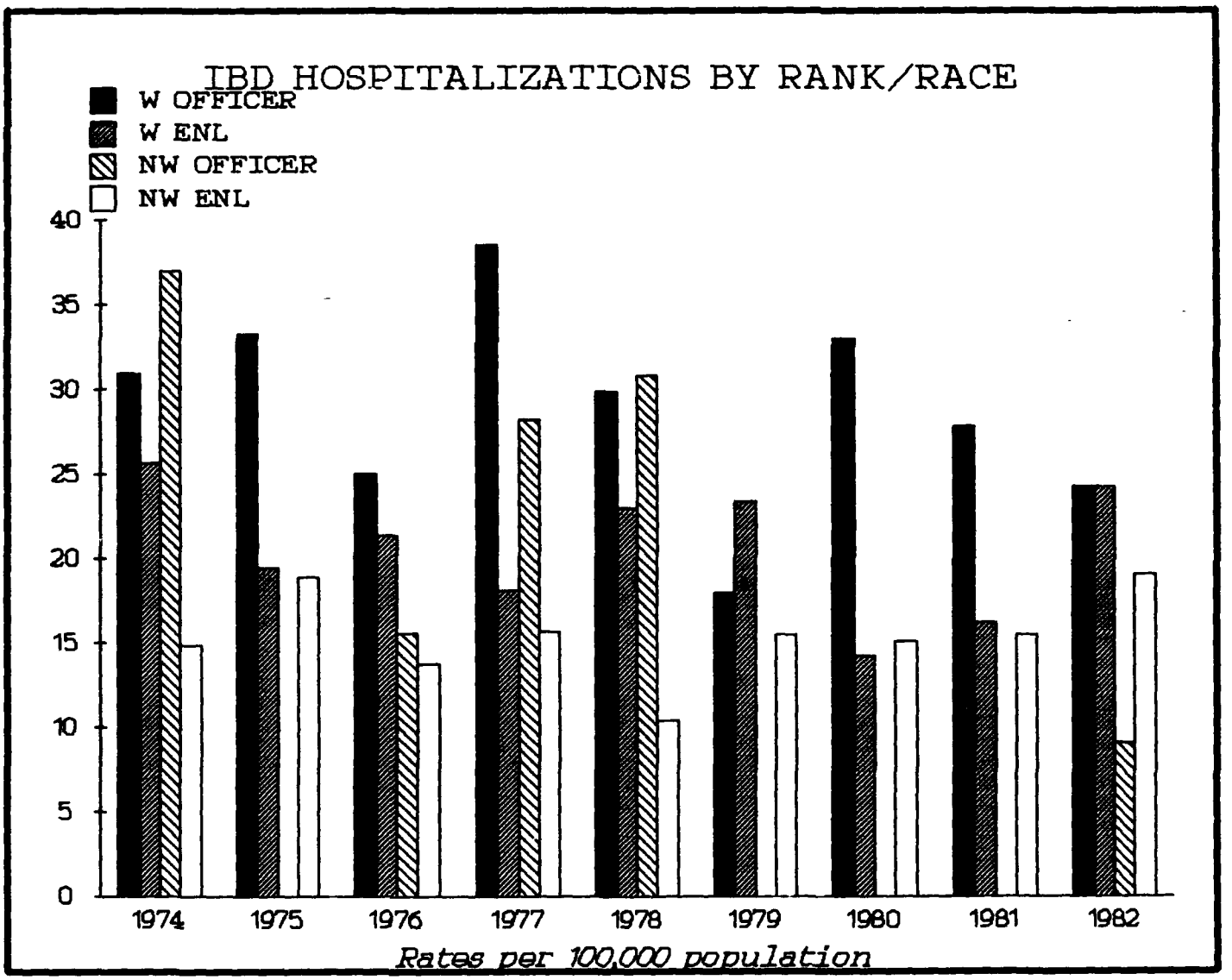
GRAPH 2-9


IBD HOSPITALIZATIONS BY RANK
TOTAL
OFFICER
ENLISTED
55
50
45
40
35
30
25
20
15
10
5
0
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
Rates per 100,000 population

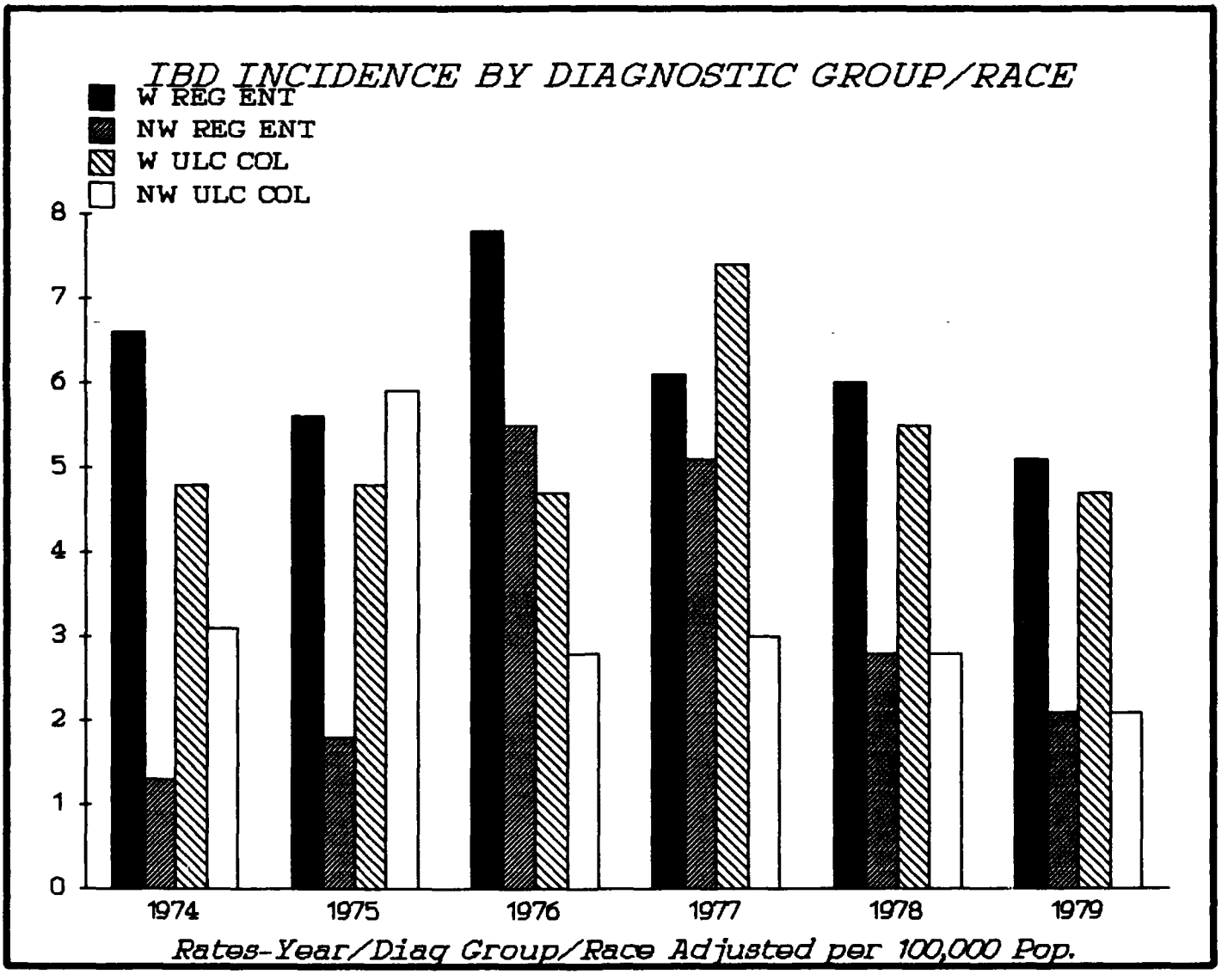
GRAPH 2-10


IBD INCIDENCE BY RANK/RACE
W OFFICER
W ENL
NW OFFICER
NW ENL
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
1974
1975
1976
1977
1978
1979
1980
1981
1982
Rates per 100,000 population

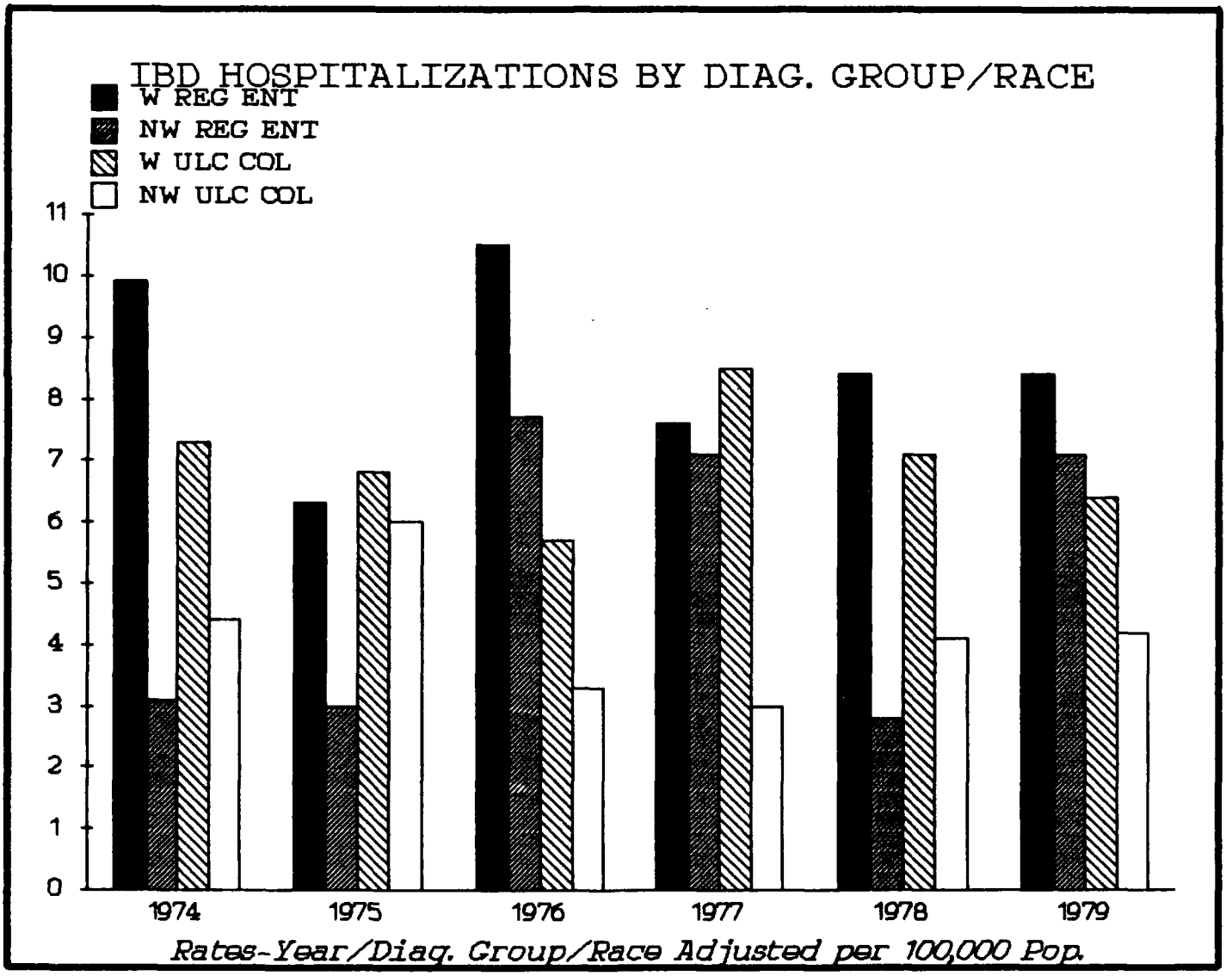
GRAPH 2-11


IBD HOSPITALIZATIONS BY RANK/RACE
W OFFICER
W ENL
NW OFFICER
NW ENL
40
35
30
25
20
15
10
5
0
1974
1975
1976
1977
1978
1979
1980
1981
1982
Rates per 100,000 population

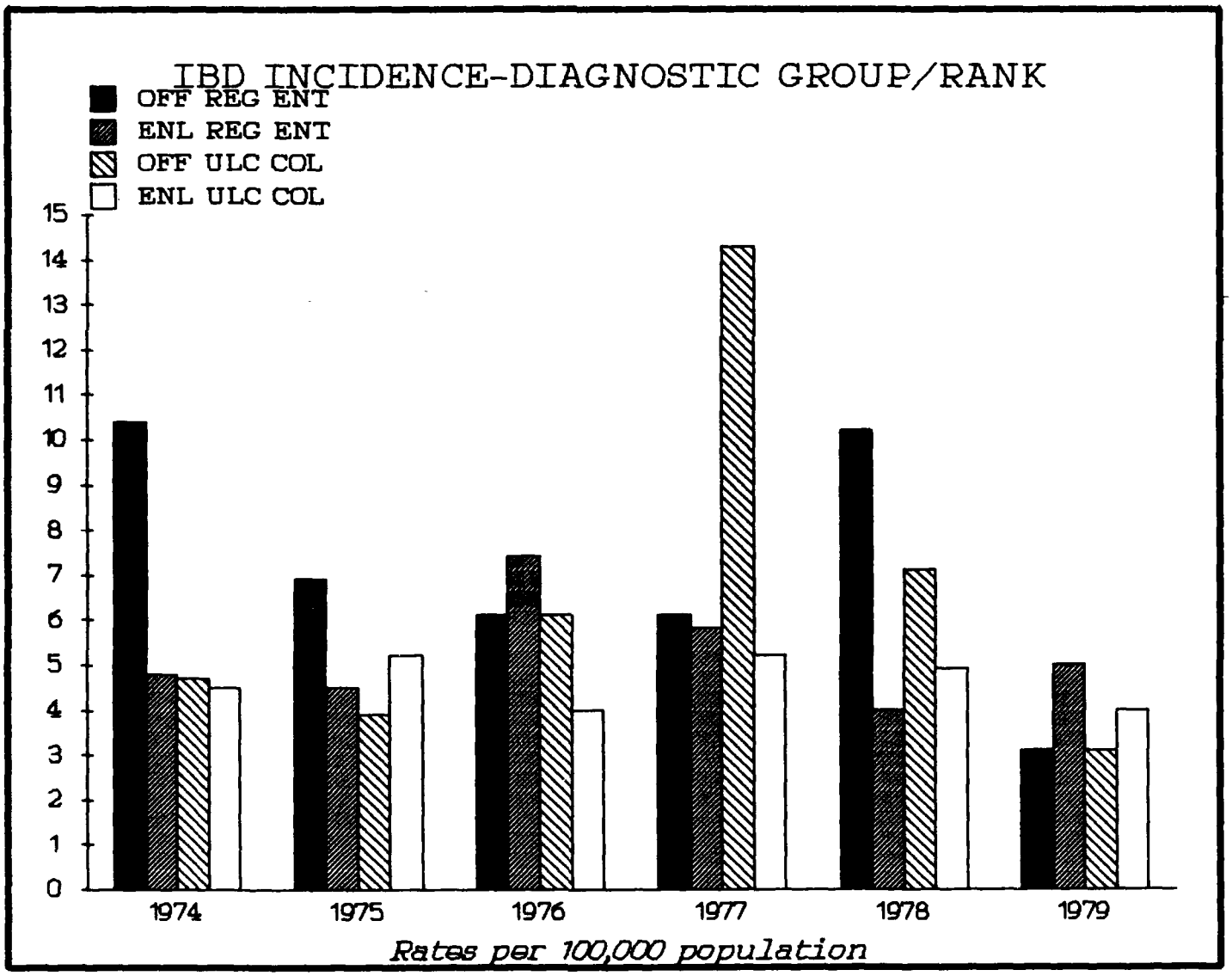
GRAPH 2-12


IBD INCIDENCE BY DIAGNOSTIC GROUP/RACE
W REG ENT
NW REG ENT
W ULC COL
NW ULC COL
8
7
6
5
4
3
2
1
0
1974
1975
1976
1977
1978
1979
Rates-Year/Diag Group/Race Adjusted per 100,000 Pop.

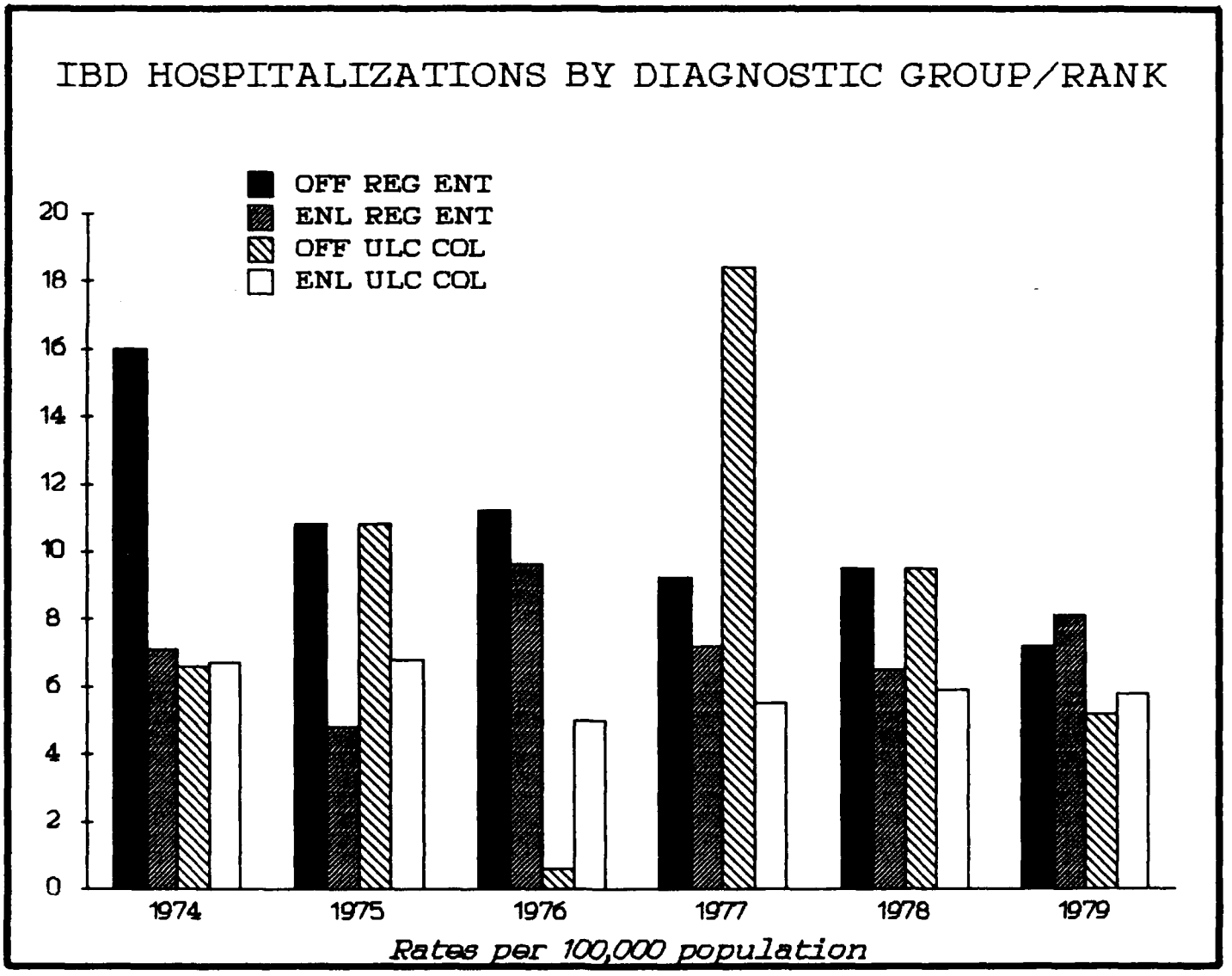
GRAPH 2-13


IBD HOSPITALIZATIONS BY DIAG. GROUP/RACE
W REG ENT
NW REG ENT
W ULC COL
NW ULC COL
11
10
9
8
7
6
5
4
3
2
1
0
1974
1975
1976
1977
1978
1979
Rates-Year/Diag. Group/Race Adjusted per 100,000 Pop.

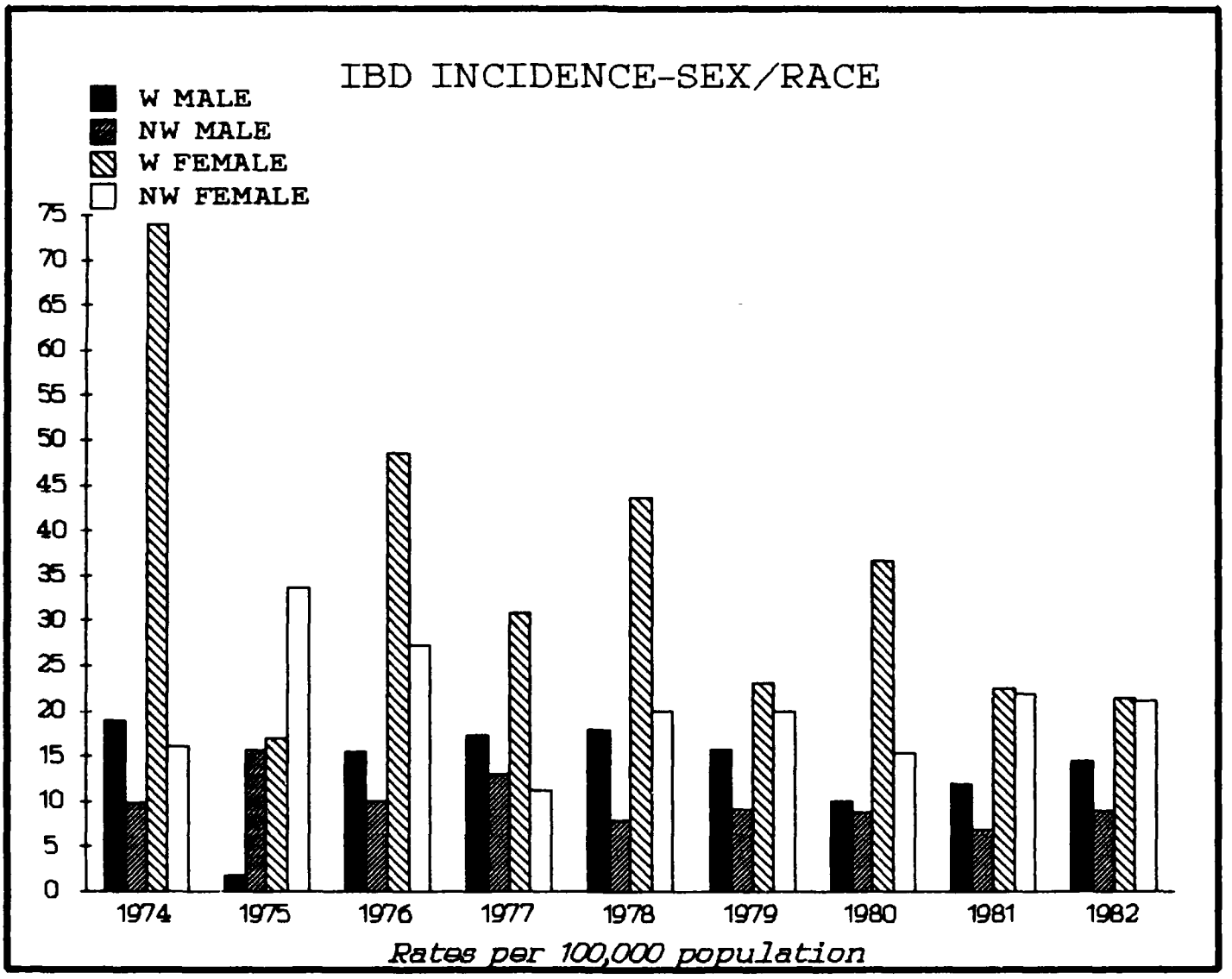
GRAPH 2-14


IBD INCIDENCE-DIAGNOSTIC GROUP/RANK
OFF REG ENT
ENL REG ENT
OFF ULC COL
ENL ULC COL
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
1974
1975
1976
1977
1978
1979
Rates per 100,000 population

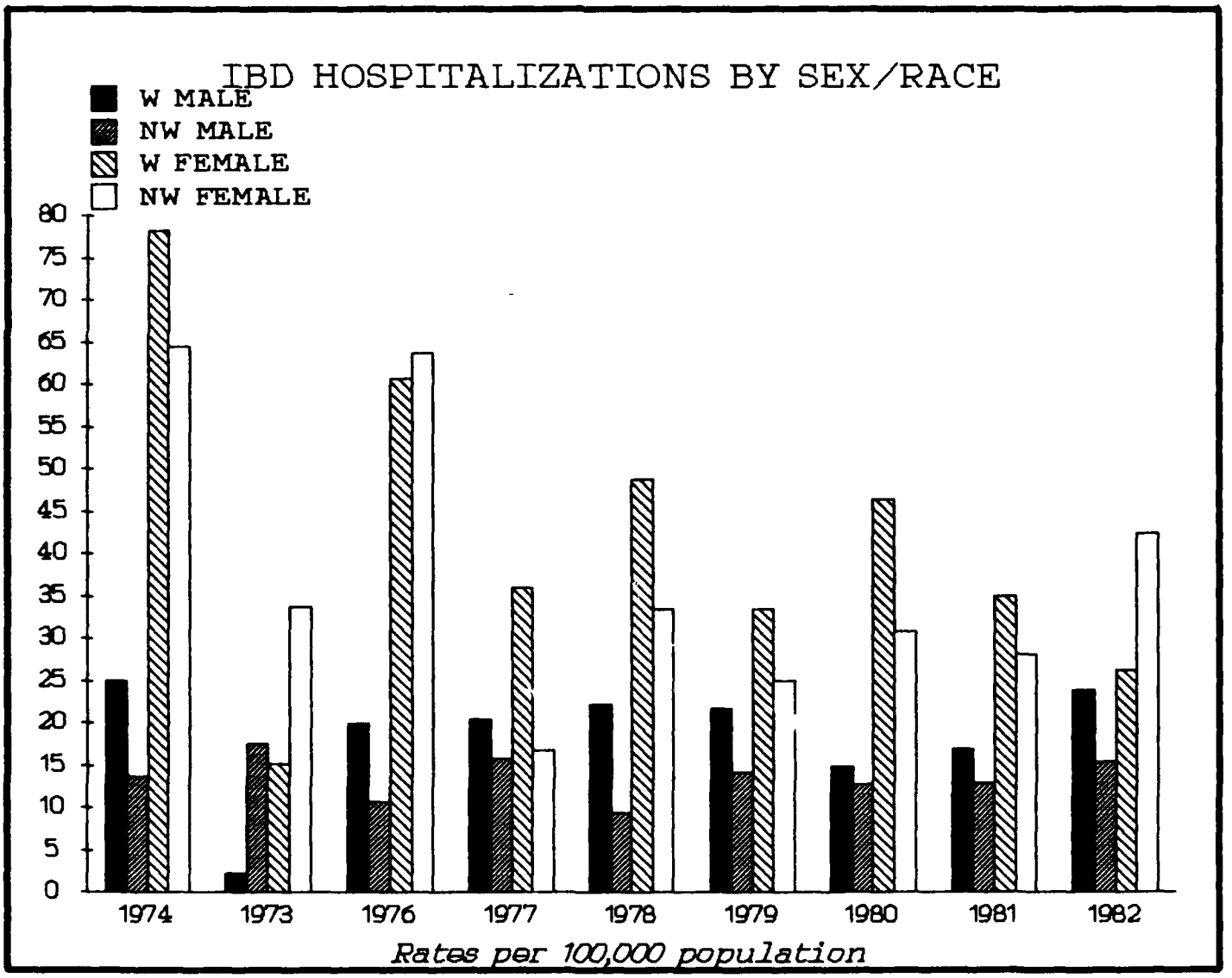
GRAPH 2-15


IBD HOSPITALIZATIONS BY DIAGNOSTIC GROUP/RANK
OFF REG ENT
ENL REG ENT
OFF ULC COL
ENL ULC COL
20
18
16
14
12
10
8
6
4
2
0
1974
1975
1976
1977
1978
1979
Rates per 100,000 population

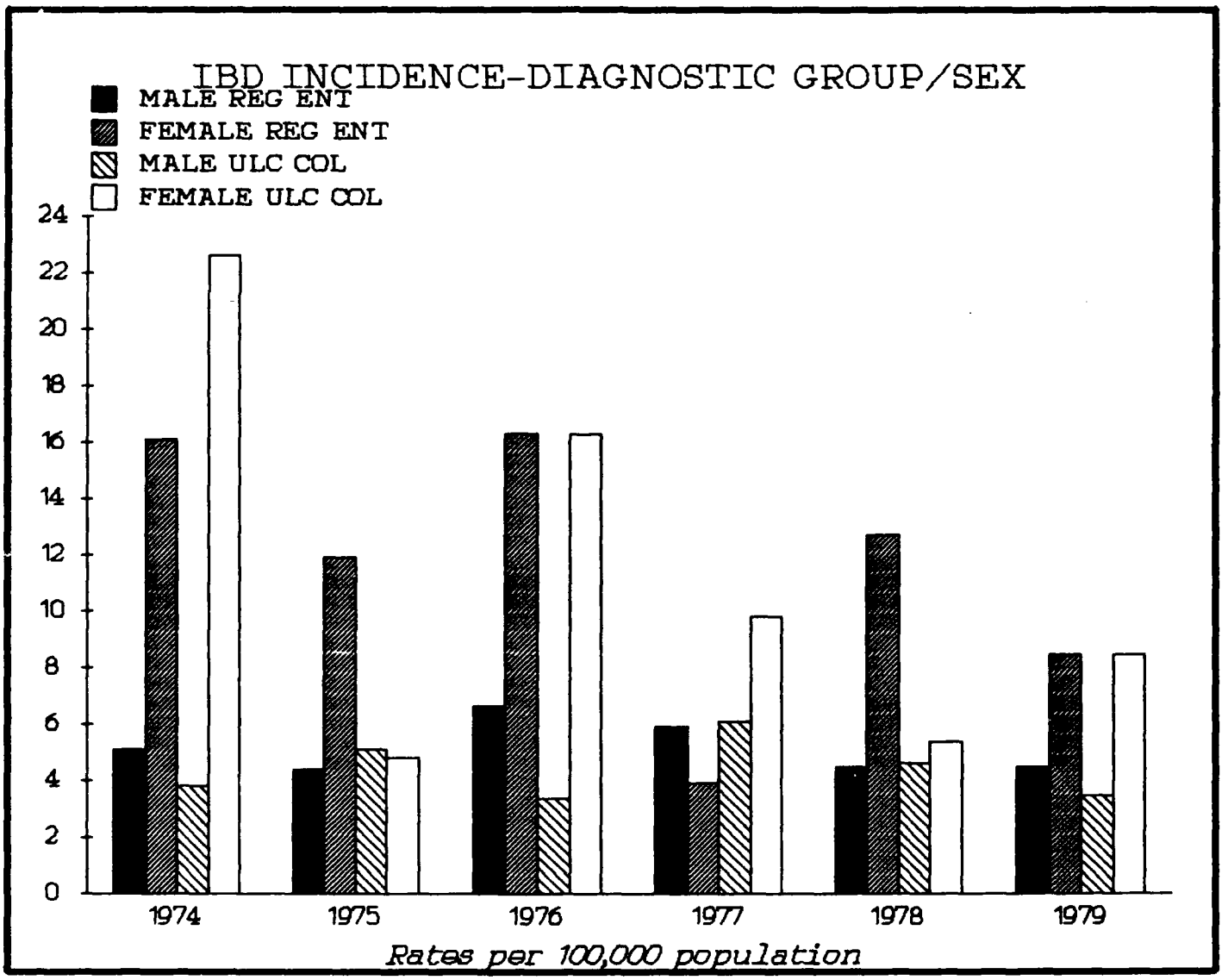
GRAPH 2-16


IBD INCIDENCE-SEX/RACE
W MALE
NW MALE
W FEMALE
NW FEMALE
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
1974
1975
1976
1977
1978
1979
1980
1981
1982
Rates per 100,000 population

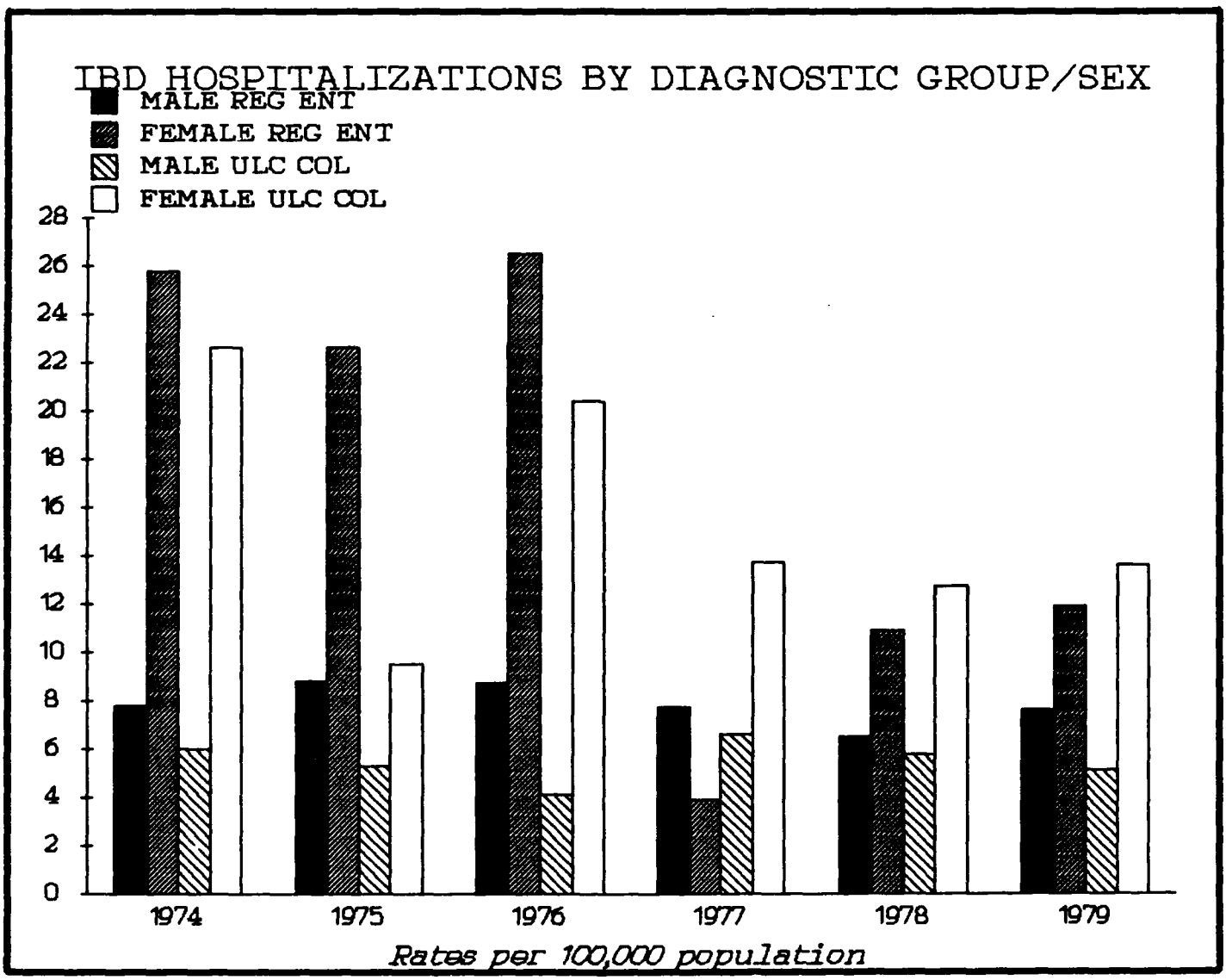
GRAPH 2-17


IBD HOSPITALIZATIONS BY SEX/RACE
W MALE
NW MALE
W FEMALE
NW FEMALE
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
1974
1973
1976
1977
1978
1979
1980
1981
1982
Rates per 100,000 population

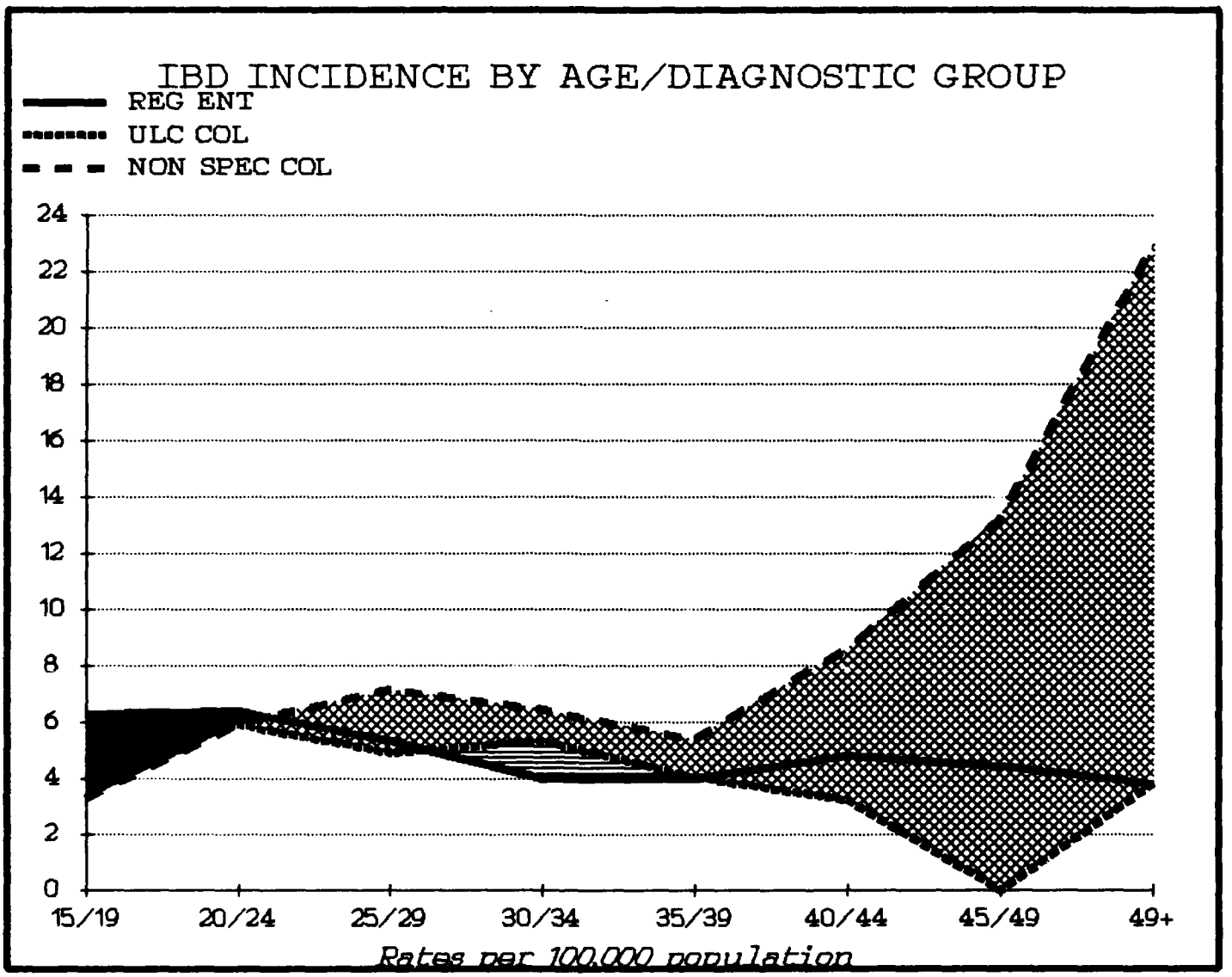
GRAPH 2-18


IBD INCIDENCE-DIAGNOSTIC GROUP/SEX
MALE REG ENT
FEMALE REG ENT
MALE ULC COL
FEMALE ULC COL
24
22
20
18
16
14
12
10
8
6
4
2
0
1974
1975
1976
1977
1978
1979
Rates per 100,000 population

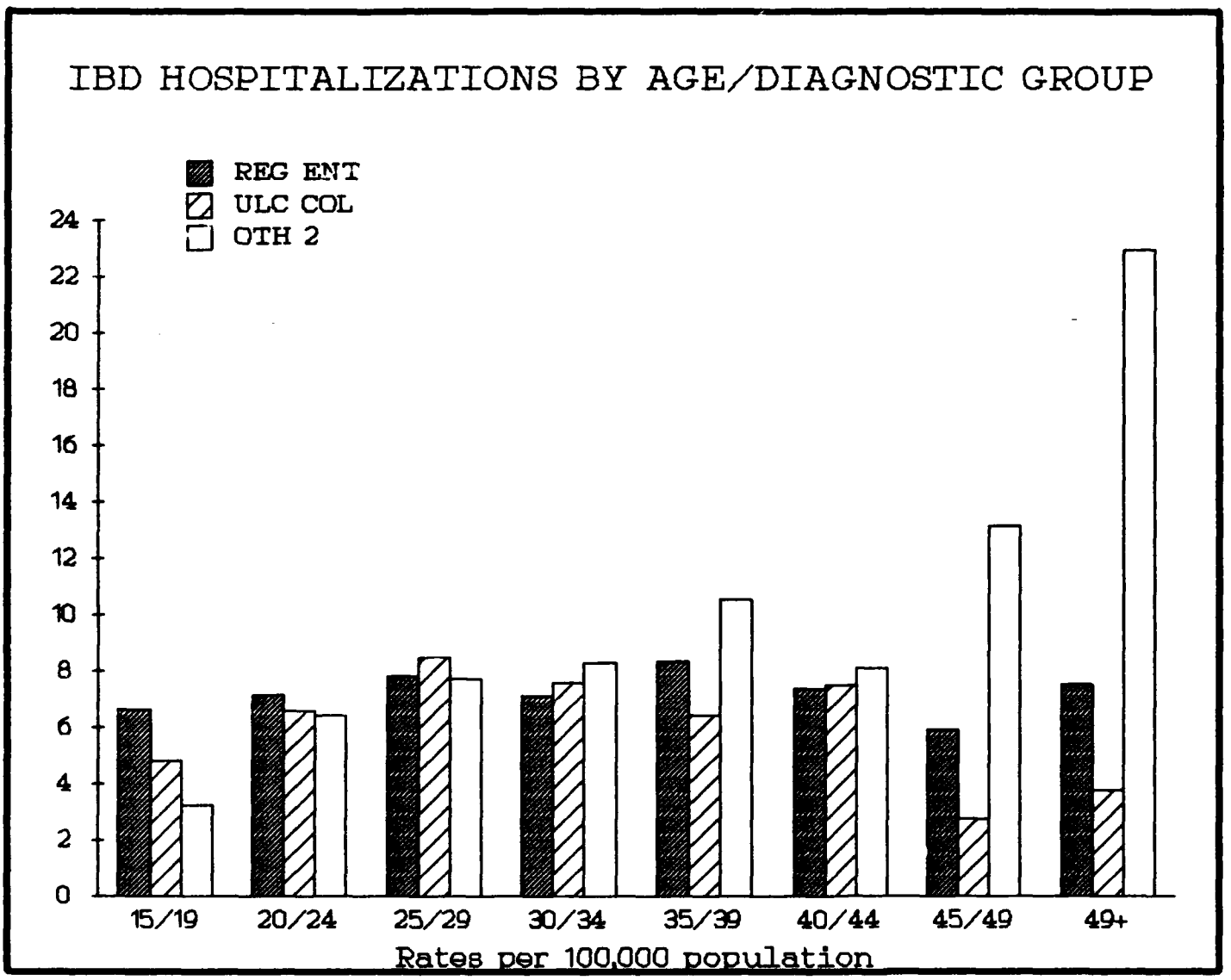
GRAPH 2-19


IBD HOSPITALIZATIONS BY DIAGNOSTIC GROUP/SEX
MALE REG ENT
FEMALE REG ENT
MALE ULC COL
FEMALE ULC COL
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
1974
1975
1976
1977
1978
1979
Rates per 100,000 population

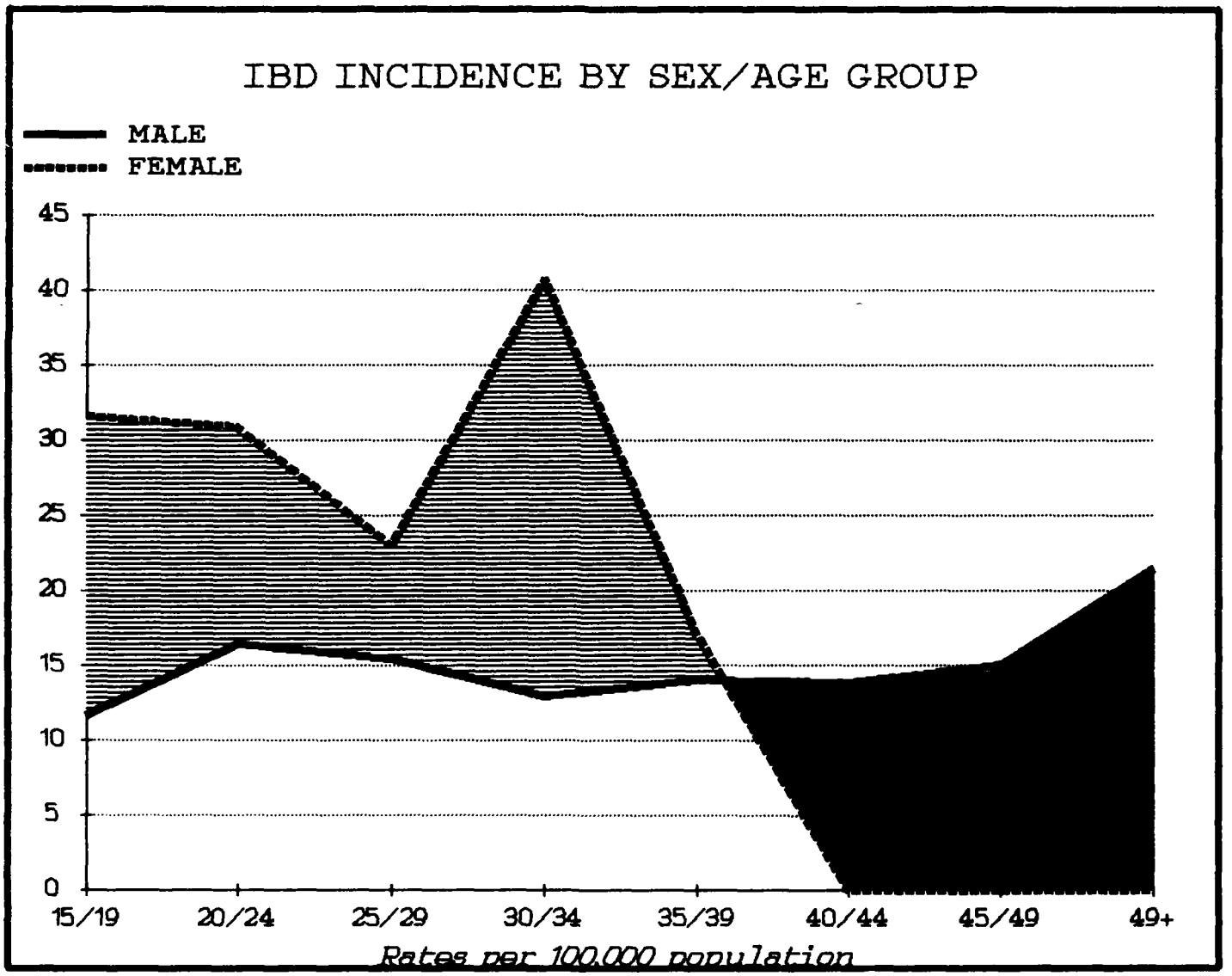
GRAPH 2-20


IBD INCIDENCE BY AGE/DIAGNOSTIC GROUP
REG ENT
ULC COL
NON SPEC COL
24
22
20
18
16
14
12
10
8
6
4
2
0
15/19
20/24
25/29
30/34
35/39
40/44
45/49
49+
Rates per 100,000 population

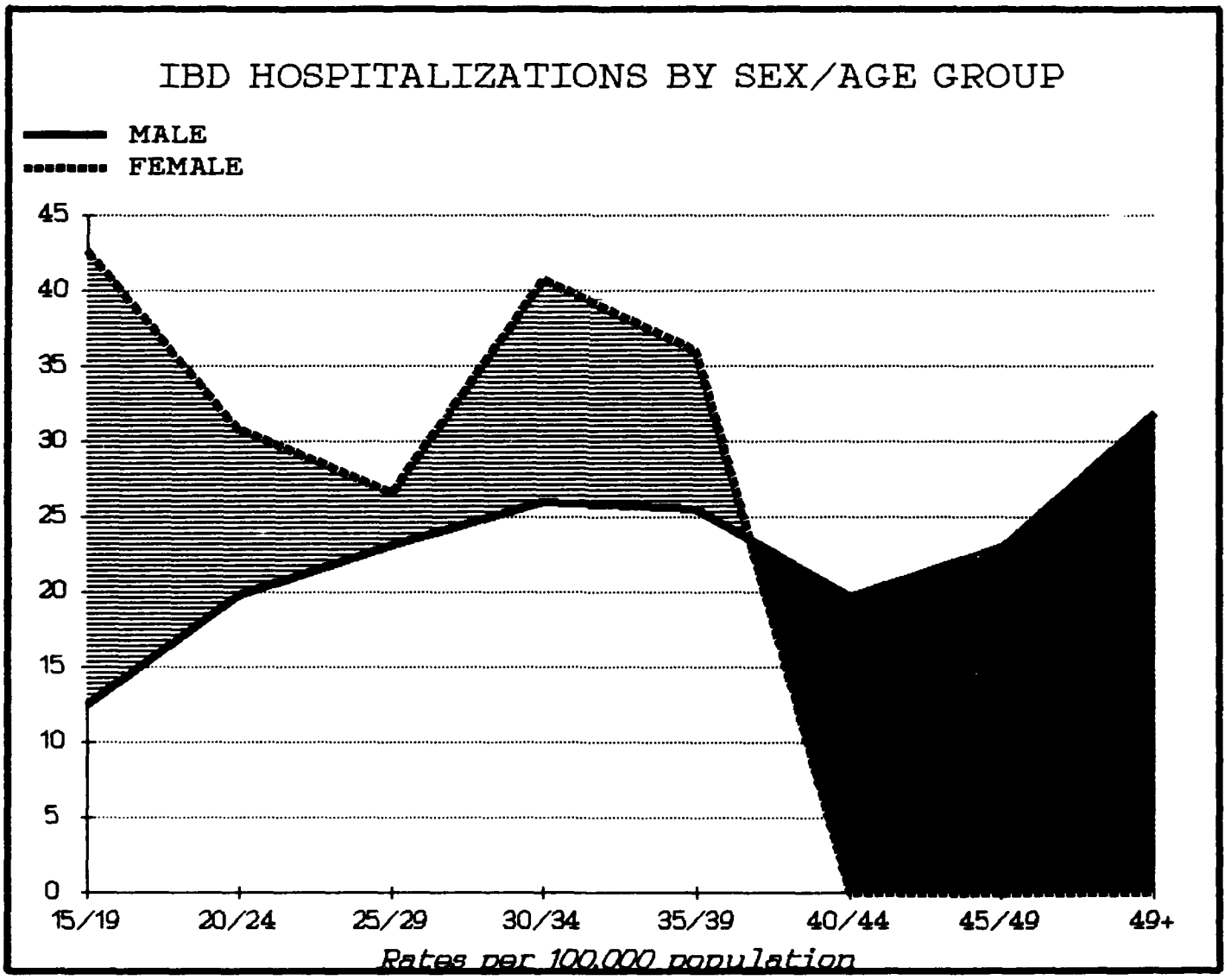
GRAPH 2-21


IBD HOSPITALIZATIONS BY AGE/DIAGNOSTIC GROUP
REG ENT
ULC COL
OTH 2
24
22
20
18
16
14
12
10
8
6
4
2
0
15/19
20/24
25/29
30/34
35/39
40/44
45/49
49+
Rates per 100,000 population

GRAPH 2-22


IBD INCIDENCE BY SEX/AGE GROUP
MALE
FEMALE
45
40
35
30
25
20
15
10
5
0
15/19
20/24
25/29
30/34
35/39
40/44
45/49
49+
Rates per 100,000 population

GRAPH 2-23


IBD HOSPITALIZATIONS BY SEX/AGE GROUP
MALE
FEMALE
45
40
35
30
25
20
15
10
5
0
15/19
20/24
25/29
30/34
35/39
40/44
45/49
49+
Rates per 100,000 population

BIBLIOGRAPHY

BOOKS

Brooke, Bryan N., "Crohn's Disease," Clinics in Gastroenterology, Vol 1, No 2 (May 1972), Philadelphia: W. B. Saunders Company, 1972.

Commission on Professional and Hospital Activities. Hospital adaptation of the International Classification of Diseases, adapted for use in the United States; 2nd ed., Ann Arbor, Michigan: CPHA, 1973.

Daniel, Wayne W., Applied Nonparametric Statistics, Houghton Mifflin Company, Boston, 1978, pp. 130-146, 223-241.

Farmer, Richard G., "Inflammatory Bowel Disease," Clinics in Gastroenterology, Vol 9, No 2 (May 1980), Philadelphia: W. B. Saunders Company, 1980.

Lilienfeld, A. M., and Lilienfeld, D. E., Foundations of Epidemiology, 2nd ed., New York: Oxford University Press, 1980.

McConnell, R. B., The Genetics of Gastro-Intestinal Disorders, London: Oxford University Press, 1966.

Snow J. Snow on Cholera, New York: Hafner, 1965.

United States Department of Health, Education and Welfare, Public Health Service, International Classification of Diseases, adapted for use in the United States, 8th revision, Washington, D.C.: U.S. Government Printing Office, 1967.

JOURNAL ARTICLES

Acheson, E. D., and Nefzger, M. Dean, "Ulcerative Colitis in the United States Army in 1944," Gastroenterology, Vol 44, No 1, June 1963, p. 14.

Bergman, L., and Krause, U., "The Incidence of Crohn's Disease in Central Sweden," Scandinavian Journal of Gastroenterology, 1975, Vol 10, pp. 725-730.

Binder, Vibeke; Both, H.; Hansen, P. K.; Hendriksen, C.; Kreiner, S.; and Torp-Pedersen, K., "Incidence and Prevalence of Ulcerative Colitis and Crohn's Disease in the County of Copenhagen, 1962 to 1978," Gastroenterology (September 1982), Vol 83, No 3, pp. 563-568.

Bonnevie, O.; Riis, P.; and Anthonisen, P., "An Epidemiological Study of Ulcerative Colitis in Copenhagen County," Scandinavian Journal of Gastroenterology 1968, Vol 3, pp. 432-438.

Brahme, F.; Lindstrom, C.; and Wenckert, A., "Crohn's Disease in a Defined Population," Gastroenterology 1975, Vol 69, pp. 324-351.

Driscoll, R. H. Jr.; Meredith, S. C.; Sitrin, M.; and Rosenberg, I. H., "Vitamin D Deficiency and Bone Disease in Patients With Crohn's Disease," Gastroenterology (December 1982), Vol 83, No 6, pp. 1252-1258.

Evans, J. G., and Acheson, E. D., "An Epidemiological Study of Ulcerative Colitis and Regional Enteritis in the Oxford Area," Gut, 1965, Vol 6, pp. 311-324.

Fahrlander, H., and Baerlocher, C., "Clinical Features and Epidemiological Data in the Basle Area. In: Regional Enteritis (Crohn's Disease)," Skandia International Symposia; Engel, A., and Larson, T., eds., Stockholm: Nordiska Bokhandelns Forlag, 1971, pp. 131-141.

Frankel, David H.; Mostofi, Reza S.; and Lorinez, Allan L., "Oral Crohn's Disease: Report of Two Cases in Brothers With Metallic Dysgeusia and a Review of the Literature," Journal of the American Academy of Dermatology, February 1985, Vol 12, pp. 260-268.

Garland, Cedric F.; Lilienfeld, Abraham M.; Mendeloff, Albert I.; Markowitz, Jan A.; Terrell, Katherine B.; and Garland, Frank C., "Incidence Rates of Ulcerative Colitis and Crohn's Disease in Fifteen Areas of the United States," Gastroenterology (December 1981), Vol 81, No 6, pp. 1115-1124.

Gelpi, Armand P., "Inflammatory Bowel Disease Among College Students," The Western Journal of Medicine, November 1978, p. 371.

Mayberry, J.; Rhodes, J.; and Hughes, L. E., "Incidence of Crohn's Disease in Cardiff Between 1934 and 1977," Gut 1979, Vol 20, pp. 602-608.

Mayberry, J. F.; Dew, M. J.; Morris, J. S.; and Powell, D. B., "An Audit of Crohn's Disease in a Defined Population," Journal of the Royal College of Physicians of London, Vol 17, No 3, July 1983, pp. 196-198.

Mayberry, J. F.; Rhodes, J.; and Newcombe, R. G., "Crohn's Disease in Wales, 1967-1976; An Epidemiological Survey Based on Hospital Admissions," Postgraduate Medical Journal (May 1980), Vol 56, pp. 336-341.

Mendeloff, A. I., "Epidemiologic Aspects of Inflammatory Bowel Disease," Gastroenterology, Vol 2, 3rd ed., Bockus, H. L., ed., Philadelphia: W. B. Saunders, 1976, pp. 540-549.

Mendeloff, A. I., "The Epidemiology of Inflammatory Bowel Disease," Clinical Gastroenterology 1980, Vol 9, pp. 259-270.

Mendeloff, A. I.; Monk, M.; Siegel, C. I.; and Lilienfeld, A. M., "Illness Experience and Life Stresses in Patients With Irritable Colon and With Ulcerative Colitis," New England Journal of Medicine 1970, Vol 282, pp. 14-17.

Mendeloff, A. I.; Monk, M; Siegel, C. I.; and Lilienfeld, A. M., "Some Epidemiological Features of Ulcerative Colitis and Regional Enteritis," Gastroenterology 1966, Vol 51, pp. 748-752.

Miller, D. S.; Keighly, A. C.; Langman, M. J. S., "Changing Patterns in Epidemiology of Crohn's Disease," Lancet 1974, Vol 2, pp. 691-693.

Monk, M.; Mendeloff, A. I.; Siegel, C. I.; and Lilienfeld A. M., "An Epidemiological Study of Ulcerative Colitis and Regional Enteritis Among Adults in Baltimore. I. Hospital Incidence and Prevalence, 1960-1963," Gastroenterology 1967, Vol 53, pp. 198-210.

Myren, J.; Bouchier, I. A. D.; Watkinson, G.; De Dombal, F. T., "Inflammatory Bowel Disease - An O.M.G.E. Survey," Scandinavian Journal of Gastroenterology (Suppl 1) 1979, Vol 14 (56), pp. 2-27.

Wigley, R. D., and MacLaurin, B. P., "A Study of Ulcerative Colitis in New Zealand, Showing a Low Incidence in Maoris," British Medical Journal 1962, Vol 2, pp. 228-231.

OTHER

Department of the Army, Patient Administration Systems and Biostatistics Activity, Information Pamphlet, Fort Sam Houston, Texas.

Department of the Army, Patient Administration Systems and Biostatistics Activity, Special Studies and Special Projects: Summaries and Examples of IPDS Reports, September 1981.

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