PERSONALITY STUDIES AND SOCIAL CHARACTERISTICS OF MEN SUFFERING FROM NON-SPECIFIC URETHRITIS.

A clinical study of the descriptive epidemiology of non-specific urethritis, with particular reference to the impact of social and psycho-sexual factors; conducted at the Venereal Diseases Control Centre, Adelaide, South Australia.

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D E C L A R A T I O N

I declare that this is an original record of work on non-specific urethritis conducted by myself under the supervision of the Department of Community Medicine, University of Adelaide. All the patients in the NSU study were examined, interviewed and followed-up personally and all other data collected by personal supervision.

This thesis contains no material which has been accepted for any other degree or diploma in any university, and to the best of my knowledge and belief, only contains previously published material where due reference is made to such material in the text.

L.J. PAMNANY.

SUMMARY OF THESIS AND CONTRIBUTION TO KNOWLEDGE

PART ONE: Introduction - Urethral infection in Man.

Infection of the anterior urethra has been known to occur in man from ancient times. This thesis commences with a brief historical review of urethral infection and its treatment through the ages. This is followed by epidemiological surveys of the extent of urethritis throughout the world today.

Statistics show that in the human male, urethral infections are the most common sexually transmitted diseases (STD's). However the true proportions of the main divisions, gonococcal and non-gonococcal urethritis, have only been measured relatively recently. The capability to differentiate did not exist before the discovery of the gonococcus by Albert Neisser in 1879 and its successful culture in 1882 by Leistikow and in 1885 by Bumm. Even then, it was only after the advent of penicillin and improved facilities for the diagnosis and treatment of gonorrhoea that non-gonococcal urethritis (NGU) became recognized as a major entity (Morton, 1972).

Where statistics for the two conditions are collected conjointly as in the United Kingdom, it is clear that NGU is being reported at a greater rate than gonorrhoea. This is supported by the statistical research undertaken by the author at the Venereal Diseases Control Centre (VDCC) in Adelaide, South Australia.

At the VDCC, the term non-specific urethritis (NSU) has always been used instead of NGU. The diagnostic criteria as used by the author to define NSU in this study were:

1. Clinical: Dysuria, in the presence of overt urethral discharge, meatitis or history of urethral discharge.
2. Laboratory: A Gram-stained smear showing 10 or more polymorphs per high power field with no evidence of N. gonorrhoeae on smear and culture and no other specific cause such as Trichomonas vaginalis being detected.

A comparison is made of the clinical presentation of gonococcal urethritis and NSU in the male, and the laboratory techniques necessary for diagnosis are outlined. The current concept of NSU is then described. Etiology remains disputed as is illustrated by the extensive review of recent advances in the microbiology of NSU. The most widely accepted view is that

Chlamydia trachomatis is the infective agent in up to 50 per cent of cases (Oriel, 1978). Other possible causes are mentioned to support the case that NSU may well be a clinical syndrome of different etiologies.

Finally, a review of antibiotic treatments in NSU and its complications is presented, leading to the conclusion that the management of persistent and recurrent NSU is at present unsatisfactory (Bowie, 1978).

PART TWO: Materials and Methods.

This segment describes the objectives of the study, the clinical setting and organisation and conduct of the survey. The aims of this study are:

1. To identify the personality traits, social background and sexual behaviour of male patients suffering from NSU. While this is a research study in Descriptive Epidemiology, of a disease whose pathogenesis is not fully established, the hypothesis under investigation here is that in the management of NSU, particularly of the patient with emotional sequelae, attitudes to sexuality and personality types may affect the therapeutic outcome.

2. A second hypothesis to be examined is that a significant proportion of male patients suffering from NSU come from higher socio-economic classes and have more stable relationships with their sexual partners than do patients with gonorrhoea.

The instruments used in the Survey are:

1. Eysenck Personality Inventory Form A (EPI), which is a self-administered questionnaire.
2. A comprehensive questionnaire pertinent to NSU, newly designed and administered by the author to each patient during a standardised interview. The questionnaire is equipped with a fixed-choice answer code, with the patient indicating his choice of answer.

Two hundred and sixty males suffering from NSU diagnosed over a ten month period to minimize seasonal bias, were invited to participate in the study. Adequate precautions were taken with the assistance of the University Department of Statistics to ensure that the sample was randomized. Two hundred and thirty nine

completed the study. This phase of the study was designed to examine the first hypothesis. For the purpose of examining the second hypothesis, relevant data were collected from a random sample of similar size of men with proven gonorrhoea (two hundred and thirty patients). The period covered for this selection was the same interval of 10 months of attendance at the clinic.

The data collected were analysed using the computer programme of the Statistical Package for the Social Sciences (SPSS).

PART THREE: Results and Discussion.

Chapter 6 presents the frequency distribution of the different conditions diagnosed at the V.D.C.C. over ten months. This analysis confirms that in South Australia the trend in the last decade is similar to that observed in VD Clinics overseas in that gonorrhoea and syphilis, the traditional venereal diseases, account for less than a third of the conditions diagnosed, with the majority of patients suffering from other STD's such as NSU, herpes genitalis, condylomata acuminata, vaginitis or sexual difficulties.

The descriptive epidemiology of NSU is presented in Chapters 7 to 12. The demographic characteristics of age, country of birth and marital status of the males suffering from NSU are described; then follows an analysis of their sexual behaviour covering the following historical events during the previous six months: (1) average frequency of intercourse (2) number of sexual partners (3) mode of intercourse whether vaginal, oral and/or rectal (4) contraceptive methods used, if any (5) homosexual activity if any.

This information relating to NSU sufferers is an original study of the variety and extent of contemporary sexual behaviour in Australian males presenting to an STD clinic.

The socio-economic background of the NSU patients is described in terms of: (1) occupational status (after Congalton) (2) level of education (3) ethnic origin including country of birth of parents. Compared with the community (1976 census statistics for males over 15 in S.A.), the NSU males are found to have a significantly higher level of education ($P < .001$).

Section 9.3 describes patient responses to the questions on exposure to education on sex and VD in an attempt to define attitudes to these issues. Awareness of NSU was not associated with level of education and there was considerable ignorance about this disease which has implications for patient counselling and health education.

Chapter 10 on the personality studies of the NSU patients begins with a review of the literature regarding personality inventories, the development of the EPI, the control data and a description of earlier EPI studies conducted on patients attending V.D. clinics.

The traits identified by the EPI are extroversion ($E \geq 13.4$), introversion ($E \leq 11.1$) and neuroticism ($N \geq 10.5$). The mean (SD) values for E and N in normals as described by Eysenck (1964), are E = 12.07 (4.37) and N = 9.07 (4.78). The patterns of E and N scores in patients suffering exclusively from NSU provide an original contribution to knowledge on this subject.

These EPI results are analysed and their clinical significance discussed in detail. To examine the first hypothesis the relationship of personality to some aspects

of sexual behaviour and response to treatment is explored. The salient features are: (1) The overall mean value for extroversion (E = 12.5) differs slightly from the standardised normal values, but the mean value for neuroticism (N = 11.8) differs significantly ($P < .05$). A tendency to neuroticism is found in 23.4 per cent of the sample ($10.5 < N < 14$) and definite neuroticism in a further 35.6 per cent ($N > 14$). (2) No significant association between extroversion scores and the number of sexual partners could be demonstrated, but there is a significant difference within the NSU group where extroverts report a greater frequency of intercourse than introverts ($P < .02$). (3) A longitudinal study of the patients in the sample was carried out to document the clinical record of recurrences (relapses or reinfections of NSU) in 12 months. In this way the reported recurrence rate is assessed which varies from no recurrence (38%) to more than three (16%). The association between the number of recurrences and N-scores is not significant. (4) The reaction of patients upon acquiring NSU, varies from mild anxiety to the emotional sequelae of venereo-neurosis (defined by Hart, 1974, as pathological anxiety characterized by persistent symptoms but without objective evidence of physical signs and laboratory tests).

In the longitudinal study, 39 patients from this cohort of 239 were assessed clinically as suffering from venereoneurosis. This clinical assessment was made independently and without knowledge of the EPI scores carried out by computer analysis, but when the pre-determined N-scores of this group are plotted, the mean is found to be abnormally high ($N = 14.9$; $P < .05$). This group also scored highly on introverson ($E = 9.3$; $P < .05$) suggesting a personality type who is introverted and neurotic. This original observation has implications for preventive medicine in the form of better patient counselling.

Chapter 11 of part three compares the occupational status, source of infection, and homosexual activity in the two groups of men suffering from NSU and gonococcal urethritis, diagnosed at the V.D.C.C. during the same study period. In each category a significant difference is found, trends being a higher socio-economic status ($P < .001$), lower incidence of casual partners ($P < .001$) and less frequent homosexual activity ($P < .001$) in NSU. These social class studies identified for the first time in Australia confirm similar trends observed overseas, bearing in mind the self-selection bias inherent in studying clinic populations (Morrison, 1963; Holmes et al, 1975). However the observation that fewer

homosexual men suffer from NSU than from gonorrhoea is an original outcome of this study and in the discussion about these findings the author speculates that the lack of an unknown vaginal element may account for the lower rate in homosexuals.

PART FOUR: Conclusions and Recommendations.

This contains a discussion where this work offers an original contribution to knowledge of the subject and advances medical practice by improved management of NSU. The information gained from the newly designed questionnaire may help clinicians understand the total person suffering from NSU rather than concentrating on just the local urethritis. Moreover the questionnaire is reproducible and can be used by others as a structured guide for the collection of detailed history pertinent to NSU, as at present this is not available in textbooks.

The information that NSU is relatively more common in married couples and those living together than gonorrhoea, calls for tactful handling of domestic situations.

In the case of the patient with persistent symptoms, better counselling is required as the genesis of pathological

anxiety probably has its origins in the personality of the individual (high N scores); iatrogenic factors that may contribute to this process are identified in this work and the therapeutic value of the doctor-patient relationship underscored.

A practical plan for the successful management of NSU which includes a schematic chart of investigations and guidelines for the treatment of the consort is presented. In addition to the recommended antibiotic regimes, the advantage of using a patient education guide as prepared by the author is emphasised, particularly in busy clinics.

PART ONE

URETHRAL INFECTION IN MAN

1. GENERAL HISTORICAL SURVEY OF URETHRITIS

> And the Lord spake unto Moses and Aaron, saying "Speak unto the children of Israel and say unto them, when any man hath a running issue of his flesh, because of his issue he is unclean."
>
> (Leviticus 15 / 1-2)

The above quotation is often cited by venereologists as evidence that gonorrhoea, or at least the symptom of urethral discharge (issue) existed in Biblical times. Historically, however, the classical description of urethral discharge goes back further than the period of the old Testament (1500 B.C.). Theodor Rosebury, the author of Microbes and Morals (1971) mentions suggestive evidence in the pre-Christian Babylonian and Egyptian civilizations citing Thayer (1965) an expert on gonorrhoea as his source. Crabtree has traced the disease further, into the reign of the Chinese Emperor Hoang-Ty (second millennium B.C.) and quotes the following as a presumed translation of the records from that era (1934, p.575):

> Among the external diseases is one that is different from all the others, the symptoms of which are easy to recognize. They are (1) affections of the urethra and vagina at the same time as the bladder (2) drainage of of corrupt materials white or red by the urethra or vagina.

Similarly mention of the symptoms is made in ancient Vedic writings (3000 B.C.) and Sushruta's Charaka, the classical work on traditional Indian medicine, mentions a prescription for urethritis (Thayer, 1965). These are frequently found in the potions of the Arabic physicians during the Dark Ages in Europe (Robinson, 1931).

These early ideas are also mentioned in the Greek and Roman period. The great Greek physician, Hippocrates (460-357) described the symptoms of urethral discharge in detail and showed remarkable insight for his day and age in stating that the disease resulted from "excessive indulgence in the pleasures of Venus." However, the term "venereal disease" was not coined until 1527, being first used by Jacques de Bethercourt (Morton, 1972). For the term "gonorrhoea" we are indebted to another ancient Greek physician, Galen (130-200 A.D.), who mistakenly believed that the disease was caused by an involuntary loss of male semen, and named it from the Greek words "gonos" (seed) and "rhoea" (a flow).

As we know now, the symptoms could easily have been from both gonococcal or non-gonococcal urethritis.

There were no means of differentiating these diseases, until the discovery of the gonococcus by Albert Neisser in 1879. Even then, it was not until the advent of penicillin which dealt so effectively with gonococcal urethritis, that non-gonococcal urethritis (NGU) became recognised as a separate clinical entity (Morton, 1972).

In this thesis, the fascinating history of syphilis would be outside the scope of the subject of urethritis. It is relevant however, to mention that from the time that Jacques de Bethercourt coined the term "venereal disease" till the end of the eighteenth century, the term was used in the singular, for gonorrhoea and syphilis were considered to be the one and the same disease. In this connection, one must mention the renowned surgeon, John Hunter (1728-93).* In 1767 when Dr. Hunter is believed to have performed his famous experiment, the germ theory had not yet been born, so the English practitioner innoculated himself intra-urethrally with pus from a man known to have gonorrhoea. Unfortunately, the man also had a hidden intrameatal chancre, and the intrepid

*the historical accuracy of the story that Hunter died from syphilis is not fully established.

investigator was rewarded by developing both diseases and announced that "matter from a gonorrhoea will produce chancres" (Rosebury, 1971 p. 181).

Other workers in the eighteen century, notably Benjamin Bell in 1793 tried unsuccessfully to separate the two conditions. It was not until 1879 when the gonococcus was identified by Neisser and successfully cultured in 1882 by Leistikow and 1885 by Bumm that the debate finally ended, as the essential criteria of producing the disease experimentally could then be fulfilled (King and Nicol, 1969).

According to Morton (1972, p.22), the first reference to gonorrhoea in England was in 1161 when a London Act forbade brothels to house prostitutes "suffering from the perilous infirmity of burning." The early English terms of "burning" or "brenning" are in keeping with the old French name of "la chaude pisse" (sic), imported probably by the Normans. The origin of the colourful term "clap" is also credited to the French probably deriving from "clapoir" which meant painful swelling. Other London Acts of later years (1430 for example) relating to brothels showed that the disease was quite prevalent in men visiting these places. Morton (1972) also makes the observation

that the recognition of sexual transmission of venereal diseases in the Dark Ages was quite remarkable, as most diseases then were believed to stem from supernatural causes or "contagion" and it was not until after the Renaissance that the true nature of other infectious diseases was understood. As mentioned earlier Hippocrates too had linked gonorrhoea with sexual intercourse, and, in fact, the Old Testament shows that Moses had a similar idea. After waging war on the Midianites a plague of "gonorrhoea" struck the Israelites. Moses ordered 12,000 Israeli soldiers quarantined for seven days so that those who developed the disease could be isolated and treated. All the Midianite women prisoners, "that have known man by lying with him" were ordered to be killed. (Numbers XXXI, Morton, 1972 p.22). This is perhaps the first instance, though an extreme one, of a public health measure to prevent the spread of a venereal disease.

In fact, gonorrhoea has been frequently associated with military operations throughout the ages, right up to the present. Other venereal diseases are far more common in wartime as well. The first significant world-wide epidemic of gonorrhoea occurred during and after World War I and this was repeated during the Second World War.

The treatment of urethral discharge through the ages has undergone many changes. There are many references to various measures, usually local washes, in most forms of ancient medicine, such as Greek, Chinese and Arabic. Some went further and more detailed examples are available in Rosebury's book (1971). One colourful example will suffice (p.21):

> In treating gonorrhoea, Aricenna (980-1037 A.D.) was probably the first to use cathetors made of the skin of various animals. That he advised a louse to be inserted into the meatus of persons suffering from the retention of urine, is simply additional evidence of the easy capacity of the Arabians to mix absurdities with their rational procedures.

Some idea of the therapeutics of the eighteenth century can be gleaned from John Astruc's "A Treatise of Venereal Diseases" (Figure 1) published in 1754, but a significant failing in the volume is the error in assuming that venereal diseases are actually forms of leprosy which has often been confused with syphilis through the ages.

Until the mid -1930's the treatment of urethral discharge was quite limited, and strictures or strangury were common complications. The doctors repertoire was greatly enhanced by the introduction of sulphonamides in 1935. Success was short lived, as after a decade, the

3. From the manuſcript Rules and Ordinances of the Stews, that were by public Authority allowed to be kept at London, in the Borough of Southwark, and are ſuppoſed to have been drawn up about the Year 1430. one of which Articles begins thus, *Of thoſe who keep Women having a wicked Infirmity*, and orders under a ſevere Penalty, *that no Stew-holder keep noo Woman wythin his hous that hath any Sycknesſe of brenning.*

His later Authorities are taken, 1. from the *Supplication of Beggars*, a Book preſented by one Simon Fiſh, a zealous Promoter of the Reformation in England and a bitter Enemy of the Roman-Catholicks, to Henry VIII. in which ſpeaking of the Prieſts he ſays, *Theſe be they that corrupt the whole Generation of Mankind in your Realm, that catch the Pockes of one Woman, and bear them to another; that be burnt with one woman, and bear it to another.*

2. From a Book publiſhed in 1546 by Andrew Boord, Doctor of Phyſick, and a Romiſh Prieſt, entituled the *Breviary of Health*, where one of the Chapters begins thus, *The 19th Chapiter doth ſhew of* burning *of an Harlotte*; and then he adds, *that if a man be burnt with an Harlot, and do meddle with another Woman within a Day, he ſhall burn the Woman that he ſhall meddle withal.*

3. From an Epiſtle placed before Stephen Gardiner's Oration *de verâ obedientiâ* printed at Rouen in 1553. by Michael Wood, in which mention is made of the *burning*.

4. From a manuſcript Work of John Bale, which Mr. Becket had in his Cuſtody, wherein Bale ſpeaking of Dr. Weſton (who was Dean of Windſor in 1556, but deprived by Cardinal Pool for Adultery) ſays as follows; *at this Day is lecherous Weſton, who is more practiſed in the Art of Brech-Burning, than all the Whores of the Stews.* And again, ſpeaking of the ſame Perſon he ſays, *He not long ago brent a beggar in St. Botolph's Pariſh.*

5. From a treatiſe of William Bulleyn, Dr. of Phyſic, called the *Bulwark of Defence, &c.* printed in 1562, wherein he treats of *the burning of Harlots.*

These Authorities explained.

Here indeed we have ſeveral Authorities, but few or none of them valid, for they all ſtand upon an unſure Foundation. For not to mention, that theſe Teſtimonies are chiefly drawn from unpubliſhed Records, or ſuch Books as are hard to be met with, ſo that we cannot either examine them as we ought, or take ſuch a View of them as to be certain of their Age or the Faithfulneſs of the Quotations made from them; omitting, I ſay, theſe Circumſtances, that I may not ſeem to cavil as diſtruſting my Cauſe, and granting that Mr. Becket has been exact in his Relations, which is a large Conceſſion, I do ſtill deny the Conſequence he has drawn from them, that this *burning* in Diſpute was the ſame Diſeaſe with a *Venereal Gonorrhœa*, or that a *Venereal Gonorrhœa* contracted by unclean Coition was formerly ſignified by the name of *burning*. But to explain myſelf more fully, it will be requiſite to enlarge a little upon this Subject.

I. Then, the Leproſy of the Arabians, which was formerly a common Diſeaſe in England, as well as in other Parts of Europe, was capable of being communicated, not only by living in the ſame Houſe, but even by viſiting a leprous Perſon, inſomuch that all Lepers were by ſeveral very ſevere Edicts ſeparated from the reſt of Mankind, and prohibited all manner of Converſation with them.

II. And

Fig 1. A page from an old text on venereal diseases. *(ASTRUC 1754).*

efficacy of these drugs waned. This could well have been due to resistance developing from misuse of these antibacterial agents (like that of the present day antibiotics) during World War II in Italy, but it is believed the gonococcus independently evolved its own biochemical defences to the drugs.

The introduction of penicillin in 1943 dramatically altered the scene and cured most cases of gonorrhoea rapidly, besides ushering in the new era of antibiotics. As mentioned earlier, this also brought to the surface non-gonococcal urethritis, which became increasingly recognized as a clinical problem.

2. URETHRITIS TODAY - EPIDEMIOLOGICAL ASPECTS

2.1 Introduction

While infection of the anterior urethra has been known to occur in man from ancient times, statistics show that anterior urethritis is, indeed, one of the major epidemics among men today. Of the two main divisions, gonococcal and non-gonococcal urethritis (NGU),* the incidence of NGU is increasing at a faster rate than gonorrhoea in western countries (Jorgensen, 1975). Because both conditions are sexually transmitted, an introductory discussion on the widespread incidence of gonorrhoea is first presented and then widened to include epidemiological aspects of NGU.

2.2 Epidemiology of gonorrhoea (males and females)

2.2.1 Preamble

Gonorrhoea occurs all over the world. The incidence in one country cannot be meaningfully compared to another, because of varying conditions. These variables include social and cultural attitudes to sex and venereal disease (VD), which in turn influence

*the term NGU is used here; the author will define the term NSU as used in this study in the next chapter. In most instances it is synonymous with NGU

political decisions on provision of public diagnostic facilities and legislation regarding notification (reporting of confirmed cases).

Reported disease statistics are subject to errors of omission, but VD statistics suffer more than others. There is still a certain amount of stigma attached to having VD which leads to under-reporting by people not coming forward for diagnosis or by private physicians not notifying cases. In the words of T. Rosebury (1971, p.230):

> As the smog of today's cities chokes up the air pasages of sensitive people, so does the stink of VD clog the channels of statistical communication.

A high degree of under-reporting must be expected from underdeveloped countries with their great deficiences in the facilities for diagnosis or documentation and their huge populations. (Guthe and Idsoe, 1968). Even in the developing countries where there are numerous clinics providing figures based on acceptable methods of diagnosis, the official statistics sometimes cover only part of the real incidence (e.g. France in Figure 2). Figure 2 is presented as a graphical illustration of the fact that even after allowing for these variables, the incidence rate (per 100,000) in different countries is steadily rising.*

*At the NHMRC meeting on sexually transmitted diseases held in Melbourne Aug., 1978, evidence was presented to show that the gonorrhoea notification rate is now levelling off in many western countries, including Australia. This phenomenon of the late seventies is presented as an appendix to this chapter.

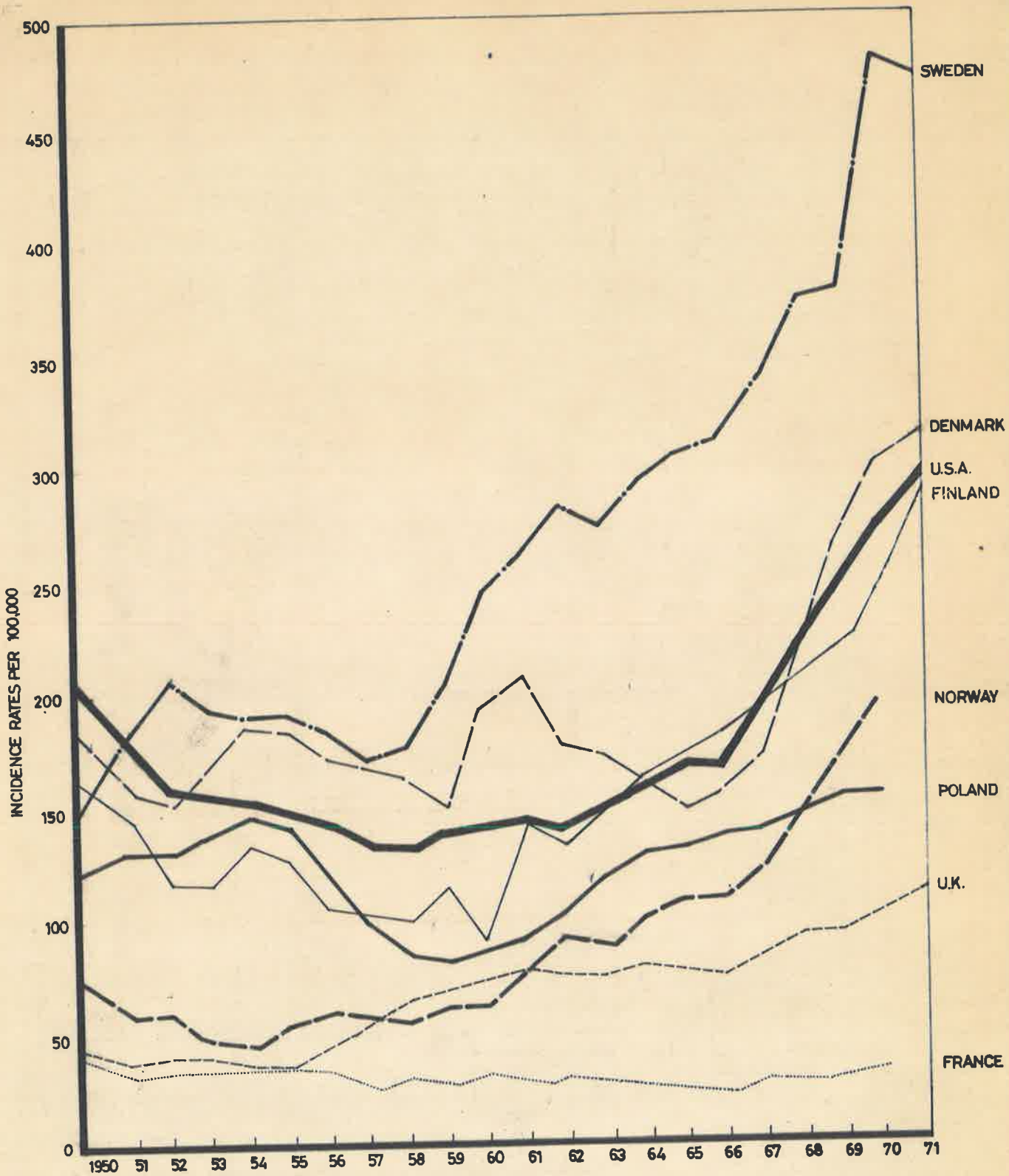


Fig. 2. 'Reported gonorrhoea rate per 100,000 in different countries 1950–1971 (compiled from W.H.O. statistics, Kiraly, 1973).

2.2.2 United Kingdom and United States of America

The reported incidence rates for diagnosed gonorrhoea are relatively accurate in countries such as the United Kingdom (UK), where most cases of gonorrhoea are seen in clinics for sexually transmitted diseases (STD) and therefore are reported (Nicol, 1976). There are at present over 230 STD clinics throughout the U.K. Statistics for gonorrhoea have been consistently recorded over the years. The trend over the last two decades is shown graphically in Figure 3.

Schofield (1975) has shown that after the postwar peak in 1946, which coincided with demobilization the gonorrhoea rate/100,000 actually fell in Great Britain. But since the mid-fifties the reported incidence has been rising steeply.

In the U.S.A., by contrast, under-reporting of cases, especially those treated by private practitioners is a problem. Hence the reported gonorrhoea rate is quite different from the trueincidence rate, but the reported rate is useful in showing trends. (Figure 4).

Supplementary information that may help to estimate more accurately the true incidence rate, has been obtained with the help of the American Medical Association and the National Disease and Therapeutic

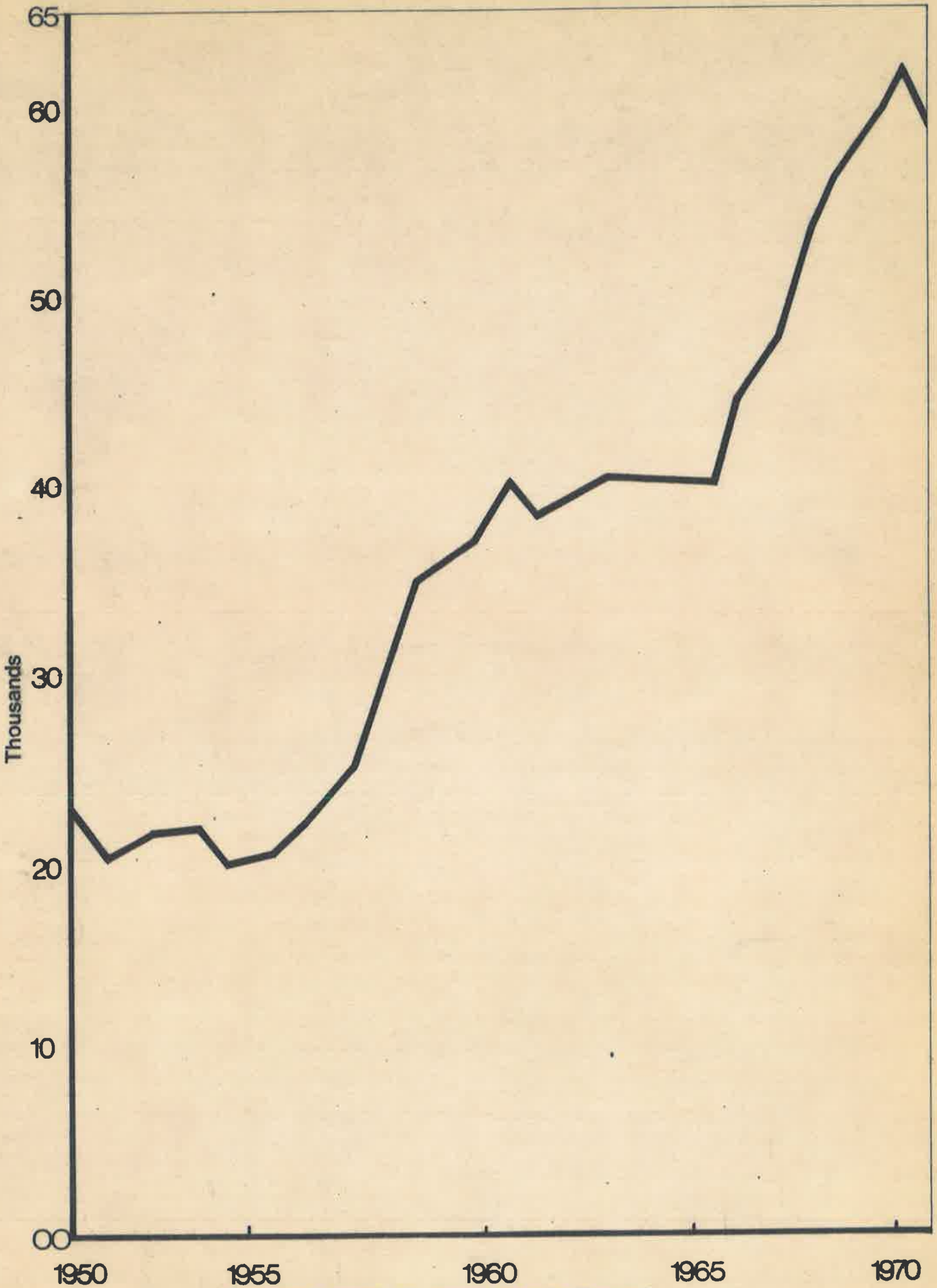


Fig 3. Reported cases of gonorrhoea in England and Wales 1950–1972 (Annual reports of the Chief Medical Officer, Department of Health and Social Security).

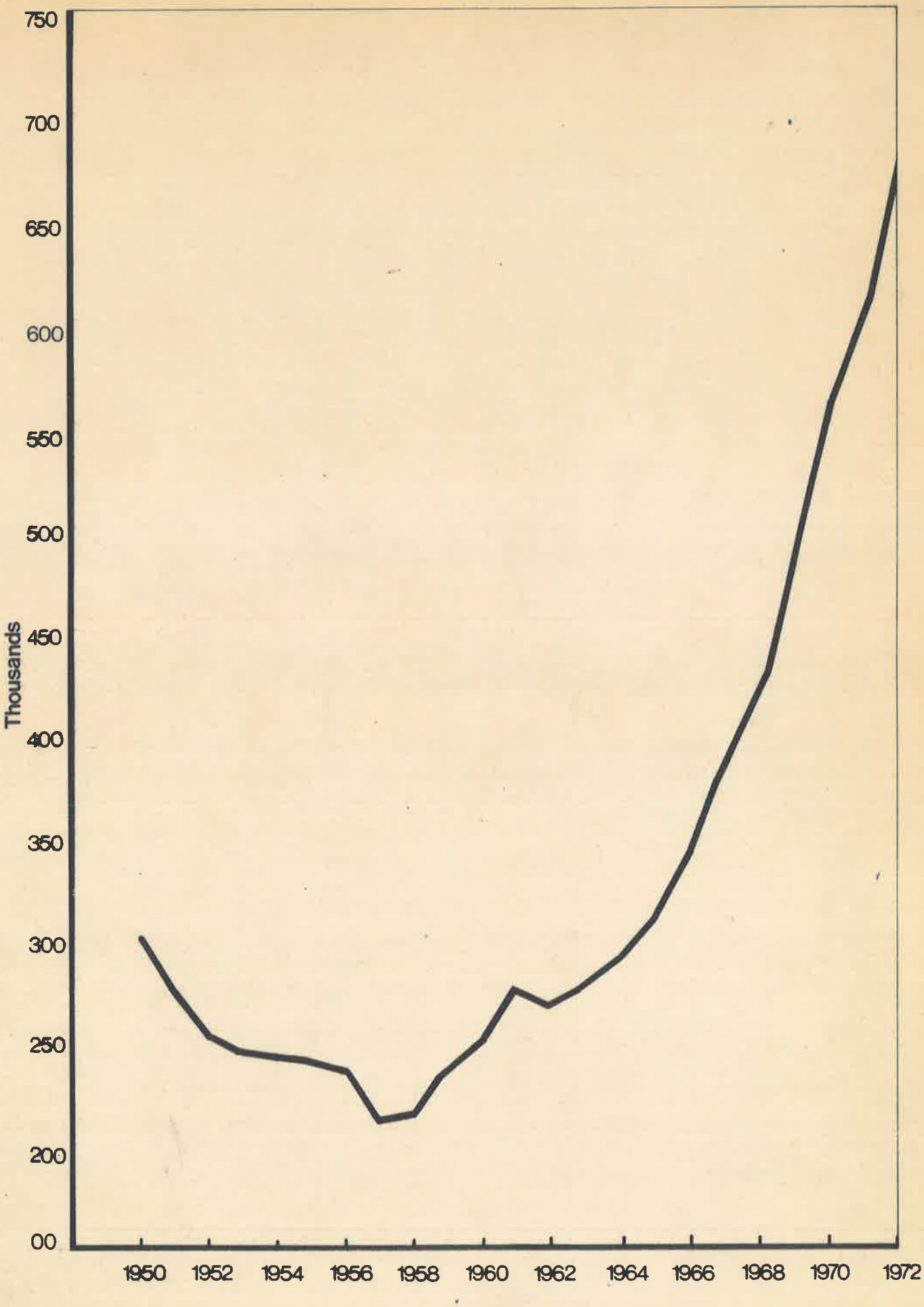


Fig. 4 Reported cases of gonorrhoea in the U.S.A. 1950–1972 (Compiled from statistics supplied by the American Social Hygiene Association, 1973).

Index (NDTI) surveys (WHO technical report series 616, 1978). For example in 1968 all US physicians were polled and asked to recall how many cases of gonorrhoea they had treated and how many they had reported (Fleming, 1970). This poll suggested that private physicians treated approximately 80 per cent of cases of gonorrhoea but failed to report nearly 90 per cent of acute cases. This information was used to estimate that, since 874,000 cases of gonorrhoea were reported to the Centre for Disease Control (CDC), Atlanta, Georgia (GA) in 1974, at least 2,700,000 must have actually occured (VD fact sheet, 1974). This is what Dr. William Brown, Chief of the VD division, CDC, means when he speaks of the 'VD iceberg.'

2.2.3 Australia and New Zealand

Australian statistics for venereal diseases are not as advanced as those in the UK and Northern European countries such as Denmark and Sweden (MJA editorial, 1975). Figures for gonorrhoea, based on consistent criteria for diagnosis, are collected by the various State Health Departments (now Health Commissions) and in the Territories by the Commonwealth government. However, the consistency regarding compulsory notification is not maintained, as VD legislation varies from State to State. Notification of gonorrhoea and syphilis is legally required throughout

Australia, but this does not always happen in practice. Even at the recent NHMRC meeting on STDs (1978) it was concluded that there is as yet, virtually, no overall co-ordination of VD notifications in Australia.

Public clinics exist throughout Australia in the capital cities except Hobart, Tasmania. In Hobart, and in the provincial cities a VD service is available in the casualty departments of public hospitals but often this is not from trained personnel. In accordance with the Brussells agreement, facilities are provided in some ports such as Fremantle, Adelaide, Melbourne, Sydney and Brisbane, in addition to the public clinics.

Significant numbers of patients are treated privately not all of whom are investigated by laboratory methods. In South Australia, the notification control system has developed in a unique manner in that diagnostic laboratories are obliged by law to supply the South Australian Health Commission with copies of reports of positive tests for gonorrhoea and syphilis. Consequently the Commission learns of nearly all <u>investigated</u> infective cases and can contact the practitioners concerned if they do not notify their cases promptly. In practice the vast majority of private practitioners co-operate

in the notification process and some actively assist in the tracing of contacts. This is the experience of the author after personally communicating with private practitioners on the telephone for two years as part of his daily duties.

Western Australia has also adopted a legal requirement for those in charge of diagnostic laboratories to notify positive results of tests for gonorrhoea and syphilis. The author has visited the VD clinic in Perth and the statistics collected are almost parallel to the South Australian clinic. This is in contrast to the Eastern States where laboratory notification is not compulsory and, therefore, incidence figures are falsely low (Table 1). After allowing for these factors, one can say in summary that in Australia the notified cases of gonorrhoea rose from 30/100,000 in 1954 to 85/100,000 in 1976 (Figure 5).

In New Zealand, there are no less than seven clinics serving the population. They are located in the main cities. In addition, VD patients have traditionally been referred to dermatologists for treatment and Platts (1969), a recognized authority on STDs in New Zealand, estimates that more than half the cases are seen

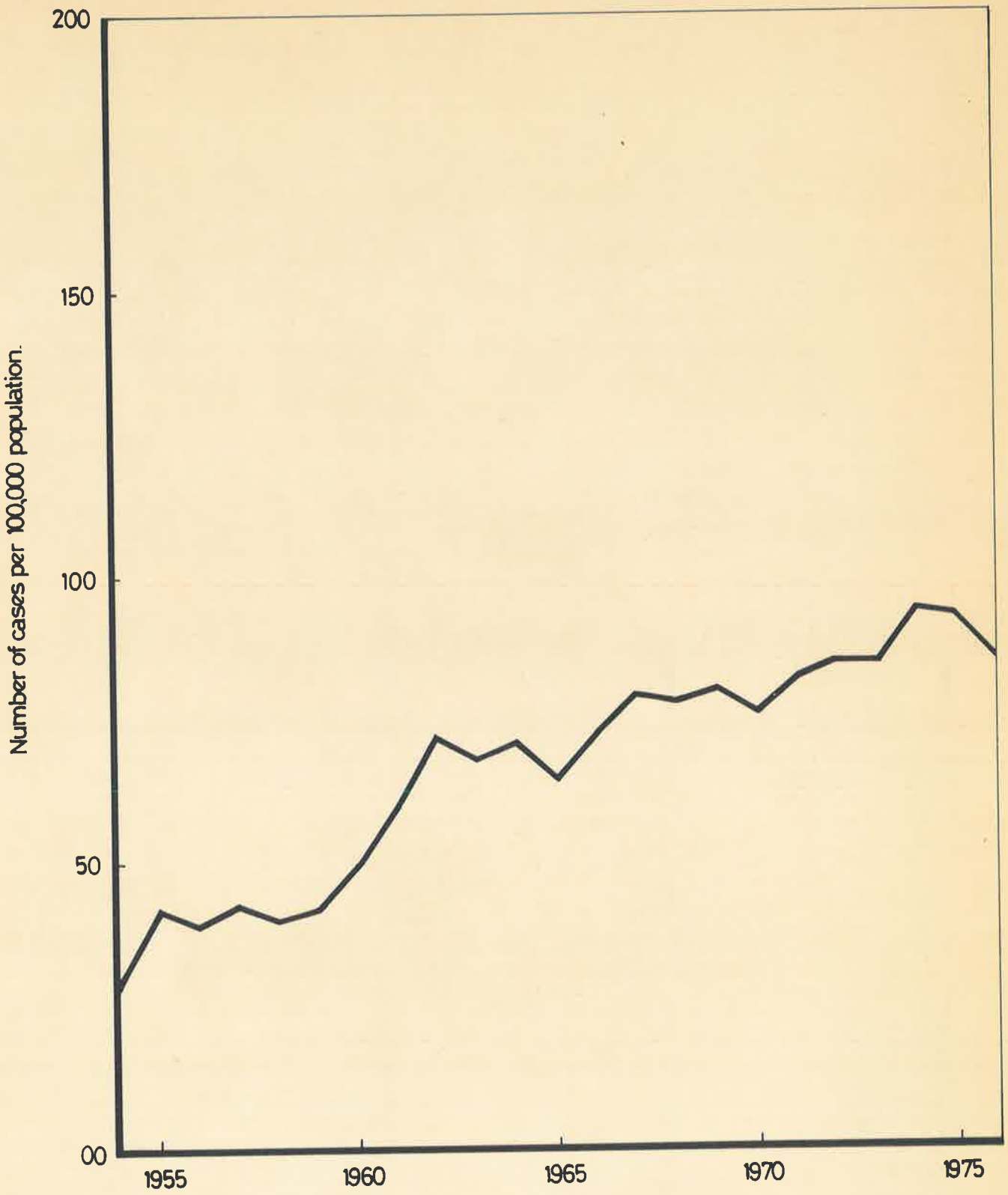


Fig. 5. Incidence of gonorrhoea by notification in Australia 1954–1976 (based on figures provided by State Health Departments).

TABLE 1

Number of Cases of gonorrhoea* Notified in Australia by State Health Depts. 1970-76 (Finger, 1976)

Year	N.S.W.		Victoria		Queensland		S.A.		W.A.		Tasmania		A.C.T.		N.T.	
	Cases Notified	Cases per 100,000	Cases Notified	Cases per 100,000	Cases Notified	Cases per 100,000	Cases Notified	Cases per 100,000	Cases Notified	Cases per 100,000	Cases Notified	Cases per 100,000	Cases Notified	Cases per 100,000	Cases Notified	Cases per 100,000
1970	3500	76	2078	60	1576	87	650	55	1186	119	75	19	50	36	443	600
1971	3871	85	2127	62	1658	93	819	70	1236	134	119	31	34	25	412	500
1972	3698	79	2232	64	2039	101	989	82	1469	143	149	38	57	40	384	470
1973	3356	70	1931	54	2192	113	1492	124	1662	160	165	43	35	24	524	630
1974	3560	74	2049	57	1952	100	2091	173	2027	187	248	62	34	19	580	585
1975	3483	73	2242	61	1812	91	2114	171	2028	182	172	43	67	36	593	617
1976	3534	72	1903	50.9	1492	71	1885	151	2018	174	165	40.6	44	22	515	523

*Diagnosis based on standard criteria.

National rates for Australia are presented in Table 3.

by private practitioners. According to Platts the estimated rate in the three largest cities lies between 250 and 400 per 100,000 and he comments that this is double that found in cities of corresponding size in Britain.

2.2.4 Seasonal Variation

Quarterly returns of notifications from both private and public sources over the years in most western countries, clearly show an interesting phenomenon in that the highest morbidity rates are in the summer months. Seasonal variation is identical for both sexes and all latitudes (Cornelius, 1971).

This predictable phenomenon was also observed by the author in the statistical research carried out at the VDCC, Adelaide. A gross representation of this phenomenon can be seen in Figure 13, Chapter 4.

Since 1951 the Ministry of Health (UK) has published figures for both NGU and gonorrhoea. If instead of annual returns, quarterly returns are used the same feature, namely a periodic increase in summer and decrease in winter becomes apparent. This points to similar epidemiological factors operating in both conditions and the most plausible one appears to be that both diseases are sexually transmitted (Csonka, 1965). This is also supported by the

observation that NGU has shown the same steady rise in England as gonorrhoea, over the last two decades (Morton, 1975).

2.3 Epidemiology of NGU

Official year-by-year figures for NGU are not available for most countries as they are for gonorrhoea. However in the UK a comparison can be made as statistics for the two conditions are collected conjointly. It is also possible to map out the epidemiological trend more accurately by comparison with gonococcal urethritis in males only (Table 2).

TABLE 2

Incidence of gonorrhoea and non-gonococcal urethritis in males: England and Wales. (Morton, 1972).

YEAR	GONORRHOEA	NGU
1951	14,975	10,794
1961	29,519	24,472
1970	36,969	46,075*

* England only.

As seen from this table, in the last decade and half, NGU has outstripped gonorrhoea in the male.

Australia-wide statistics for NGU, even from within government clinics, are not generally available for comparison with Table 1 on the notification of gonorrhoea. But it is likely that other Australian clinics will show the same pattern as that found at the VDCC. At the VDCC, statistical research by the author shows that NGU is twice as common as gonorrhoea in the male (Figure 15, Chapter 6). In fact the present day situation in England is parallel to this, that is, NGU is twice as common as gonococcal urethritis (Oriel, 1978).

The steep increase in the reported incidence of NGU (NSU) in males is depicted graphically in Figure 6.

2.4 Summary of factors responsible for the increase in reported (incidence) rates

Post-World War II population growth has been spectacular and there are now a greater proportion of young, sexually-active members of the national population; better medical facilities mean better reporting of cases (Apparent Increase). The rising incidence of urethritis, however far exceeds that which can be accounted for by this factor alone.

"Prosperity doth best discover Vice" - Francis Bacon (1561-1626). Greater economic prosperity also

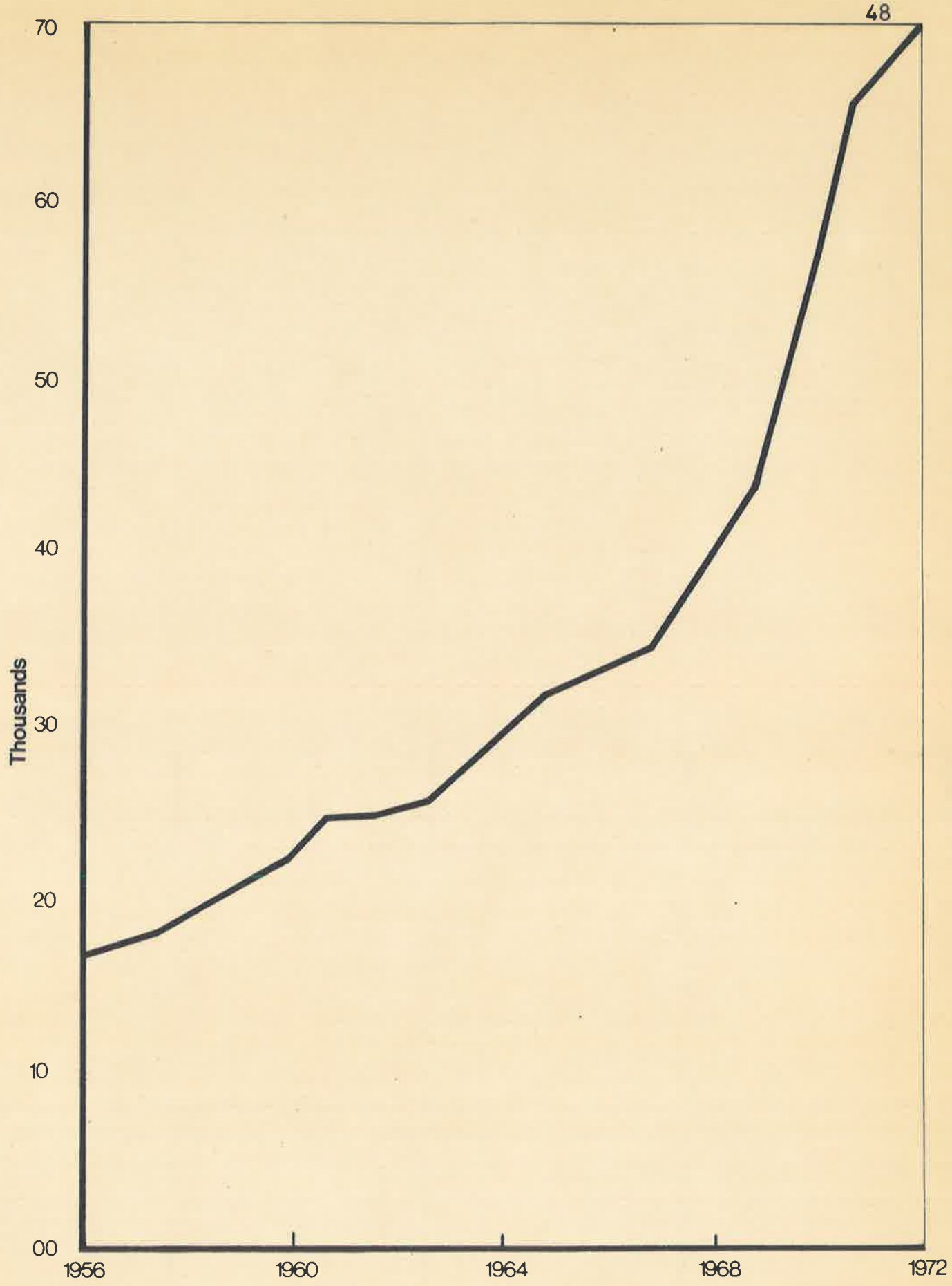


Fig. 6. Reported cases of non-gonococcal urethritis in England & Wales, 1956–1972 (Annual report of the Chief Medical Officer, Department of Health and Social Security).

encourages immigration, travel for business and tourist traffic. The twin processes of industrialization and urbanization have encouraged many young people to move away from their home environment in search of work and education (Schofield, 1975). Schofield also comments on the decreased use of the condom as an important factor. Fleming (1966) reviewed the operation of environmental factors in the spread of venereal disease, and so have King (1970) and Willcox (1972). Guthe and Idsoe (1968) discussing world trends emphasize the complex of balances - ecological, human and environmental - facilitating and restraining gonorrhoea rates (Figure 7). The multiple inter-dependent forces are listed and illustrated as a scale. Their shifting aggregate weight may in one period drive the epidemiological pendulum in one direction - which facilitates spread and high incidence of disease - and in another period in the direction which favours control.

In those western countries where attempts at VD control have been intensified, the proportion of males to females with gonorrhoea (male/female ratio) is steadily dropping. In the United States it is now 3/1, in Britain 2.1/1, New Zealand (clinics) 1.6/1, Scandinavia less that 2/1 (Platts, 1974). In other countries the ratio varies from over 4/1 to 10/1

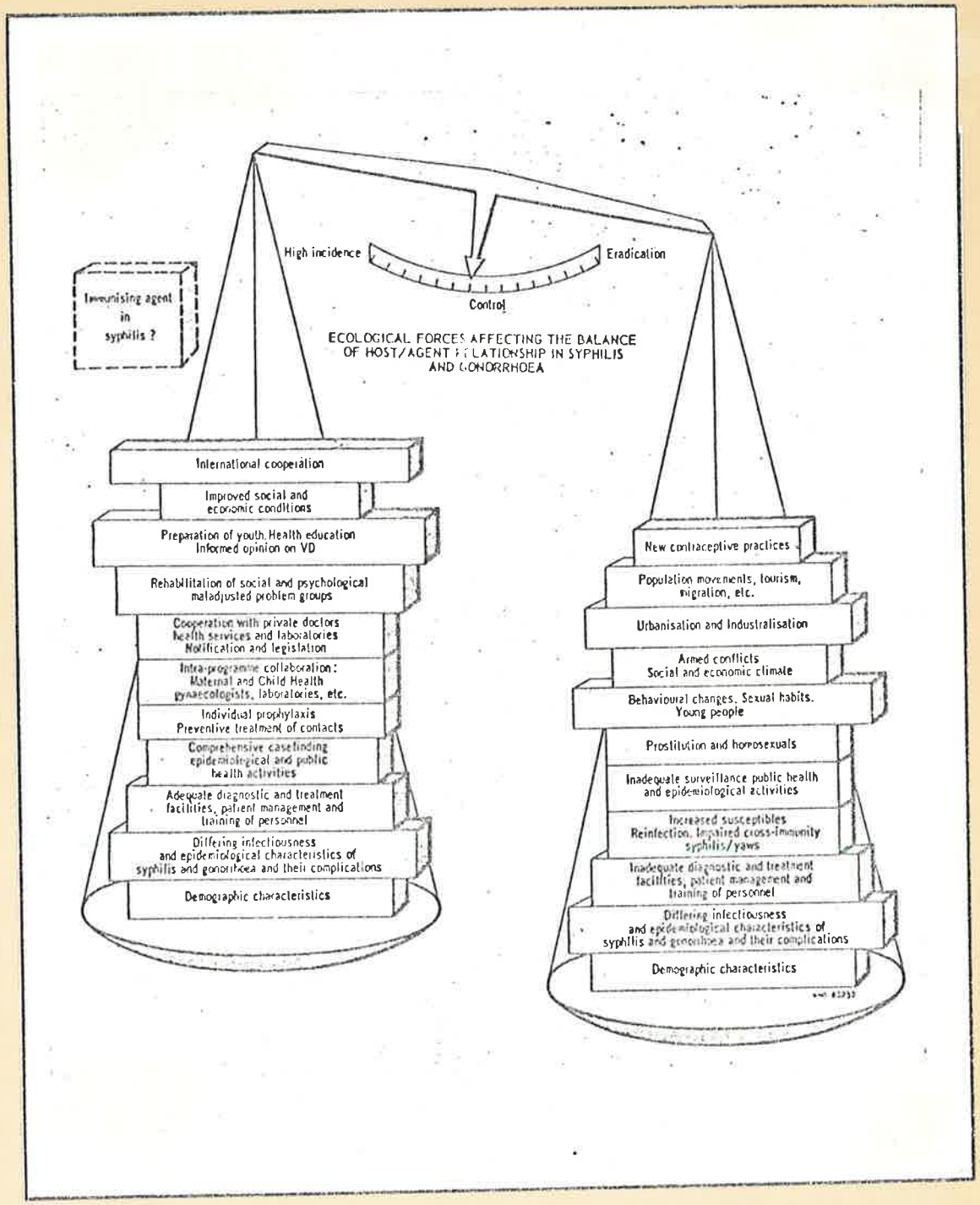


Fig. 7. Dynamics of V.D. Control using the model of Guthe & Idsøe 1968, (Some epidemiological aspects of venereal diseases, W.H.O. Document INT/DVT/68/235).

indicating that most infected females and, thus, the silent reservoir of infection, are being left untouched, either by not seeking out contacts or by failure to diagnose them, or both.

Appendix:

Latests trends in incidence rates:
NHMRC meeting on STDs, August 1978

At the above meeting, which the author attended as a nominee of the S.A. Health Commission, members were advised that national data in the last three years (1975-77) gave hope that the "steady rise in gonorrhoea rate /100,000 over previous years" might now be slowing (NHMRC, 1978). This is tabulated as:

TABLE 3
Gonorrhoea notifications in Australia
1970 - 1977

YEAR	NOTIFICATIONS	RATE/100,000
1970	9562	76
1971	10359	82
1972	11037	85
1973	11337	85
1974	12570	94
1975	12316	93
1976	11479	85
1977	11769	86

A similar trend appeared to be occurring in the United States (MMWR, 1977), Sweden and Denmark (Juhlin, 1975). The rising rate in the UK has also begun to level off (Catterall, 1975). A time-series model (Box, 1976) is being used by the CDC, Atlanta to forecast gonorrhoea incidence rates in the USA and the fact that the recently reported rates for 1976 fall short of those forecasted suggests that incidence rates are beginning to level off there.

3. NON-SPECIFIC URETHRITIS: CURRENT CONCEPTS

3.1 Non-gonococcal urethritis and NSU

Apart from gonorrhoea, there are other sexually transmitted causes of anterior urethritis in men (and of cervicitis and urethritis in women, together with proctitis in both sexes). Sometimes this is referred to as non-specific genital infection in both sexes (NSGI). However, in this thesis the principal concern will be with non-specific urethritis (NSU) in men, and proctitis and NSGI will be mentioned only where necessary.

There can be some confusion regarding the terms NGU and NSU. To clarify the issue, Dr. J.D. Oriel, Director, Department of Genitourinary Medicine, University College Hospital, London, is quoted from his reply when he was asked to define the subject at a urology conference in San Diego, California (Urology Times, 1977 p.661):

> ..... (After the discovery of the gonococcus and it's successful culture, there occurred)... a large group of patients with urethritis from whom this organism could not be recovered. At that point a clearly defined disease syndrome was referred to as non-gonococcal urethritis and this term was used for very many years. Back in the '40s and '50s, (sic), however, some specified

> causes for urethritis in men were defined, among them urethral trauma and foreign bodies in the urethra, Trichomonas vaginalis, Herpes simplex infections. They were referred to as specified causes for urethritis and the remainder was given the bad name non-specific urethritis. This implied that there was no specific cause for this disease. We know better now.

Figure 8 is a theoretical list of causes of urethral discharge in males. This implies that there may be no specific cause for NSU, but it is now believed that a sizeable proportion of NSU may be caused by Chlamydia trachomatis. This will be discussed in greater detail in section 3.3.

Thus, if urethritis in men can be simply divided into gonococcal and non-gonococcal, then the latter can be sub-divided into groups with known etiology and unknown etiology.

Much early and recent work concentrated on clarifying the extent of known and unknown groups of NGU. The conclusions are generally consistent with Table 4 which is based on Hancock's work in 1964 as published in a text-book on venereal diseases (King and Nicol, 1969 p.220).

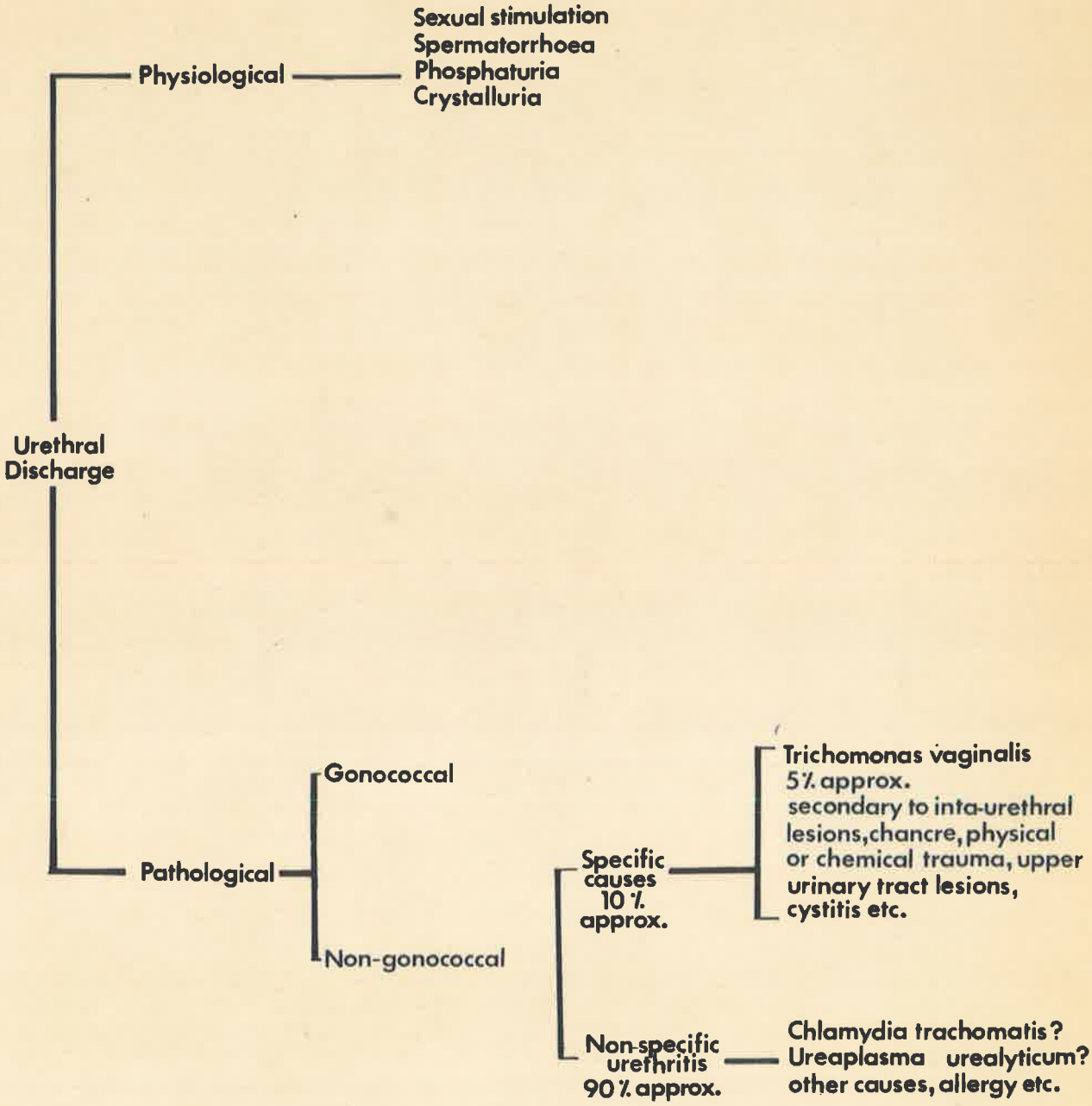


Fig. 8. Causes of urethral discharge in males.

TABLE 4

Causes of non-gonococcal urethritis in 457 men (Hancock, 1964).

CAUSE	Percentage
Infection of the bladder and kidneys	2.6
Pre-existing urethral stricture (associated with Trichomonas vaginalis in about one-third of the cases)	2.5
Trichomonas vaginalis (without urethral stricture)	3.5
Other causes e.g. herpetic, mycotic, traumatic, chemical, neoplastic	1.4
Non-specific (abacterial) urethritis	90.0

When urethritis occurs after an acute episode of gonorrhoea which is shown to have cleared on follow-up tests, then the term post-gonococcal urethritis is used (PGU). PGU is included in the general category of NSU.

Many venereologists prefer to use the original term non-gonococcal urethritis and then try to indicate if necessary, special groups of patients with this syndrome where there is a definite cause. Others use the term NSU to mean broadly the same thing. At the VDCC, the term NSU

has always been used in this way, instead of NGU. For the sake of identification of the study population, the author has defined NSU as used in this study, by certain diagnostic criteria shown in Chapter 5.2. The above explanation applies to the literature review conducted by the author, where NGU has been included.

3.2 Clinical aspects of gonococcal urethritis and NSU in the human male

3.2.1. Gonococcal urethritis

Genital gonorrhoea in the male is most commonly confined to the anterior urethra. Most patients have an acute urethritis, characterized by dysuria of varying severity and urethral discharge which also varies from mucoid and scanty to purulent and profuse (Figure 9). Discharge usually follows dysuria but it may be a first symptom.

The urinary meatus may become inflamed and swollen. Oedema of the penile shaft and prepuce occurs infrequently. Secondary balanitis may be present, but is generally only found in the uncircumcised. The regional lymph nodes are occasionally enlarged and tender.

Not all males develop symptoms. A cohort study of US Navy men showed that 97 per cent of those who acquired the disease in East Asia developed signs and

gonorrhoea

NSU

Fig. 9. Clinical appearance of typical gonococcal urethritis and NSU.

symptoms of urethritis within two weeks of exposure. (Harrison, 1973). The probability of a man acquiring a N. gonorrhoeae infection from a single exposure has been estimated by Holmes, et al (1970) to be between 22 per cent and 35 per cent. The incubation period in males is usually two to ten days but may be as short as twenty four hours (Schofield, 1975). Most cases of gonococcal urethritis are uncomplicated. Complications of gonorrhoea are outside the scope of this thesis. The main aim in presenting the previous information is to be able to contrast this picture with that of NSU, which can be mistaken for gonococcal urethritis by patients and sometimes by their medical attendants, on clinical symptoms alone.

3.2.2. Clinical presentation of NSU

As with gonorrhoea the discharge is variable in appearance and occurrence. Typically the discharge in NSU is less purulent than in gonorrhoea, being more watery, and more readily seen in the morning; dysuria may be absent or of variable intensity, and meatitis is usually slight or absent (Figure 9). In the less common acute NSU, which usually has a shorter incubation period, patients present with a purulent, profuse and continuous discharge not unlike that in gonorrhoea. However, more and more cases of gonorrhoea are being seen with scanty mucous discharge

and some gonococcal infections in males are asymptomatic. Therefore, on clinical grounds alone, it is not possible to diagnose accurately gonococcal from non-gonococcal urethritis and any male with a penile discharge should have appropriate laboratory investigations.

The incubation period, if it can be determined, is usually two to three weeks, but may be several months (NHMRC Handbook, 1978). Morton (1972, p. 95) a recognized authority has stated "anything from a few days to a few weeks."

Jacobs et al (1975), studied the clinical and laboratory features of urethritis in 400 symptomatic men at a venereal disease clinic. One hundred and eighty five had gonococcal urethritis and 214 NGU (one had another bacterial infection). His gross findings on symptoms are presented in Table 5.

TABLE 5

Major symptoms in men with symptomatic urethritis (Jacobs, 1975)

SYMPTOMS	GONORRHOEA No.	%	NGU No.	%
Dysuria plus discharge	131	71	82	38
Dysuria only	4	2	32	15
Discharge only	50	27	100	47
Neither	0	0	0	0

While the presentation of dysuria and discharge in this study differ significantly, venereologists generally find that clinically, it is not possible to differentiate NGU (NSU) from gonorrhoea and so laboratory techniques for the diagnosis of gonorrhoea are described.

3.2.3. Laboratory diagnosis

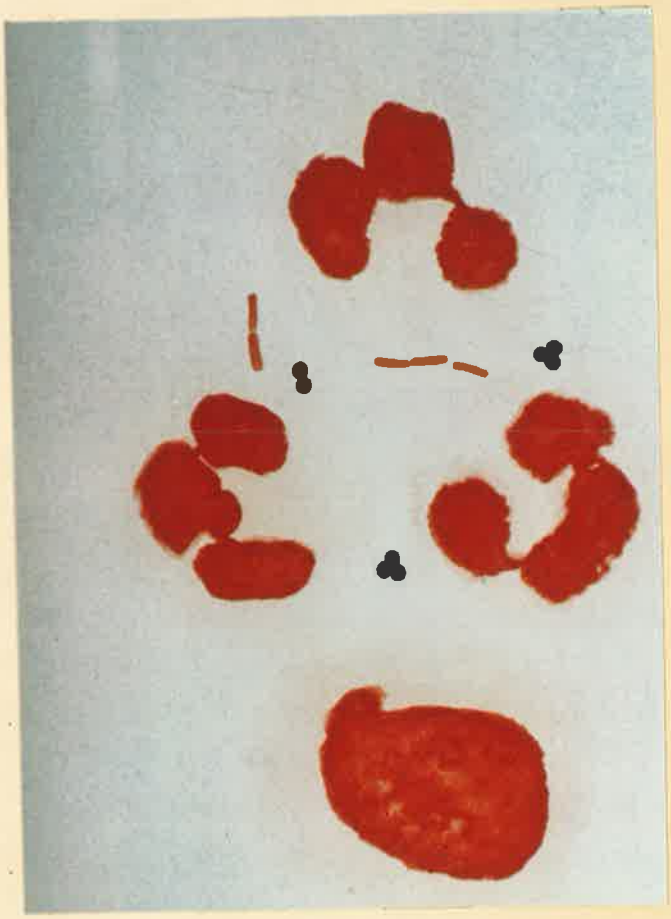
The essential investigation is to collect some urethral discharge with an endo-urethral or intrameatal swab, smear it thinly on a glass slide, fix by gentle heat and use Gram's stain. This will demonstrate the morphology of the organisms (N. gonorrhoeae) which are typically pink coloured Gram-negative intra-cellular diplococci (Figure 10). In material from the male urethra, pairs of extracellular diplococci are suggestive of gonorrhoea but have to be differentiated from short gram-negative rods. (In material from the oro-pharynx in males and endocervix in females, this presumption cannot be applied). However, where possible the diagnosis should be confirmed by culture in a suitable medium such as Thayer-Martin or its modified forms; confirmation of the colonies by the oxidation test; and finally, by fermentation with various sugars.

Two comments will be made here:

(i) Fluorescent staining for antibodies (direct fluorescent antibody test)

Gonorrhoea

Intracelluler and extracelluler Gram-negative diplococci with morphology typical of "Neissessa gonorrhoeae."



NSU

Absence of Gram-negative diplococci, polymorphs present, occasional Gram-negative bacilli and Gram-positive cocci.

Fig. 10 Microscopy (Gram stained smears) in typical gonococcal urethritis and NSU

has been developed mainly as a confirmatory test for cultured organisms, but the test lacks sensitivity and, depending on the commercial preparation used, specificity. It has a valuable role for instance, in examining joint fluids where the organisms can be non-viable. This test is time consuming, and, at present, is not routinely used in Australia. (NHMRC Handbook, 1978).

(ii) The current gonococcal complement-fixation test (GCFT) is of doubtful use in the diagnosis of chronic or metastatic gonorrhoea and in assessing response to treatment. Certainly as presently done, the GCFT is useless in the acute stage of gonorrhoea (NHMRC Handbook, 1978).

From the absence of organisms, particularly gonococci, and the presence of polymorphonuclear leucocytes (more than 10 per high power field), and some epithelial cells, a presumptive diagnosis of NSU can be

made if supported by clinical history and examination (Figure 10). This has to be confirmed by negative cultures for gonorrhoea. It is desirable if Trichomonas vaginalis and Candida albicans can be excluded by careful inspection of the wet mount and smear at this stage.

Lagerholm et al (1966), after comparing cytomorphologic appearances of male urethral smears by the Giemsa method, in gonococcal urethritis and NSU, reported that while both showed typical inflammatory changes - mainly granulocytic, the NSU smears showed a preponderance of lymphocytes.

3.3 MICROBIOLOGICAL RESEARCH IN NSU

Most of the research on NSU in recent years, has been principally concerned with the possible causative agent or agents. A bacterial etiology was suspected because the disease often responded relatively quickly to antibiotic therapy (Harkness, 1953). Many earlier studies using standard microbiologic techniques had failed to identify a specific organism as a significant cause of NSU (Morton, 1975). Isolation of Ureaplasma urealyticum (T-strains) from the urethras of male patients who had NSU was the first significant advance (Shephard, 1956).

3.3.1 The Mycoplasmas

These organisms originally called PPLO (pleuro-pneumonia-like organisms), have been demonstrated in the urethral tract of man in varying proportions both in sickness and in health. The mycoplasmas that produce large colonies (*M. hominis*) and those that produce tiny colonies ('T'-strains after Shephard), are believed to differ in their significance as causative agents of NSU. The 'T'-strains, also known as *Ureaplasma urealyticum*, are considered to be more suspect (King, 1964); although their role, as will be seen in this discussion, is not proven.

Studies of the role of *U. urealyticum* as a urethral pathogen have been complicated because in health the rate of urethral colonization is correlated with the total number of partners with whom an individual has had intercourse (McCormack et al, 1973). In general, studies of rates of isolation of *U. urealyticum* from patients with NSU and controls, have shown differences when the controls were less sexually active than the urethritis group, but not when sexual activity was comparable. (Holmes et al, 1967). Moreover, *U. urealyticum* have been isolated with similar frequencies from control subjects and from patients suffering from NSU in a number

of studies (Ingham et al, 1966; Jansson et al, 1971; Lassus et al, 1971). Black and Rasmussen (1968), actually found the incidence of U. urealyticum higher in control subjects than in patients.

Serologic studies have not supported a role for U. urealyticum as a urethral pathogen (Bowie et al, 1977).

On the positive side of the picture, evidence is available consistent with a pathogenic role:

(1) Post-gonococcal urethritis was related to T-mycoplasmas by Csonka et al (1966), who cultured that organism from urethral material from ten of thirteen men who developed PGU and only fourteen of fifty who did not, following effective treatment with penicillin.

(2) Treatment studies and experimental innoculations support a pathogenic role. Sulphonamides are active against C. trachomatis (to be discussed in the next section), but not U. urealyticum (Shepard et al, 1974a); whereas aminocyclitols are active against U. urealyticum (Lee et al, 1974; Gnarpe, 1974) but not C. trachomatis. The urethritis of men whose cultures

were C. trachomatis-negative, U. urealyticum-positive responded poorly to sulphonamides, but responded well to aminocyclitols when U. urealyticum was eradicated; the urethritis did not respond well when U. urealyticum persisted (Bowie et al, 1976, 1977).

In other studies, Shepard, (1974b), using suboptimal doses of doxycycline to treat patients with NGU, showed that with the disappearance of U. urealyticum, symptoms disappeared and with reappearance of U.urealyticum, symptoms recurred.

Intra-urethral innoculation of U. urealyticum was attempted by Csonka and Taylor-Robinson (1977), but they could only find two human volunteers, and both innoculations resulted in colonization for several days and produced urethritis.

Dunlop et al in 1966 studied the clinical aspects of mycoplasmas in non-specific genital infection. While they found M. hominis to be present in the genital tract of the majority of women studied and in the rectum of some, and in the urethra of a sizable minority of men, they concluded that there was no evidence that mycoplasmas were the cause of clinical conditions.

The role of mycoplasmas in human infertility is receiving some attention. Gnarpe and Friberg (1972), investigated fifty-five couples seeking medical advice for primary sterility and used couples where the wife was pregnant as controls. They made the observation that T-mycoplasmas were commonly found attached to spermatozoa and it was thought that this might well inhibit fertilization. Later (1973), they treated their subfertile couples with doxycycline for ten days and within a five month follow-up period, twenty nine per cent of fifty-two couples were pregnant.

In conclusion, mycoplasmas, both M. hominis and T-strains (U. urealyticum) have been found in many body sites in sickness and in health. Their significance in the pathogenesis of NSU remains a matter for speculation, with many workers concluding that they are only commensals and indicators of sexual activity; others are equally convinced that they are urethral pathogens.

3.3.2 Chlamydia and urethral infection

The association of infection of the conjunctiva and of the genital tract is historical. Albert Neisser in 1879 demonstrated the gonococcus in conjunctival material from newborn babies and in genital material from adults.

For fifty years after Halberstaedter and Prowazek (1907) described the inclusions named after them first in ocular and then in genital material, their relevance to disease remained controversial. Moreover they could not be grown on culture. Then in 1957 Tang and his colleagues isolated the causal agent of trachoma in the yolk-sacs of fertile eggs (Lancet editorial, 1974). A similar agent was isolated from conjunctival material from a baby with ophthalmia neonatorium and from cervical material from the mother of an affected baby (Jones, 1959). Finally the agent was also isolated from urethral material in about a fifth of men with NSU (Dunlop et al, 1967).

The isolate was termed TRIC agent (TR for trachoma and IC for inclusion conjunctivitis - Figure 11). Many different names and classifications were used including Bedsonia, after the late Sir Samuel Bedson of the London Hospital, who isolated and characterised psittacosis agent. Evidence shows that the organisms are members of a single genus, Chlamydia oculogenitale, better termed as Chlamydia trachomatis, sub-group A (sub-group B causing psittacosis).

There is a common blood test for all the chlamydia, and lymphogranuloma venereum complement-fixation test (L.G.V.C.F.T.), but as it only measures group antibody, it may be negative in urogenital cases.

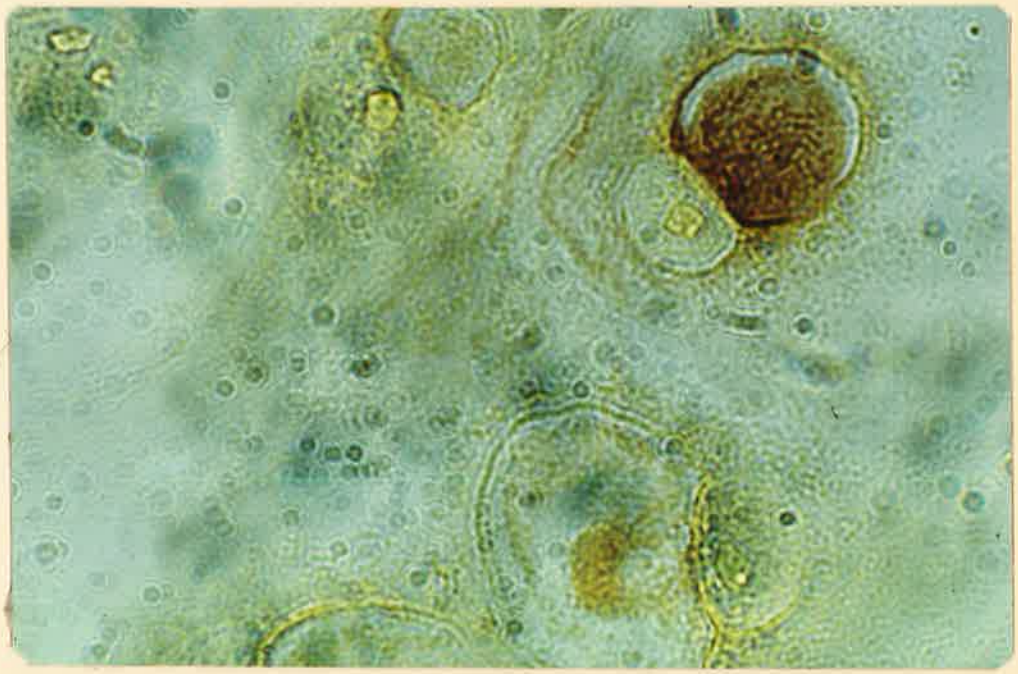


Fig. 11. TRIC agent· *Halberstaedter-Prowazek* inclusion body *(X 2 250).* Isolate from urethral material after 48 hours in irradiated Mc Coy cells.

Among the newer tests for chlamydia, the following three shall be briefly mentioned, as they have led to the higher success rate of isolation of chlamydia.

(1) Isolation in yolk sac is an insensitive method and also open to cross-contamination in the laboratory. Culture in irradiated McCoy-cells has proven to be a significant advance (Magruder et al, 1963; Gordon et al, 1969). A simplified one-passage technique of culture in irradiated McCoy-cells has been developed and refined. Serum is added to the transport medium and specimens are stored in liquid nitrogen instead of in a mechanical refrigerator (Darougar et al, 1972). High speed centrifugation increases the sensitivity of the method. Using this method many workers have shown isolation rates of 40% to 50% in NSU compared with up to 21% in yolk-sac (Dunlop et al, 1967). This compared with about 7% to 10% isolation from controls and 20% from gonococcal urethritis (90% of whom develop PGU). Using this sensitive method (Holmes et al, 1975; Oriel et al, 1975, 1976; Schachter et al, 1975; and many others), it would appear that there is evidence for supposing that a proportion of NSU is related to chlamydia and that new developments will enable us to define how big this proportion is.

(2) Micro-immunofluorescence (micro-IF) test

This test developed by Wang et al in 1971 can be used to distinguish TRIC agent from LGV agent and to identify serotypes of Chlamydia in epidemiological studies and for the preparation of intradermal tests. Thirteen serotypes have so far been identified.

(3) Radio-isotope precipitation (RIP) test

This test (Phillip et al, 1971; Dwyer et al,1972) is a sensitive serological test which measures antibody to chlamydial group antigen. However, it is not type-specific like (2), and mono-specific reactions are more commonly found in ocular rather than urogenital infections.

TABLE 6

Diseases caused by Chlamydia trachomatis
(Urology Times, 1977)

SEROTYPE	ASSOCIATED DISEASE
A - C	Trachoma NSU
D - 1	Cervicitis
LGV 1 - 3	Inclusion conjunctivitis Lymphogranuloma venereum

Summarizing the isolation studies, it can be said that convincing evidence of C. trachomatis as the cause of 30% - 50% of cases of NSU has been developed by many groups (Oriel, 1978); controlled studies have repeatedly shown that C. trachomatis can be isolated from the urethras of only 7% of men without urethritis (Richmond et al, 1972; Dunlop et al, 1972; Oriel et al, 1972; Holmes et al, 1975; Schachter et al, 1975; Bowie et al, 1977; Oriel et al, 1976; Vaughan-Jackson et al, 1977; and others).

TABLE 7

Isolation of C. trachomatis from men with NSU (Urology Times, 1977).

YEAR	AUTHORS	PLACE	NO. OF PATIENTS	ISOLATION RATE
1972	Dunlop et al.	London	99	44%
1972	Richmond et al.	Bristol	103	39%
1975	Schachter et al.	San Francisco	76	36%
1975	Holmes et al.	Seattle	113	42%
1976	Oriel et al.	London	240	49%

In addition to isolation data, further strong support for a role for C. trachomatis as a primary urethral pathogen is derived from serologic studies, urethral innoculation of monkeys, and studies of PGU. In the usual population of patients seen in STD clinics because of NSU, many have preexisting antibody to C. trachomatis demonstrable by micro-IF tests, and it is unusual to find sero-conversion or fourfold increase in micro-IF antibody (Holmes et al, 1975). However, when a group of patients with a history of no previous NSU and relatively fewer partners was studied, the serologic findings strongly supported a role for C. trachomatis as a primary pathogen (Bowie et al, 1977).

DiGiacomo and Gale in 1977 reported on a male baboon they had injected experimentally. The primate showed evidence of urethritis by the presence of intra-urethral follicles.

PGU provides an opportunity for prospective assessment of the ability of C. trachomatis to produce urethritis. When gonorrhoea is treated with an antibiotic that does not eradicate C. trachomatis, PGU develops in almost all men who have concurrent C. trachomatis infections, and the rate of development of PGU is much greater in C. trachomatis-infected patients than in others (Holmes et al, 1975; Vaughan-Jackson et al, 1977; Oriel, Ridgway et al, 1976).

3.3.3 Microbiological studies of female partners

Female sex partners of patients with NSU whose cultures are C. trachomatis - negative, are usually C. trachomatis-negative as well in the cervical specimens (Holmes et al, 1975). Schachter, 1978, p. 490 in a review of the subject states that there is general agreement that approximately seventy per cent of sexual consorts of men with chlamydial urethritis have chlamydial infection of the cervix.

The following table regarding female consorts is taken from the proceedings of a conference on NSU at San Diego, California, published in the Urology Times, 1977.

TABLE 8

Microbiology of 328 female contacts of men with NSU (Urology Times, 1977)

ORGANISMS ISOLATED	NO. OF PATIENTS
Chlamydia trachomatis	73
Neisseria gonorrhoeae	16
Trichomonas vaginalis	11
Candida albicans	32
Mixed infections	21
No pathogens isolated	175
	328

3.3.4 Other infective agents as causes of NSU

Furness et al (1977) have suggested that Corynebacterium vaginale (also known as C. genitalium, type 1), is a cause of NSU. They isolated it from forty per cent of patients with NSU and from an insignificant number of controls; they did not however culture for C. trachomatis. Other isolated studies (Mehta et al, 1967; Dunkelberg and Woolin, 1963) are reported but their findings are not convincing. From the data reported, C. vaginale appears responsive to tetracycline and erythromycin.

Some cases of NSU are due to Herpes-virus hominis infection not associated with genital lesions, but their incidence is low (Holmes et al, 1975).

As mentioned earlier, it is desirable to exclude Trichomonas vaginalis and Candida albicans but their proportion in repeated studies is consistenly very small (Wong et al, 1977).

3.3.5 Other possible causes (non-infective) of NGU (NSU): the case for considering NSU as a clinical syndrome of multiple causes

Despite the recent advances in microbiology, some 30% - 40% of cases of NSU have no discernable cause. It is assumed that where the urethritis is secondary, the primary causes listed in Figure 8 of this chapter have

been looked for. One theory to explain the development of NSU in this situation is that NSU is a manifestation of sensitivity to some allergen in the female genital tract (Weston, 1965). So far there is no conclusive proof to support this theory and treatment with corticosteriods or antihistamines does not alleviate NSU (Schofield, 1975). The part played by the host, according to Schofield, needs to be further studied. Some studies, notably by Csonka et al, 1974, have shown an excess of IgM in the sera of some patients. Chromatographic studies have revealed an elevated albumin peak and an unknown beta-globulin, in some cases. These abnormalities were not found in the sera of patients with gonorrhoea or healthy controls (Csonka, 1974).

Another view is that there is some deficiency in the urethral mucosal defence either <u>per se</u> or possibly after alteration due to alcohol. Certainly alcohol does seem to be associated with some recurrences of NSU but such clinical impressions are gained by personal communications from colleagues, Newnham (WA), Brennan (VIC), Lopez (NSW). The literature does not show any reference to the precise pattern or mechanism whereby alcohol may act, other than the time honoured process of a catalyst to sexual intercourse. The author has attempted to document

the alcohol consumption just prior to symptoms in his study sample, with this in view, in the latter part of the thesis.

In conclusion, the diagnosis of NSU is made by the exclusion of gonorrhoea and known causes of non-gonogoccal urethritis. On present evidence there is less support from the clinical research studies for mycoplasmas, than for chlamydia as a cause; but in view of the failure to account for every case of non-specific urethritis on an infective basis, there is possibly more than one cause, and NSU may well be a multifactorial clinical syndrome.

3.4 THERAPEUTIC CONSIDERATIONS

3.4.1 Antibiotic regimes

Advances in the treatment of NSU have not paralleled the recent expansion of laboratory research into its etiology, even though almost every antimicrobial agent in clinical useage has been tried (Willcox, 1972). There is however some indication both *in vivo* and *in vitro*, that the tetracyclines have advantages over other antimicrobials (Morton, 1975).

Sulphonamides, streptomycin and combinations of these drugs have been tried and the results are often conflicting (Csonka, 1965). Much effort seems to have been wasted on therapeutic trials which were not controlled and where insufficient clinical data were given to permit critical conclusions and comparisons to be made. The greatest difficulty has been the period of follow-up, as relapses/recurrences can occur up to six months and some people equate this with the failure rate of the drug. It seems reasonable to agree with Csonka in suggesting that early evaluation of a drug - say one to two weeks after treatment would show its efficacy, as the response is often immediate; during the short period of observation the defaulter rate is usually low enough to allow the collection of a statistically acceptable series; and difficulties in the interpretation of treatment failure

due to re-infection are less likely to arise early on.

As early as 1959, a double-blind trial by Leach had shown that response to broad spectrum antibiotics was superior to that of placebo in achieving about eighty per cent cure rate after twelve weeks follow-up. Fowler (1970), however, in a recent double-blind trial of tetracycline and placebo over three months concluded that tetracyclines benefited only 10 per cent more patients than placebo, based on relapse rate over three months. But Fowler considers recurrences to be relapses rather than reinfections. The sole study adequately controlling for re-exposure is that by Holmes et al, (1967) conducted aboard an aircraft carrier at sea. This convincingly demostrated that short term results with tetracyclines were much better than with placebo and a dose of 1.5 grams(gm)q.i.d. for 7 days was recommended.

Willcox (1968), tested erythromycin in one hundred and six men with NSU. He used erythromycin stearate in a dosage of 6.25 gm over six days. The re-treatment rate in the ninety two men followed up was 29 per cent at three months. Willcox provides a table comparing his findings with those obtained using twenty three other preparations. His conclusion was that tetracyclines offered the lowest retreatment rates.

Shepard who first isolated T-mycoplasmas (U. urealyticum), reported in 1970, that 500 mg of tetracycline given 6 hourly for seven days, or erythromycin in like dosage for ten days eliminated the organism. When the organism persisted recurrence could be expected. He advised treatment of wives with the same course of antibiotics as the patient.

Csonka and Spitzer (1969) reported a trial of lincomycin in NSU. They prescribed 500 mg four times daily for five days. In fifty seven men the cure rate at seven days was only 26 per cent. Retreatment with tetracycline give much more satisfactory results.

The theoretical basis for these observations may be related to the fact that tetracyclines and erythromycin almost always eradicate C. trachomatis (Handsfield et al, 1978) and most U. urealyticum (Shepard, 1974b). Lee et al, (1974) also found that spectinomycin eradicates U. urealyticum from the urethras of seventy per cent of men.

Tetracycline is clearly the treatment of choice as being of proven value, (B.M.J. editorial, 1971), the recommended dose being either 1 gm for a fortnight or 2 gm a day for one week. 2 gm a day for one week, is the standard procedure at the VDCC, and this is the dose used in this group of NSU patients under study.

John (1971) decided to assess the value of a larger dosage for a more prolonged time. Three groups were studied.

(1) One hundred and thirty men given oxytetracycline 500 mg three times daily for 5 days

(2) Two hundred men given oxytetracycline 250 mg four times daily for 21 days

(3) One hundred and sixty nine men given oxytetracycline 500 mg four times daily for 10 days

Cure rates at three months were 55.0, 87.5 and 72 per cent respectively. Side effects were minimal and John recommends the 21 day course.

From the patient's point of view it is better to prescribe a drug that has to be taken less frequently and this increases patient compliance. Hence, long acting tetracyclines such as minocycline, (Fowler, 1974); doxycline (Lassus, 1971) and DETECLO (Bhattacharya et al, 1973) are all interesting trials.

In conclusion, one can say that although many studies of the antibiotic treatment of NSU have been performed, the optimal drug, dose, and duration of therapy have not been fully determined. However there is general agreement that tetracyclines are of proven value.

3.4.2 Complications of NSU

The organic sequelae of NSU are generally uncommon and best described under the term local complications; quite apart from local complications is the pnenomenon of recurrence of symptoms in NSU (relapse or reinfection?), which is frequently seen. This will be discussed under the heading of recurrences. Finally, the emotional sequelae are discussed seperately, and the author will show in this thesis, that the psychological aspects of having NSU can constitute a significant problem in the management of this common condition.

(1) Local Complications

Local complications from NSU are generally similar to those which may follow gonorrhoea, but they are usually less severe and occur infrequently (King et al, 1969). This is particularly so at the VD centres where early and effective treatment with antibiotics and surveillance has kept the incidence of organic sequelae to the minimum. Occasionally the patient presents to the clinic with a complication, but at the VDCC this has happened rarely. Some degree of littritis is probably inevitable in the course of any urethral infection. Tysonitis, cowperitis and infection of para-urethral ducts may occur. Prostatitis when accompanying NSU is usually asymptomatic and painless. The criteria on which the diagnosis of chronic prostatitis should be based are the subject of considerable divergence of opinion (King et al , 1969;

Morton 1972). The percentage of men diagnosed as having prostatitis can be increased by examining five consecutive portions of one specimen of freshly expressed prostatic fluid, preferably using dark ground microscopy (Oates, 1957). Morton (1972), however, believes that prostatic massage should be avoided as its beneficial effects are doubtful and its harmful effects more than likely; (it is postulated that infection can spread to the dorsal spine by a network of veins).

In any case the presence of leucocytes in prostatic fluid could also be physiological (peri-prostatic congestion especially in the morning), just as easily as pathological. Oates (1957) and Ambrose et al, (1953), both using the same criteria found a third of their controls with "prostatitis". In keeping with this trend, there is a notable absence of reports claiming that antibiotic therapy with or without prostatic massage is definitely beneficial (Morton, 1972).

Urethroscopy was carried out in 284 of 598 men treated for NSU by Morrison (1965). Only four were found to have a stricture, and two of them had symptoms of hesitancy and poor stream.

The incidence of Epididymitis is less controversial as the condition is clinically obvious. It is in fact the most common organic complication of NSU seen at the VDCC.

Over and above the local complications, and far more serious in its implications, lies the shadow of Reiter's disease or syndrome, named after Hans Reiter (1916), who described the association of polyarthritis, conjunctivitis or iritis, skin lesions and balanitis and/or urethritis. The existence of the syndrome was known to Brodie as long ago as 1818 and perhaps to others before that (Morton, 1972).

As full descriptions of the clinical picture and theories on etiology of Reiter's disease are available in standard textbooks, the author will confine himself to the relevancy of this complication to the subject of NSU. The cause is unknown and the clinical pattern of the disease may vary in different countries (Maddocks, 1967). Few patients with NSU are likely to develop Reiter's disease in Australian experience (exact figures or percentages have not been published, but this is the comment of leading Australian venereologists as reported in the NHMRC handbook, 1978).

In the UK in one year four hundred and fifty patients were found to have Reiter's disease of the total number of patients attending STD clinics (Chief Medical Officer's Annual Report, 1971). The incidence in males was 1.8 per 100,000 in that year. It would be unwise to assume that this is the true incidence, as in any

multi-system disease, patients are liable to be presented to different specialists (such as rheumatologists), and statistics will have to be acquired from all relevant sources.

Recently there have been reports of a highly significant association between HLA -B27 antigen and ankylosing spondylitis (Lancet, 1973). Aho et al, (1973) identified this antigen in eighty per cent of patients with Reiter's disease. Other studies have since confirmed this association, and it is now an established investigation in NSU patients presenting with arthritis and conjunctivitis. It is not known whether the urethritis of Reiter's disease is of the same origin as that seen in patients with uncomplicated NSU. Venereologists and rheumatologists generally agree that Reiter's disease cannot be considered simply as a complication of NSU, but that genetic and immunologic factors are involved in the interrelation of these two syndromes (Harris, 1975). Morton, taking an extreme position sums it up in his book "Venereal Diseases" with this thought-provoking statement (1972, p. 101):

> The complication of Reiter's arthritis with the eventual possibility of crippling is the greatest single hazard to which a promiscuous male exposes himself today.

(2) Recurrences

Since spontaneous remission is also known to occur in NSU, the role of antibiotics is seen mainly as benefiting the patient by shortening the course of the disease and reducing the recurrence rate and possibly, complications (Holmes 1967, Fowler 1970, Rodin 1964, and others).

Owing to the lack of a known cause or causes of NSU and the considerable variation in its severity, assessment of treatment in the terms of a "cure" remains difficult. One source of this difficulty is the inability to distinguish clearly between relapse and reinfection, as unlike gonorrhoea the recent sexual intercourse may not be the sole transmitter of the infective agents(s) (one notes the parallel with another viral STD namely Herpes genitalis). In order to avoid this confusion the author has used the term recurrence to define a fresh episode of NSU, clearly demarcated from its precedent episode by a period free from consistent symptoms of dysuria and discharge (Wright, 1969), and absence of sufficient polymorphs on a Gram-stained smear.

On the assumption that recurrences are mainly relapses rather than reinfections, some workers have tended to express the failure rate in one to three months. Such figures vary enormously from trial to trial but this

is not surprising if one also considers the existence of legitimate variables such as the host-factor of immunologic response or the choice of a new sexual partner.

(3) Psychological Aspects

The most common complication associated with NSU, is anxiety of varying duration and severity (NHMRC Handbook, 1978). NSU is a common condition which is discussed widely among young men. Many misconceptions about its causes and complications exist, as will be identified in this research. These anxieties are often more pronounced in the better educated, as NSU has been reported to be a common problem in university campuses (McChesney, 1973). Errard (1974) found that eighty five per cent of urethritis complained of by university students was due to NSU. In addition to anxiety about themselves, male patients with NSU are sometimes anxious about their sexual partner. In spite of evidence that female consorts of male patients generally are asymptomatic (Rosedale, 1959), it is wise to investigate and treat the patient's sex partner. Although it has not been demonstrated conclusively that treatment of the partner diminishes the recurrence rate in male patients, Thin (1978) recommends treatment of consorts.

The appropriate management for men whose disease persists or recurs after both the patient and the partner are treated, needs to be clarified. Many such men may spend years in clinic attendance (Oriel, 1978).

The above goal has been kept in mind as one of the reasons for this thesis which concentrates on the social and psychological aspects of NSU. From clinical observation at the VDCC, the author felt that success in treating difficult cases of NSU depends upon a combination of:

(i) appropriate investigation and drug administration

(ii) patient counselling and the therapeutic role of the doctor-patient relationship.

These aspects are amplified in <u>part four</u> after presenting the findings of this study. A further review of the relevant literature has been conducted and is shown in the individual segments on the socio-economic aspects (Chapter 9, p. 140) and personality studies (Chapter 10, p. 158) of the patients suffering from NSU.

PART TWO

MATERIAL AND METHODS

4. THE CLINICAL SETTING

4.1 A brief history of the VDCC

In South Australia the treatment of venereal diseases has been shared between private practitioners and the public clinics. The former are mainly general practitioners and the latter consist of: (i) the Venereal disease control Centre (VDCC, Figure 12) located at 275 North Terrace Adelaide, South Australia, (ii) the Port Adelaide Special Clinic (PASC), (iii) the Flinders Medical Centre STD Clinic (FMC clinic). The FMC clinic only operates for two sessions per week and the PASC is only attended by medical practitioners for limited periods of no more than an hour per week; hence the main attendance by the public of South Australia is at the VDCC.

The overall supervision and organisation of control work rests with the Department of Public Health, now a part of the S.A.Health Commission. Under the provision of the Health Act, doctors are required to notify the Department of all cases of gonorrhoea and syphilis they

Fig 12. Building housing the Venereal Diseases Control Clinic, Adelaide.

diagnose together with any information they have about possible sources of infection and post infective contacts of their cases. Laboratories are also required to notify the Department of all positive results of tests they carry out for these diseases. This obligatory laboratory notification is an invaluable help in control work, and in recent years it has also been adopted in Western Australia and to some extent (for syphilis notification only) in New South Wales. (NHMRC Report, 1978).

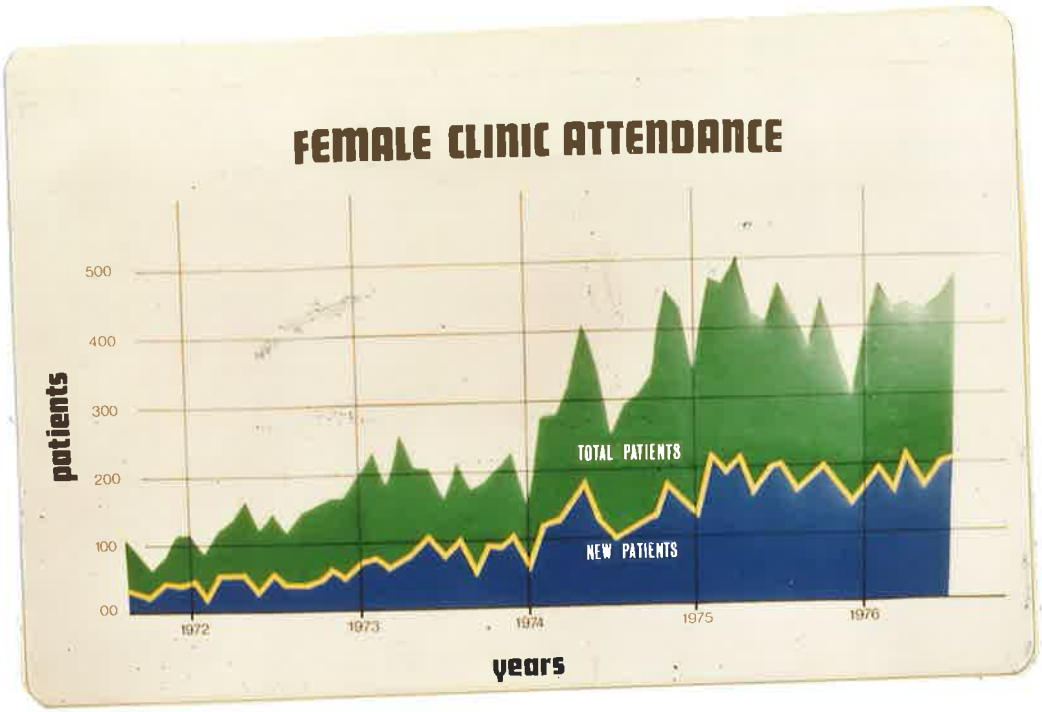
In practice such notifications in S.A. are seen and dealt with by a very small specially experienced staff within the Epidemiology Branch of the Department. The information provided by notifications and any gained during consequent enquiries and interviews remains confidential to this staff which carries out its work in a humane manner so as to avoid embarrassment to anyone contained in them, the sole aim being to find all infected persons so that they can be treated for both their own and the public good.

In practice again, in private cases, the doctor may elect to do the tracing of contacts and often does so, particularly in domestic husband/wife situations, but the bulk of this work is usually left to the Department staff.

Up to March, 1974, this staff of the Department worked in two different buildings, (a) The Royal Adelaide Hospital (called the Special Clinic) and (b) The Department of Public Health Office at Rundle Mall. In two years the very large and fruitful expansion of contact-tracing work in the metropolitan area, led the South Australian government to upgrade public facilities for the investigation, treatment and control of venereal diseases, resulting in the present clinic being established in March, 1974. From that date onwards, the clinic operated on a full time basis and patient numbers have increased enormously. (Figure 13).

The facilities of the clinic

The VDCC is located on the first floor of one of Adelaide's most pleasing buildings, from the architectural point of view (Figure 12). There is a fine blend of Scandinavian influence with white walls and natural pine wood and plenty of plants. The interior is equally pleasing, but unfortunately owing to the expansion in numbers attending the clinic, there is now insufficient space for two clinics for each sex which seems desirable. However, plans for an extension have been drawn up.



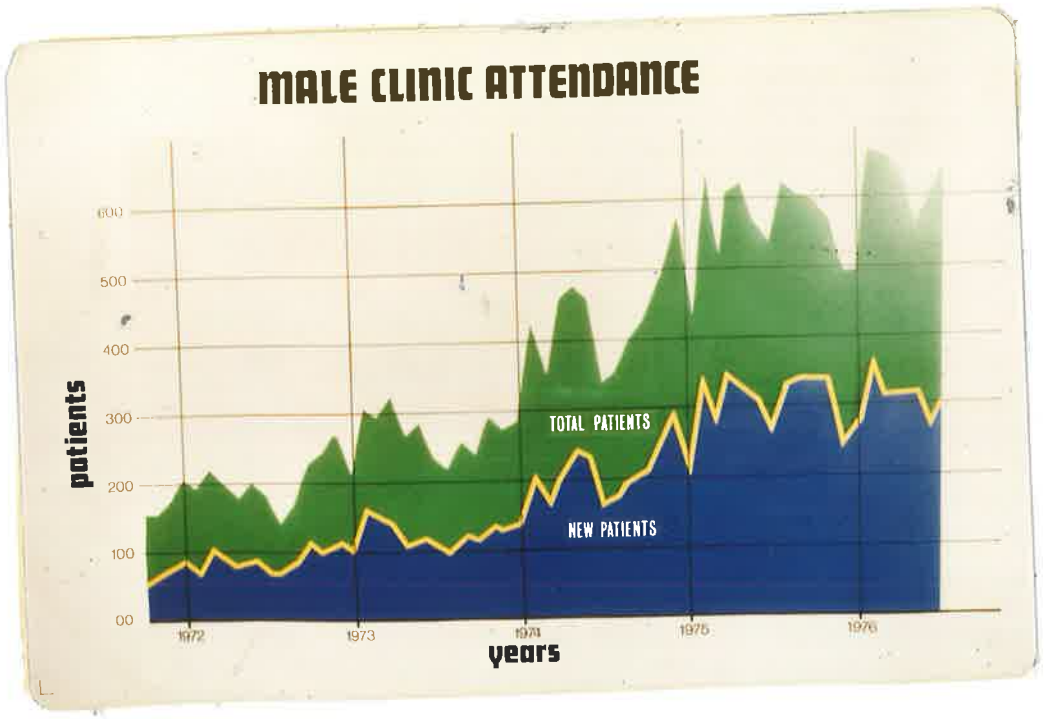


Fig. 13. Charts showing growth in clinic attendance 1971 - 1976.
(The blue area represents new cases and the green area represents follow-ups.

By comparison with hospital outpatient standards, the equipment and space is good, and by comparison with VD clinics in Australia, excellent. (The clinic in Western Australia, is also quite presentable and covers about 40 squares).

The clinic sees about 12,00 patients a year about a third of whom are new cases or new episodes and the rest follow-ups (Appendix 1). A histogram of the diagnostic spectrum of these cases is presented in Figure 15, part three. The clinic operates on a 9 a.m. to 5 p.m. basis, weekdays only, and is manned by three full-time medical officers.

As the author was employed as a full time medical officer at the clinic during the duration of the study, it was possible for him to see each patient in the study personally for the interview, and thus the uniformity of the interviewer factor was maintained, within the scope of clinical services provided by the author to the other clinic attenders.

5. ORGANISATION AND CONDUCT OF THE SURVEY

5.1 Objectives of the study

It is generally held today that NSU appears to be due to an acute or subacute inflammatory response brought about either by certain infective agents and/or by idiosyncratic factors in the individual. While there are many papers on the former, there are scarcely any on the latter. This study has been undertaken mainly to obtain more information on the latter.

The guidelines applying to descriptive epidemiology have been followed where possible (Gordon, 1976).

The fundamental process in descriptive epidemiology is the grouping of people suffering from the disease with a particular variable or characteristic. This is sometimes classified under who (person), where (place) or when (time), in an effort to obtain the "picture of the disease" (Lowe et al, 1973 p.146).

The important variables in this study are those characteristic of:

Who (Person) : males suffering from NSU - age, marital status, occupation and level of education, sexual behaviour and personality types, attitudes to sex and VD, and other factors considered relevant to NSU which have not been adequately documented such as alcohol intake and physical exertion.

Where (Place) : Adelaide, South Australia. A major study on the epidemiological aspects of males suffering from NSU has not been previously conducted in Australia. Furthermore, a Medlars research request and a search of the international literature shows that this is perhaps the first study of its kind in investigating the psychological and social background of NSU sufferers.

When (Time) : seasonal variations and periodic recurrence of NSU as seen at the VDCC are some of the variables studied.

In addition to descriptive epidemiology, the study has been designed to investigate the following hypothesis formulated by the author. In Chapter 3, in the

section on Therapeutic Considerations, it was noted that NSU is frequently liable to recurrence and that the psychological aspects in patients suffering from NSU are important. Moreover the management of NSU, especially in in the case of the person with persistent symptoms, is considered unsatisfactory (Bowie, 1978). The hypothesis put forward is that in the management of NSU, particularly of the patient with emotional sequelae, attitudes to sexuality and personality types may affect the therapeutic outcome. Therefore, patient counselling and the doctor-patient relationship are important.

Because of the above objectives, this research does not include any specific consort-studies or research microbiology of the NSU patients. To undertake consort-studies properly would be outside the scope and limitations of the project resources, but reference has been made to other studies on consorts where relevant.

Similarly, research microbiology involving chlamydia and mycoplasma isolations would not contribute to an original study and this subject has been, and is, receiving thorough scrutiny in many reputable centres, as illustrated in the review of the literature presented in Chapter 3.

A second hypothesis to be examined in this thesis is that a significant proportion of the clinic patients suffering from NSU come from higher socio-economic classes and have more stable relationships with their sexual partners than do patients with gonorrhoea seen at the VDCC.

5.2 Definition of the study population and sampling.

The study was carried out on patients attending the VDCC during January to October 1976, who were diagnosed as suffering from NSU. The definitive criteria for the identification of NSU, as used in this study were:

1. Clinical: Dysuria in the presence of overt urethral discharge, meatitis or history of urethral discharge.
2. Laboratory: A Gram-stained smear showing 10 or more polymorphs per high power field with no evidence of *N. gonorrhoeae* on smear and culture and no other specific cause such as *Trichomonas vaginalis* being detected.

The ten month period was considered necessary to minimize seasonal bias. During this period 1049 patients were diagnosed as NSU cases (new patients and new episodes).

As the author was employed as a full time medical officer at the VDCC and had to provide a clinical service to the other patients, it was not possible to study all the NSU cases. Therefore, a sampling process to ensure randomization was designed by the consultant statistician from the University Department of Statistics. This randomization scheme incorporated the features of natural selection by the patients reporting to the clinic at random between 10 a.m. and 4.30 p.m. and the daily and weekly alternation of morning and afternoon sessions at the male surgery by the author.

The author was not involved in the personal selection of patients in the sample as this was delegated to the medical assistant who had the task of calling in patients to the surgery; out of the randomized sub group of patients seen personally by the author, 260 males were invited to participate in the study by completing, firstly, the Eysenck Personality Inventory (EPI), and then the NSU questionnaire. The detailed description of these questionnaires and the mode of administration are described separately in sections 5.3 and 5.4.

Five patients declined and three forms were discarded because of unsatisfactory completion. Two persons who were illiterate opted to stay in the survey and their inventory was completed by a neutral third party (male nurse) simply reading the questions and recording the Yes/No tick indicated by the patient. The forms were analysed by computer using the pre-prepared programme supplied with the handbook, (Appendix 4) and this process eliminated a further 10 patients because their lie-scores (L-scale) recorded 6 or above. * Three others were excluded for miscellaneous reasons, one of whom expressed a desire to withdraw halfway during the interview, the other two for large gaps in their second (NSU) questionnaire. Isolated missing values in the interview questionnaire were accepted.

Thus 239 completed patient studies remained for analysis. The series of defaulters (those declining plus those excluded) numbers 21 and their demographic data were collated and are presented in Appendix 2. As this appendix shows, these data do not appear to be biased in any direction and this, plus the small numbers involved in relation to the sample, is not expected to affect the results.

*According to Eysenck and Eysenck (1964), a lie-scale of 6 or more on Form A, suggests that the individual is 'faking good' (desirable social responses) and his answers should be regarded with scepticism.

For the purposes of examining the second hypothesis, relevant data were collected from a random sample of similar size, of men with proven gonorrhoea diagnosed at the VDCC during the same study period of January to October 1976. The randomization was supervised by the University Department of Statistics. This group consisted of 230 men.

The criteria for the diagnosis of gonorrhoea in these males were as follows:

> Gonorrohoea is defined on laboratory tests. Initial Gram-staining of material collected by an endo-urethral swab showing the presence of Gram-negative diplococci; followed by positive urethral cultures for N. gonorrhoeae. Specimens for culture of N. gonorrhoeae were innoculated directly onto the primary isolation medium of Amies(1969) and the cultures read by qualified laboratory technicians.

The essential criterion was the positive culture, as failure to identify the organism on smear did not preclude selection. Only two cases out of the 230 fell into this category.

In this phase of the study involving cross-sectional analysis of the variables of socio-economic status and sexual partners in the two groups of men suffering from gonococcal urethritis and NSU, there was no overlap between these two diagnostic categories at the time of selection of the two samples, Post-gonococcal urethritis was not included in the cross-sectional study. In longitudinal studies however, some overlap between these two conditions is inevitable, but studies have shown that histories of gonorrhoea were more frequent among men who had gonorrhoea, while histories of NSU were more frequent among men diagnosed as having NSU (Holmes et al, 1975; Jacobs et al, 1975).

5.3 The instruments used in the survey

5.3.1 The Eysenck Personality Inventory (EPI)

The EPI form A is shown in Appendix 3. This instrument was used as a means of assessing the personality of the NSU clinic patients for the following reasons:

(i) It has been used in previous surveys of VD clinic patients of both sexes in England; this provides experience and a basis for comparison (Wells 1969; Schofield, 1975).

(ii) It is simple to understand and quick to administer, the mean time for the self-administered questionnaire being five minutes (three to seven minutes being usually required). The 57 items can be simply answered by a tick notation.

(iii) It is accurately scored by computer using the program supplied with the handbook (Appendix 4).

Time and costs were among the foremost considerations of this project. Each EPI form costs only eight cents and is supplied by the Australian Council for Educational Research, Victoria.

(iv) Direct evidence is available on the validity, retest reliability, and a vast range of controls for a suitable standardization sample of normals according to the handbook (Eysenck and Eysenck, 1964).

A critical appraisal of the development of the EPI, its questions, and scoring methodology, is discussed in Chapter 10, on the results of personality studies of the patients.

The existence of more refined personality inventories such as the Minnesota Multiphasic Personality Inventory (MMPI) is acknowledged (Hathaway et al, 1943), but these would have been difficult to administer in the circumstances of the clinic, and would be more informative for qualification of any psychiatric pathology rather than a broad outline of certain behavioural aspects of personality, such as those measured by the EPI.

5.3.2 The NSU questionnaire

This was aimed at providing information not previously available. Hence, it was necessary to design a separate questionnaire tailored to the needs of the survey.

The decision of approach, that is, interview versus self-administered questionnaire was reached after a good deal of thought. Finally it was decided that the complex variables involved in a clinical study of NSU would be better obtained as a natural flow on from history-taking which is a consultation by interview. Moreover as the personality inventory was self-administered, the interview served to balance the research design. To maintain uniformity of the interviewer factor, the author was the sole interviewer, personally seeing all the patients (respondents).

Content of the NSU questionnaire : Framing questions to collect the variables involved proved to be harder than expected. This is largely because there are no well-defined clinical descriptions of factors important to NSU in textbooks on venereal diseases. A few of these are empirical observations and the personal belief of venereologists, for example, nowhere was there any information about the time interval between alcohol consumption or excessive physical exertion and onset of symptoms of NSU and yet these are considered by some clinicians to be scientifically sound "precipitating" factors. Although uncertain of their exact role, the author has attempted to document both these variables (Questions 19 and 20).

Several questionnaires were prepared and discarded. The Senior Medical Officer, who acted as joint supervisor of the project till his retirement, convinced the author to restrict himself to the 25 basic questions seen in the final product (Appendix 5). This process was also helped by pre-testing it against a dummy respondent (another male patient - not included in the sample) who was also a psychologist. The questionnaire design when completed was tried on ten ordinary patients as a pilot study. As a result of this pilot study, the structure or framework of the questions was slightly modified to minimize misinterpretation by respondents.

5.4 Administration of the EPI and the questionnaire

Respondents were introduced to the EPI by the author after the diagnosis of NSU was established. Once consent had been obtained the respondent was ushered to a private cubicle in the waiting room by the medical assistant and seated comfortably to fill in the 57 Yes/No items by himself. Instructions regarding the filling in of the inventory are printed on the first page, but were also explained by the author at the initial contact.

The patient was then interviewed again by the author in the male consulting room, where the patient had previously been examined (Figure 14). The patient was interviewed after the initial consultation, diagnosis and the completion of the EPI, to allow a fair measure of rapport to develop before questions on intimate sexual behaviour were asked. It is the experience of the author and other medical practitioners who work at the VDCC that most patients are frank about their sexual history simply because of their decision to come to a discreet specialist clinic for a suspected venereal disease problem. Confidentiality was stressed and care was taken to exclude moral implications or value judgements during the course of the interview. The author has worked as a registrar in psychiatry for a year in a teaching hospital and this

History taking

Swab collection

Fig. 14. The male consulting room.

training was useful in developing the affective skills necessary for psychiatric encounters. These skills included use of the technique of openended questions, no facial or verbal overtones to suggest disapproval of certain answers (Sim, 1968), and ensuring complete confidentiality by satisfying the patient that the questionnaire had no name and was not attached to the clinic's record sheet.

The NSU questionnaire was accompanied by an answer sheet which was standardised and coded for computer analysis (Appendix 6). The patient was interviewed by direct questioning and indicated his choice of answer to the question from the possible answers provided. The answer code sheet had sufficient flexibility to allow for differing responses, but it was structured and the patient had to choose from the options provided. The interview generally lasted from 20 to 30 minutes.

As mentioned earlier, a pilot study proved to be useful in ironing out practical problems. For example, from the experience of the pilot study a decision to complete both schedules (EPI + NSU questionnaire) on the same visit was reached, thus ensuring more completed records in the definitive survey.

5.5 Data handling method

Answers to the questionnaire were pre-coded according to the value labels shown in the coding sheet forming Appendix 6. The author familiarized himself with this sheet, so that when the definitive survey commenced answers were immediately coded onto the DATA CODING FORM Appendix 7, from which the data was punched onto a single 80 column computer card by the staff of the University of Adelaide computing centre. This approach was slightly more time consuming than a tick notation at first, but ultimately provided a significant saving in time and paperwork because it by-passed the coding phase. Consequently the final pre-punched survey results were of a size which could easily be fitted into a manila folder. The results were analysed using the Statistical Package for the Social Sciences Manual (SPSS, Nie et al, 1975). The program for this analysis is shown in Appendix 8. This program was developed by the author using the SPSS Primer (Klecka et al, 1975) and supervised by Mr. Ron Read of the University's programming staff before execution.

5.6 Collection of data for the group with gonococcal urethritis

This phase of the study was designed to examine the second hypothesis, namely that there are differences between the clinic patients suffering from gonorrhoea and NSU with respect to socio-economic status and relationships with their sexual partners. Therefore, the author researched these specific data items for this group from the clinical history by applying questions 4, 6 and 12 of Appendix 5. These items are qualified in greater detail as described below:

(1) Occupation

The basic classification used was the 7 - point scale devised by Congalton (Appendix 6B) which is applicable in the Australian context. But by means of the following priority rating it was possible to include the categories of chronically unemployed and students in an identical fashion for both NSU and gonorrhoea groups. If the patient considered himself as unemployed for more than 6 months, this took precedence over the calling or trade followed and he was entered into a separate category namely Group 8 (Unemployed). Likewise, full-time

students of an educational institution, such as university, college or high school were grouped into category 9 (part-time students were placed according to occupation followed or if unemployed, then category 8).

The final answer code was graded 1 - 9, and by this technique of coding, accuracy of computer programming and analysis could be provided.

(2) Types of contacts - In this section the status of the sexual partner, casual or otherwise was obtained, together with information on whether the patient was homosexual, heterosexual or bisexual. Homosexual acts between consenting adults have been legalised in South Australia with the introduction of the relevant legislation by Parliament in 1975. Liaison between the clinic and the male homosexuals' representative bodies has always been good and the medical history indicating whether a male patient is homosexual is reliable, as far as the VDCC is concerned.

In the two groups of men suffering from gonorrhoea and NSU the comparative proportion of homosexuals and bisexuals (homosexuality) was undertaken as the author had seen from clinical observation that relatively fewer homosexual men suffered from NSU than from gonorrhoea. From an extensive search of the literature it would appear that this is an original concept. The theoretical significance of this is discussed in Chapter 11.

5.7 Statistical Analysis

Statistical analysis was carried out with the assistance of the consultant statistician from the University of Adelaide. The following statistics have been used in this study (Hill, 1971).

(1) Frequency Distribution: tables displaying the absolute and relative frequencies of the variables are presented as the chief exercise in the descriptive analysis.

(2) Scatter-diagram (Scattergram): this graph shows the individual measurements of the personality scores (E and N values) and the degree of association.

(3) Histograms: these display (i) the different conditions diagnosed at the VDCC and

(ii) comparison of defined variables between the two groups of patients with NSU and gonococcal urethritis.

The tests of significance used in this study are:

(1) Student's t test which has been used in testing mean values of E and N against the normative data supplied by Eysenck and Eysenck (1964).

(2) Cross-tabulation analysis of relevant variables has been performed. The significance of the association has been tested by the Chi-square statistic (X^2). The limitations imposed by multiple cells and control variables have been carefully considered and conclusions drawn with caution in interpreting the biological significance in a clinical context.

(3) The Chi-square test of homogeneity (X^2), has been used in comparing the variables in the two groups of men suffering from gonorrhoea and NSU.

PART THREE

RESULTS AND DISCUSSION

6. DIAGNOSTIC TRENDS AT THE VDCC

The incidence of sexually transmitted diseases is on the increase all over the world (Schofield, 1975). All over the western world and Europe, VD clinics that were set up by government bodies were encouraged to provide services for the accurate diagnosis of gonorrhoea and syphilis (chancroid and lymphogranuloma venereum). These services in turn improved clinic capacities for diagnosing NSU, trichomoniasis, candidiasis, and genital herpes infections. If viral warts, pediculosis pubis, scabies, molluscum contagiosum, corynebacterium vaginale vaginitis and inguinal dermatophytoses are added to the traditional venereal diseases, then at least 14 conditions can be diagnosed in a sexually transmitted diseases (STD) clinic.

From January to October 1976, (the study period), the relative frequency of these diagnoses at the VDCC was researched and the histogram of this study is shown in Figure 15. Where there occurred more than one condition in the same patient, the primary diagnosis was recorded and the additional diagnosis if not secondary to the first was then also recorded as a new episode. Thus one patient

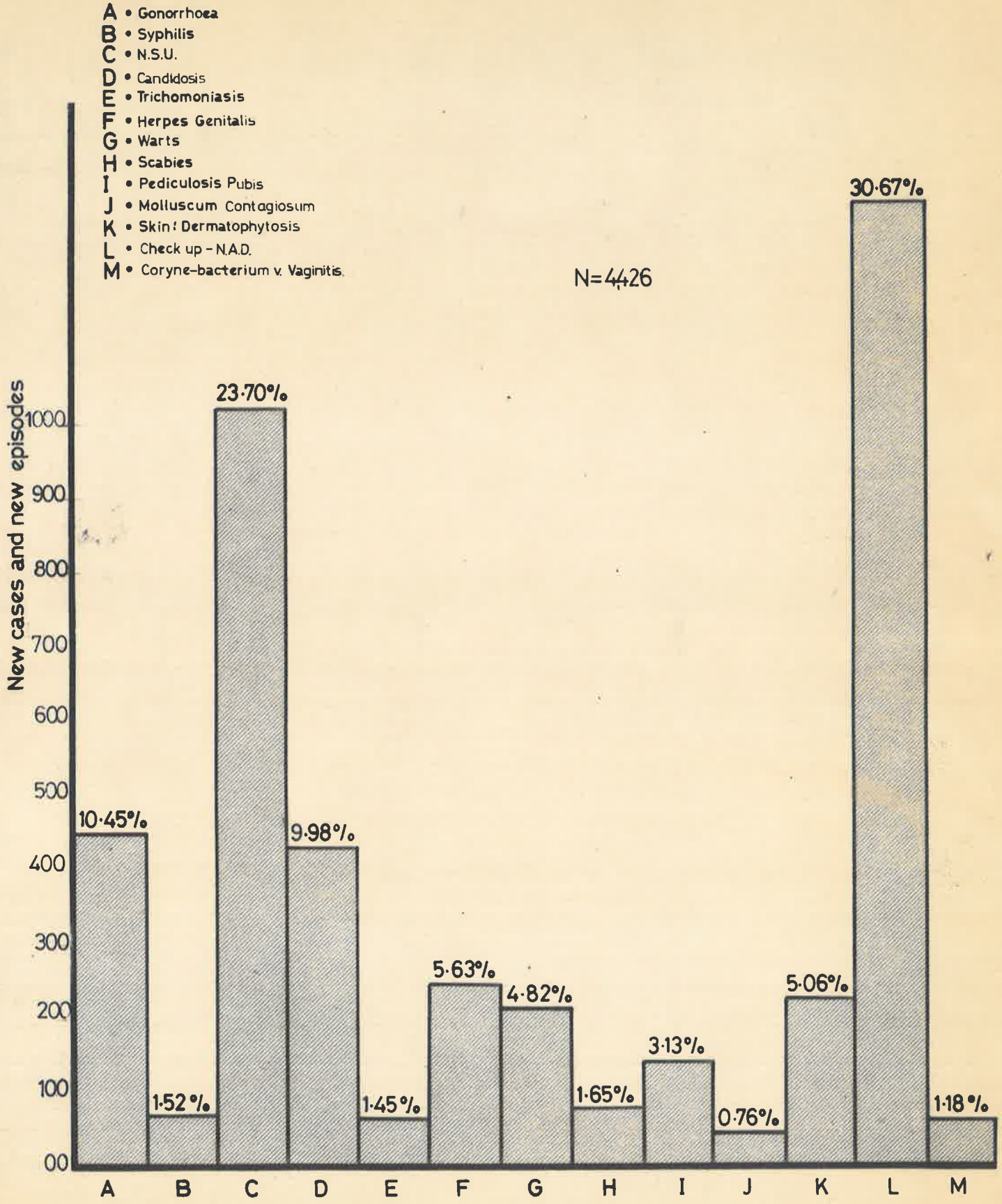


Fig. 15. Diagnosis of new cases at the V.D.C.C. Jan-Oct. 1976.

may present several times, but all new diagnoses (new episodes) were recorded, excluding follow-ups. "Check-ups" in this graph refers to the category of patients in whom no abnormality was detected (NAD). These patients attended the clinic primarily to exclude the possibility of STD.

Discussion

From Figure 15 we see that the classical venereal diseases (syphilis and gonorrhoea) constitute less than a third of the conditions diagnosed. This trend is also seen in other clinics such as those in the UK (Catterall, 1971). Thus it can be said that there is a marked alteration in the types of disease seen at the clinics for Venereal Diseases since the time they were set up. According to the British venereologists this is a desirable change both for itself, and also because, by becoming responsive to patients needs, the clinics would uncover more cases of gonorrhoea and syphilis. Quite recently Henderson (1977), from the Center for Disease Control, Atlanta, Georgia, has made a plea for the United States to improve the competence of its STD clinical services, with this point in view.

Another well known trend that is reflected in this graph of VDCC statistics is that NSU is more prevalent than gonorrhoea. United Kingdom clinic statistics show a ratio of over 2:1 and this is supported by the findings of this study.

7. DEMOGRAPHIC CHARACTERISTICS OF THE MALES SUFFERING FROM NSU (NSU PATIENTS)

7.1 Age

This parameter is characteristically one of the first to be described in a demographic survey. The age in years at the time of diagnosis was recorded for each patient in the sample. It is customary in describing statistics on venereal diseases to present the incidence by age groups thus showing which age group is at greatest risk. For example, the age specific reported incidence rates of gonorrhoea in the UK are highest for ages 18 - 24 with a tendency towards a slightly younger age distribution of cases in women (Lind, 1973).

The numbers involved in this sample are not large enough to make such an inference valid, but the interesting feature in table 9 is that 62% of the group were between the ages of 20 to 29 years, whereas 2% were aged 50 years and over.

TABLE 9

Age distribution of the NSU patients

AGE GROUP (years)	NO. OF PATIENTS	
	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)
9 - 14	0	0
15 - 19	39	16.3
20 - 29	148	61.9
30 - 39	33	13.9
40 - 49	14	5.8
50 and over	5	2.1
	239	100

Mean	25.9 years
Minimum	16 "
Maximum	65 "

7.2 Marital status

This is shown in table 10.

TABLE 10

Marital status of the NSU Patients

MARITAL STATUS	NO. OF PATIENTS	
	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)
Single	149	62.4
Married	40	16.7
Defacto	22	9.2
Separated	17	7.1
Divorced	10	4.2
Widowed	1	0.4
	239	100

The table is self explanatory, but the comment to be made here is that some patients who are separated or divorced could still be having a regular relationship and fit in with the category 'defacto'.

As seen from Table 10, at least a third of the patients are married, have a defacto relationship or have been married before. The sexual relationships of the patients is further qualified in Table 13, on page 128.

7.3 Country of birth

The ethnic origin of the NSU patients was examined by enquiry about the country of birth of the patient.

TABLE 11

Ethnic origin of the NSU patients

COUNTRY OF BIRTH	NO. OF PATIENTS	
	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)
Australasia	160	66.9
U.K.	31	13.0
Mediterranean Europe	22	9.2
Northern Europe	19	7.9
Asia	4	1.7
Other (USA, etc)	3	1.3
	239	100

Immigration is an important factor in the epidemiology of venereal diseases (Willcox, 1970). This is mainly the case with gonorrhoea (Oller, 1970).

Table 11 is presented for its descriptive value. In Chapter 9, the cultural (ethnic) background of the patients is explored further by broadening the enquiry to include country of birth of the patients' parents (Table 24).

8. SEXUAL BEHAVIOUR OF THE NSU PATIENTS

8.1 Reported frequency of intercourse

The information on this variable is provided by patient answers to question 11 of the NSU questionnaire (Appendix 5). The question is phrased to allow the patient to record the answer in terms of average frequency of sexual intercourse per week during the last six months. The code for the answer is shown in Appendix 6.
If this appears confusing, this is because it is difficult to obtain an accurate history of sexual behaviour.

TABLE 12

Frequency of intercourse in six months

CATEGORY LABEL		NO. OF PATIENTS ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)
Daily	4		
More than twice weekly	20	86	35.9
Twice weekly	62		
Once weekly		84	35.2
More than once fortnightly	26		
		35	14.6
Once fortnightly	9		
Once a month		17	7.1
Irregular but less than above		14	5.9
No intercourse		3	1.3
		239	100

"The right frequency for sex is as often as you both enjoy it" (Comfort, 1975 p.30). Human nature being what it is, what is suitable for one person, is not suitable for another.

Table 12 only records the reported frequency of intercourse in one time interval, namely the last six months. This would vary with (a) opportunities available for sexual intercourse with another person as against the patients' desired frequency (b) other sexual outlets, for example masturbation (which does not involve exposure to venereal infection, but is socially disapproved; Comfort, 1968) (c) finally, the inclination or sex drive of the individual which varies greatly but which is also influenced by age and adverse experience such as the presence or fear of venereal disease (in males fear of pregnancy is not a major factor).

From Table 12 it is seen that three patients reported no contact sexually with another person (coitus or fellatio) at all in six months and yet these patients developed NSU. It is possible these patients may be lying. As explained in part two on methodology, patients who tend to "fake good" (based on desirable social values) generally score as such on the Lie scale and are weeded out. Ten such cases were rejected on their L-scores out of the random sample of 260. This exercise plus the clinical rapport experienced by the author leads him to state that the benefit of the doubt should be given to these patients. It is possible that the incubation period for NSU is longer than usual in their case, as may happen with a slow acting virus.

8.2 Number of sexual partners

The answers to question 12 of the questionnaire ('in the last six months, your sexual partners have been as follows:'), are recorded in Table 13.

TABLE 13

Number of sexual partners

CATEGORY LABEL	NO. OF PATIENTS ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (%)
1. Regular partner only	66	27.6
2. Regular partner but recent episode of outside intercourse (I/C)	56	23.4
3. Casual partners only (less than 3 in six months)	75	31.4
4. Casual partners only (more than 3 in six months)	39	16.3
5. No partners (no I/C)	3	1.3
	239	100
Maximum No. of partners	8	

The first observation that is striking is the fact that no outside intercourse was reported in 66 cases. To explain the development of NSU in this situation, one must allow for a theory of transmission more complex than the simple one in gonorrhoea. Such observations regarding source of infection in NSU are found in other parts of the western world (Willcox 1953, Rosedale 1959, Csonka 1965).

Willcox (1953) found that a casual consort was given as the source of 60 per cent of cases of gonorrhoea, but of only 40 per cent of cases of NSU. He concluded that: "a wife or regular partner was nominated more often as the source of infection with NSU than with gonorrhoea."

Rosedale (1959) studied 150 female consorts of men with NSU, and reported that of the male patients, 102 (68%) were husbands or regular consorts and 33 (22%) were described in their case history as "promiscuous."

Csonka (1965) reviewed non-specific genital infection. He pointed out that a significant proportion of married men with NSU, in contrast to those with gonorrhoea, deny extra-marital intercourse. He emphasises the absence of a comparable condition in women and notes the great variability of the incubation period.

However, there is general agreement that NSU is acquired by sexual intercourse. This view is largely based on epidemiological evidence, for example, the observation that gonorrhoea and NSU have increased pari passu for more than 20 years, and that both conditions show the same seasonal variation (Morton, 1975).

Further analysis of Table 13 shows that 51% of the NSU patients in this study were classified as stable relationships (regular partner), as seen from categories 1 and 2. Only 16.3% of the total sample would represent habitual promiscuity (category 4). Of these, only 11 (4.6%) were solely clients of prostitutes (Appendix 6, item 12, answer 5) but 8 patients in the married/defacto relationships (category 2) had visited a prostitute as their casual episode (item 12, answer 6). Thus only 7.9% or 19 patients had attended a prostitute, a fact which is socially significant in western society, as it shows that promiscuity on a commercial basis, namely prostitution, is is not as important in spreading infection as promiscuity for pleasure.

The extent of homosexual activity in the study sample is described and discussed in Chapter 11.

8.3 Mode of intercourse

In keeping with the changing pattern of sexual behaviour in the so called "Permissive Society" it is relevant to record the proportion of extravaginal coitus as manifested in this group of NSU patients.

The framework of the question is shown in Appendix 5 (question 15)and the answers as coded are shown in Table 14. Anatomical terms such as vagina and rectum were easily understood by most patients, but where necessary, common terms, within the patients' comprehension for example "back-passage" etc, were used by the interviewer.

TABLE 14

Mode of intercourse

CATEGORY LABEL	NO. OF PATIENTS	
	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)
1. Vaginal only	149	62.3
2. Vaginal mainly, oral occasionally	36	15.2
3. Vaginal mainly, oral and rectal occasionally	35	14.7
4. Vaginal mainly, rectal without oral	7	2.6
5. Rectal and oral only	9	3.9
6. Missing Cases	3	1.3
	239	100

By traditional standards, vaginal intercourse is firmly established as the normal sexual practice, with extravaginal modes of coitus, sometimes considered abnormal or a perversion. Indeed, people whose attitudes on this subject are rigid, fit the description quoted from a book "Sexual Maladjustment and Disease" by Gavin Hart (1977 p.29):

> To conform completely to this limited definition of normality, a couple must perform even vaginal coitus in only one position and preferably without too much enjoyment. Such an attitude has resulted from the virtually obligatory role of vaginal coitus in reproduction.

It is now common knowledge that vaginal coitus is not the only path to orgasm, and in fact, in the case of male homosexuals, penovaginal intercourse does not occur. What is relevant here, though, is not the indulgence in other sexual practices per se (recorded in sexology books), but the association of venereal infection such as NSU thereby.

Orogenital Contact

This covers the practice of cunnilingus and fellatio. In this thesis on male urethritis, the practice that is discussed is fellatio. Excluding the homosexuals who form all of category 5, it is found that while this is not a popular practice, it is not uncommon with 29% professing to practice it. In other studies reviewed by Hart (1977) the practice varies in frequency. In one American study 49% of married couples practiced fellatio, as part of precopulatory activity (Morris, 1971).

Anal intercourse

Rectal penetration while common in homosexual behaviour is not confined to this source; but it is uncommon in this sample and the obvious overlap in category 3 is unavoidable. It must be borne in mind that few heterosexual patients consider these practices as more than satisfying curiosity and the occasional impulse (Comfort, 1975). The author's questionnaire is not designed to indicate how many times these practices were indulged in, but the fact remains that vaginal intercourse was the main practice in 92% of these NSU patients and the only practice in 63%.

8.3.1 Frequency of intercourse and other variables

Crosstabulation of frequency of intercourse with age, status of sexual partners and mode of intercourse was performed. Significant associations were only found with age and status of sexual partners and these are presented.

TABLE 15

Relationship of age to frequency of intercourse

AGE GROUPS	NO. OF PATIENTS	FREQUENCY OF INTERCOURSE			MISSING VALUES
		twice a week or more	weekly, more than, or fortnightly, to once a month	irregular	
10-19	39	7	25	7	0
20-29	148	65	80	1	2
30-39	33	7	24	1	1
40-49	14	7	4	3	0
50 and over	5	0	3	2	0
	239				

Chi-square (X^2) =35.53

degrees of freedom (df) = 8

$P < 0.001$

The association of frequency of intercourse with advancing age is generally examined on the hypothesis that as one grows older the frequency of intercourse declines. This is not always the case, but looking at this table, it appears that people below the age of twenty-nine years reported a greater frequency of intercourse than those older.

The group below the age of nineteen should theoretically have the strongest sex drive (Kinsey, 1948), but this group may not have reached a regular-partner stage, and this may influence the frequency of intercourse (examined in Table 16). As Kinsey has stated, masturbation is the most frequent sexual practice in this group.

Another factor that may influence the findings of Table 15 is that it is predominantly the younger age group that visit the VDCC, and the proportion to be kept in mind is that only 2.1 per cent of the sample are aged 50 and over.

TABLE 16
Relationship of status of sex partner to frequency of intercourse.

STATUS OF PARTNER	NO. OF PATIENTS	FREQUENCY OF INTERCOURSE		
		twice a week or more	weekly, fortnightly, once a month	irregular
Regular partner mostly (categories 1 and 2 of Table 13)	122	57	64	1
Casual partners (categories 3 and 4)	114	29	72	13
Missing Values (no partner)	3	-	-	-
	239			

$X^2 = 19.62$ df = 3
($P < 0.001$)

As expected those patients with a regular partner (spouse, defacto, fiancee, girlfriend) recorded a higher frequency than those with no regular partner (pick-up or prostitute).

8.4 Contraceptive habits

Question 16 relates to the use of the condom by the NSU patient in the last six months. The answers given are tabulated below.

TABLE 17

Condom usage among the NSU group

CATEGORY LABEL	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)
1. Not used at all	201	84.1
2. Occasionally	29	12.1
3. Condom used in the 4 weeks prior to symptoms	9	3.8

The condom or some form of mechanical barrier involving a male sheath has been used through the ages, as a review of the historical literature shows. In the sixteenth century A.D., mention is made of its use as a prophylactic against syphilis, in addition to its established use as a contraceptive (Hart, 1977).

Hart (1977) has also reviewed several studies on the efficacy of the condom as a prophylactic against venereal infection, including his own study on Australian troops in Vietnam (1974). Condoms, when properly used offer some prophylaxis against VD (Wittkower, 1944; Ekstrom, 1970). But the fact remains that condoms have an insignificant effect on total VD morbidity today due to their infrequent usage by the male community. McCormack (1973) in his study of T-mycoplasmas (U. urealyticum) in male college students, mentioned earlier in chapter 3, showed that those who needed it the most (promiscuous) used it least.

In this study, Table 17 shows that only about 16 per cent of the male patients used the condom at all, and this is consistent with other studies on VD clinic patients with condom usage ranging from 3 per cent to 20 per cent (Hart, 1977).

Most of the studies mentioned above, relate to gonorrhoea and syphilis. The role of the condom in the prophylaxis of NSU is not established, and in at least one study (Barlow, 1977), condom usage did not lower the incidence of NSU while it did so in the case of other STDs. This could be due to the small sized particles like chlamydia (0.25u) filtering through the pores, or

because of the differing nature of transmission of infection in NSU. In this connection, it is worth noting from Table 17, that nine patients had used the condom in the last four weeks prior to their symptoms of NSU, if one considers four weeks as a reasonable incubation period for NSU.

Eighty nine patients in the sample stated that the contraceptive pill was the only method used by their single consort (regular partner) whereas seventy eight patients who had a regular partner as the main consort reported her being on the pill. Together this constitutes 69% of the total sample. (answers to question 17 of Appendix 5).

Some workers have reported that the hormonal changes of the menstrual cycle can affect the isolation rate of chlamydia (Singer, 1975). The fact that NSU is increasing in both incidence and prevalence and that more and more young women are on the pill is merely an observation, but is there a link? One can speculate, but there is no evidence at present for such a suggestion. It would also appear that a number of women especially the educated ones are changing from the pill to other forms of contraception because of side effects, imagined or real, of the former, (Schofield, 1973, p. 107).

Another trend that has come about in recent years is that there is a resurgence of the use of the condom in some countries associated with the fall in notification rate of gonorrhoea (NHMRC Meeting, 1978). In Sweden, for example, Juhlin (1975) reports that the sale of condoms has risen to 50 million per year, while the gonorrhoea rate is slightly lower (cases/100,000).

9. SOCIAL STATUS OF THE NSU PATIENTS

9.1 Occupation

The occupational status of the patient was determined on a seven-point scale after Congalton (1969).

Congalton classified all occupations by the ratings of 303 randomly selected Sydney residents and 1189 tertiary students throughout Australia. There was a high correlation between the ratings of both groups. A full list of these occupations was used for classification in this study and is available in Appendix B from Congalton's book Status and Prestige in Australia, F.W. Cheshire Melbourne, 1969. A summary is shown in Appendix 6B of this thesis.

Congalton also devised a four-point scale for a broader socio-economic grouping based on occupation, but it was considered that the seven-point scale would be more informative. In addition two more groups are included for a more complete analysis, details of this being described in chapter 5, section 6 (Group 8: unemployed; Group 9: full-time student). Appendix B gives the exact

listing of each occupation, but a broad summary of the socio-economic groupings by social prestige as applicable to Australian society would, according to Congalton, be as follows:

Group 1 - High ranking professionals such as doctors, dentists, solicitors, architects, engineers, professors and also top clergymen; directors and owners of large businesses.

Group 2 - Executives, established farmowners, and some other professionals but excluding those in Group 3.

Group 3 - This group covers mainly those professionals with tertiary qualifications short of a degree but with high social standing, e.g. nurses, teachers, physiotherapists.

Group 4 - Tradesmen, technicians, policemen are placed here, as well as entertainers, artists, publicans, insurance agents.

Group 5 - Office assistants, clerks, sports and recreation workers, salesmen - generally skilled workers

Group 6 - Lower paid sales staff such as shop assistants - generally semi-skilled workers.

Group 7 - Unskilled workers.

Group 8 - Chronically unemployed, invalid and age pensioners.

Group 9 - Full time students - University, C.A.E., or other institutions.

The results are tabulated as follows:

TABLE 18

Occupational status of the NSU patients

CATEGORY	NO. OF PATIENTS	
	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)
Group 1	5	2.1
Group 2	15	6.3
Group 3	23	9.6
Group 4	36	15.1
Group 5	56	23.4
Group 6	47	19.6
Group 7	20	8.4
Group 8	5	2.1
Group 9	32	13.4
	239	100

Median 5.223
Variance 4.194

Stratification of Australians into social classes, has not been satisfactory (Hart, 1974). To quote Lowe et al, in "Epidemiology: A Guide to Teaching Methods," 1973 p. 149:

> The concept of socio-economic status, is without a clear definition but is often derived from a combination of occupation, income, education and living standards, and is a difficult variable to give any quantitative value to.

To provide a point of reference, the following table is presented which attempts to distribute Australians by social class.

TABLE 19

Broom's classification of social status in Australia (Hart, 1974, p. 84)

CLASS	PER CENT
I - Professional	12.4
II - Managerial	20.5
III - Clerical	13.1
IV - Craftsmen	22.5
V - Semi-skilled	18.9
VI - Unskilled	12.6

Singh (1966), Ekstrom (1970), Hart (1974), amongst others have suggested an inverse relationship between social status and venereal infection. However, the self-selection bias that is inherent in studying clinic populations has to be borne in mind in that lower socio-economic groups are more likely to visit government hospitals and clinics and thus are documented better than those who tend to be treated privately.

In South Australia experience shows that as there are no recognised specialists in venereology, the better educated in fact come to a specialist clinic both for appropriate treatment and anonymity from their family physicians. Many private practitioners also refer their cases to the VDCC, and there is compulsory notification by all private laboratories. Thus the two factors may counterbalance each other, at least at the VDCC, Adelaide .

9.2 Education

The level of education of the patients in the NSU sample is described in the following table. The main criterion used was the certificate, diploma or degree obtained.

TABLE 20

Educational status of NSU patients

CATEGORY LABEL	NO. OF PATIENTS	
	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)
1. Primary or less	9	3.8
2. Secondary but not completed Leaving certificate	53	22.1
3. Completed Leaving	49	20.5
4. Trade level qualification	49	20.5
5. Technical level qualification	19	7.9
6. Matric	11	4.6
7. College of Advanced Education	14	5.9
8. University student	26	10.9
9. University graduate	9	3.8

The influence of education on susceptibility to venereal disease (mainly gonorrhoea and syphilis) has been studied, and some workers have detected an inverse relationship between these two parameters, as reviewed in 'Sexual Maladjustment and Disease' (Hart, 1977 pp.130,131).

In the present study on NSU, the author certainly did not find that an increase in education level was related to lower infection rate . For a given community, the proportion of its educated members as a percentage of the whole, needs to be determined before valid comparisons can be made. This information applicable to males only, residing in South Australia during 1976, was sought from the Bureau of Census and Statistics (Australian Bureau of Statistics, 1978).

Based on this information, Table 21 has been compiled by the author.

TABLE 21

Level of Education: NSU patients compared with males over the age of 15 in South Australia in 1976

	NSU PATIENTS		MALES IN S.A.	
QUALIFICATIONS, LEVEL OF SCHOOLING	NO.	%	NO.	%
Secondary or less, including leaving certificate	111	46.5	274,540	60.9
Matriculation	11	4.6	(not separately recorded; included in above)	
Trade level	49	20.5	80,333	17.8
Technician level	19	7.9	17,322	3.9
Tertiary level (CAE, University; students and graduates)	49	20.5	31,319	6.9
Not stated, not applicable	0	0	47,176	10.5
Total Population	239	100	450,690	100

$X^2 = 97.82$ df = 3

$P < 0.001$

From Table 21, the following significant observation can be made, There is a greater proportion of tertiary level students (20.6 per cent) in the NSU group than one would normally expect in the male community at large in South Australia (6.9 per cent). Even at the technician-trade level, there is a greater proportion in the NSU group (28 per cent) than the community (22 per cent). It is therefore fair to conclude that the NSU group in general was found to be better educated than average.

9.3 Sex and VD education

Almost every authority in Australia agrees that there are deficiences in this area at present as well as in the immediate past. But it is interesting to see how the subject is viewed from the patient's point of view. The patients' answers to questions 9 and 10 are documented in the following tables. The questions do not refer to formal education only and the codes are so devised that they allow the patient to select his own priority from all possible alternatives (1-9) as to the most dominant one operating in his case (Appendix 6). For the sake of presentation these answers are then recoded into five broad categories as defined in the tables.

TABLE 22

Sex education of the NSU patients

CATEGORY LABEL	NO. OF PATIENTS	
	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)
1. No information acquired formal or informal	74	31.0
2. Parental source predominantly	43	18.0
3. School teacher predominantly	34	14.2
4. Peers predominantly	32	13.4
5. Media predominantly	56	23.4
	239	100

TABLE 23

VD education of the NSU patients

CATEGORY LABEL	NO. OF PATIENTS	
	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)
1. No information, formal or informal	90	37.6
2. Parental source predominantly	4	1.7
3. School teacher predominantly	11	4.6
4. Peers predominantly	53	22.2
5. Media predominantly	81	33.9
	239	100

One of the methods of control which can be applied to the venereal diseases in general is health education. Continuous reference is made to this fact in the literature and even government policy in some cases emphasises the need for developing the health education aspect of preventive medicine. This emphasis, however, is not reflected in the actual action taken.

About half of this sample had not experienced any formal education on sex and only 14.2% (probably the more recently schooled) had experienced formal classes on sex education while still in high school. At present, programmes on sex education form a part of the school curricula in most schools. Significantly 36.8% were influenced most by their peer group contact and media instruction (adult lectures, films, and sex manuals either informally or through organisations like the Army, Community clubs etc). The content of this latter source is not always open to review and the delivery of the information may not be effective, owing to lack of trained personnel.

Parents (usually father or mother but not both) who are likely to have a strong emotional impact on their children at a formative stage, did not figure prominently for sex education (18%) but were virtually non-existent as

a source of VD information (1.7%). This has been examined elsewhere with even less participation by parents being found (Bird, 1965).

Peers and the mass media exert an undue influence on information about VD available to most people as formal education is sadly lacking. In spite of a wide range of alternatives available, (Appendix 6) 37.7% of this NSU sample, reasonably well educated people, chose to say that they had acquired no information on venereal disease at all.

9.4 General discussion on the social status of the NSU patients

Conversion of the broad concept of the socio-economic status into valid quantifiable parameters is beset with many difficulties. In view of these difficulties it is more appropriate to confine investigation to the simpler, individual components of this characteristic and even then for some individuals these criteria will give contradictory information.

The individual components described in this study are education, occupation, and parental background (ethnic origin). These are displayed in Tables 20 and 18, with the ethnic origin shown previously in Table 11. The findings of other workers are also compared but as these relate mainly to gonorrhoea and syphilis, meaningful

comparison cannot be made. Some papers however are relevant. The first, by Jacobs and Kraus (1975), demonstrates a racial difference in the incidence of non-gonococcal urethritis in a major American centre; this difference, that white men suffered from NSU more frequently than negroes, is interpreted by the authors as indicating a socio-economic factor rather than ethnic, based on the variables of income and education. In the two VD clinics with which the CDC, Atlanta, Georgia, is associated, NSU represents 30 per cent of urethritis in non-whites and up to 70 per cent among white men (Volk, 1974).

Rosedale (1959) in an analysis of female consorts of NSU patients in London, reported that of 150 women, 140 were white and 10 coloured, but no attempt at recording any socio-economic parameters was made. Csonka (1965) in a review of the British literature to that time, makes a generalisation that NSU had an apparent predilection for higher socio-economic groups when compared with gonorrhoea. There is, however, very little work on this subject in NSU, parallel to that available on gonorrhoea and syphilis.

To supplement the data on the ethnic background of this group of NSU patients, the patient was asked to fill in the country of birth of his father and mother as well. This exercise revealed the extent of the first

generation factor, that is, how many of the Australian born patients came from homes where the parents were migrants and therefore brought their children up accordingly.

TABLE 24

Country of birth of patient's parents

NATIONAL CATEGORY LABEL	FATHER NO.	FATHER %	MOTHER NO.	MOTHER %
1. Australasia	131	54.8	132	55.2
2. U.K.	48	20.1	43	18.0
3. Mediterranean Europe	25	10.5	27	11.3
4. Other Europe	29	12.1	29	12.1
5. Asia	4	1.7	5	2.1
6. America, other	2	0.8	3	1.3
	239	100	239	100

9.4.1 Health education

Despite the growing demands for health education, the information provided by this study sample revealed deficiencies in the area of sex and VD education. The United States government has intensified activity in this area since 1963 culminating in the formation of a Behavioural Sciences Section as an integral part of the U.S. Public Health Service (Forer, 1965). The attitudes of young people to venereal diseases are presented in

Schofield's book 'The Sexual Behaviour of Young Adults' (1973, pp.77-80). Rowntree (1966) investigated public education in venereal diseases in Sheffield, looking at both policy and programmes and found a lot to be desired. Unfavourable family and social backgrounds were noted by Ekstrom, 1970, in a sociological study of female teenagers with gonorrhoea. Elias and Gebhart (1969) demonstrated difference in sex knowledge according to social class. For example, in the lower socio-economic groups 96 per cent of adolescent boys knew about intercourse, but only 4 per cent knew about fertilization. Seale (1966) found that fear of VD was not a significant factor influencing sex behaviour.

Not all of the workers in these enquiries support one another, none the less a scientific body of knowledge in the important area of sex education, attitudes and behaviour of patients with sexually transmitted diseases (and non infected attenders), is gradually being established (Rowntree, 1975).

Another aspect of this study is that it reveals that the mass media have considerable potential in reaching wide sections of the community who cannot be contacted formally through schools because they have left early or because there were no programmes while they completed their

education. Holmes and her co-workers, 1968, found that only 23% of a group of patients at a VD clinic had any knowledge about VD, and the outstanding characteristic of this subgroup was the early age at which they left school. They concluded (p. 390):

> any education about venereal disease which is to prove useful to the group most at risk should be given before the age of 15 years.

Newspapers, magazines, radio, films and television all have a part to play in health education, but the author would like to emphasise that while professional health educators are essential there must be <u>active</u> partnership of the medical profession to ensure accuracy, balance and credibility. There are some fine examples of this partnership in the form of two films; (a) "20th Century Focus - VD" (B.B.C., 1973) and (b) "Half a Million Teenagers" Los Angeles Public Health Department (Churchill Films, 1969).

Evaluation of health education on STDs is difficult (Dalzell-Ward, 1973). Exposure to the message alone, irrespective of medium is not an index of success and the resulting attitude and behaviour change must be evaluated by others, based on consumer feedback. The index of success most often demanded is that of a reduction in disease rates.

As these programmes are directed at controlling the spread of the statutory (traditional) venereal diseases, one must put the matter in perspective regarding NSU. The generally high level of education found in this NSU sample was not related to the patients' knowledge or awareness of NSU (Question 21 of Appendix 5) and this crosstabulation is shown in Table 25. Patient answers 1 and 2 which constitute misconceptions about NSU were widespread irrespective of the level of education. Therefore health education of NSU patients starts at the clinical contact level, and is directed towards management of the anxiety and ignorance about the differing nature of NSU. This can be a useful therapeutic tool as shown later.

TABLE 25

Relationship of level of education with awareness of knowledge about NSU

LEVEL OF EDUCATION	NO. OF PATIENTS	KNOWLEDGE ABOUT NSU		
		No. with Misconceptions	No. without Misconceptions	Missing Values
1. Secondary or less	111	85	22	4
2. Trade/technician level	68	57	10	1
3. Tertiary level	60	46	14	0
	239	239		

X^2 = 1.52, df = 2, (not significant at 0.05 level)

Knowledge about NSU is not associated with level of education.

10. PERSONALITY STUDIES OF THE NSU PATIENTS

10.1 Introduction

Nearly three decades ago, Dr. Caroline Bedell Thomas, of Johns Hopkins University, set out on an intriguing search to identify personal characteristics, both physical and emotional, that might be linked to the development of various diseases later in life. Between 1946 and 1976 various investigations have begun to assemble a comprehensive picture of the interplay of mind and body in the susceptibility to heart disease, high blood pressure, cancer and mental illness. As can be expected from such research, not all the findings are consistent and not all the researchers are in agreement with each other, but the common observation is that individuals with certain personality types are predisposed to illness.

Unlike the disease states mentioned above, venereal diseases are communicable infections transmitted by sexual intercourse. This unique fact highlights the need to consider VD as a behavioural problem, the control of which requires due consideration of the fundamental personality of the individual (Burton, 1969). But since

human sexuality and the various factors which influence it in modern society, is a complex subject, a simple study of personality is not going to give all the answers. Moreover the psychological aspects of venereal diseases are not limited to determining the types of individuals which are particularly susceptible to infection, but also the reactions of individuals to venereal exposure and their response to treatment. This chapter is principally concerned with personality studies of venereal disease patients in general and the NSU sample of 239 in particular.

10.2 The Eysenck Personality Inventory

The Eysenck Personality Inventory (EPI) is a development of the Maudsley Personality Inventory (MPI) (Knapp, 1962). Like the parent instrument, it sets out to measure two major dimensions of personality, extroversion (extraversion) and neuroticism . It is essentially an improvement on the MPI while retaining the reliability of the latter. The advantages of the EPI over the MPI are described in the manual (Eysenck 1964), but briefly they are as follows:

1. The EPI items have been carefully reworded so as to make them understandable even by subjects of below average intelligence and/or education (important in a VD clinic).

2. The EPI contains a Lie Scale which may be used to eliminate subjects showing "desirability response set" that is, faking answers based on desirable social values.
3. The retest reliability of the EPI is somewhat higher than that of the MPI; even after periods of several months it is still in excess of 0.85.
4. Direct evidence is available of the validity of the EPI as a descriptive instrument of the behaviour manifestations of two major dimensions of personality - extroversion and neuroticism (according to the manual)

10.2.1 General background to personality inventories

Psychologists have always recognised the importance of describing the major patterns of behaviour in man. Such a complicated creature does not easily fit into a regular pattern and the search for an ideal personality inventory is still being pursued by psychologists.

To define personality is not an easy task. The author found the following description of the clinical concept of personality as defined by Professor Morgan of Johns Hopkins University, as good as any: (Morgan 1956, p.213).

> a knowledge of the development of the individual, his motives and emotions, and his abilities to learn, think and perceive is important in comprehending how a person gets to be the kind of individual he is. It is also possible and practicable to consider the individual as a whole and to describe the interplay between him and other individuals with whom he associates in his daily affairs (sic). The field of psychology that attempts to do this is called the study of personality.

There are two fundamental approaches to the study of human personality.

(a) The inferential approach, by questionnaire and (b) the intuitive approach, by clinical assessment. There can of course be a combination of both, a subjective and objective approach.

The description of personality types in terms of general and basic traits (as in this study) is best suited to the questionnaire approach. This has the further advantage of being open to objective assessment and even computerization (Appendix 4). But the individual-oriented clinical approach is also necessary for this study in describing the management of the patient, shown in the next section.

Personality inventories for use in the questionnaire approach, have been developed by two general techniques; empiricism and factor analysis (Eysenck and Eysenck, 1964). The early inventories were developed with

empirical methods, that is, a large number of plausible statements about feelings and behaviour were given to subjects with known personality traits, and personality scales were then developed on the basis of the observed item responses. The Minnesota Multiphasic Personality Inventory, the MMPI (Hathaway and McKinley, 1943) is an example of this type.

An alternative and more recent approach is to factor analyse a large number of statements describing an individual's personality, and to determine the statements that relate to a "primary" trait. The 16 Personality Factors Questionnaire by Cattell is an example of this type, as is the MPI, and its successor, the EPI (Eysenck and Eysenck, 1964). Provided that the errors inherent in self-reported questionnaires (particularly the problem of situational variation) are minimised, no more satisfactory method has yet been sufficiently validated for personality assessment within a large population study (McMichael, 1972).

10.2.2 The choice of the EPI

The reasons for the selective choice of the EPI in this study have already been discussed in part two on methodology. But is is relevant to mention that two other personality inventories, the MMPI and the Cornell Medical Index (Brodman et al, 1949), which could also have

been used, were considered to be too extensive and symptom-oriented for "normal" young populations, besides posing logistical problems.

The EPI form A (Appendix 3) comprises 57 questions directed at measuring two basic dimensions of personality: extroversion - introversion (the E Scale) and neuroticism(the N Scale). The authors, Eysenck and Eysenck, state in their manual (1964, p.7):

> while not wishing to deny the existence and importance of factors additional to E and N, we believe that these two factors contribute more to a description of personality than any other set of two factors outside the cognitive field.

Evidence is also presented in the manual to show that the two factors are uncorrelated and independent.

10.2.3 Normal and abnormal standardization of the EPI

Table 4 of the manual shows the makeup of the normal standardization group, constituting a sample of 2,000 British people. Twenty-two different groups by education and occupation and both sexes are represented. The detailed examination of the data does not suggest any gross departure from good sampling practices. Table 5 shows the mean values for groups suffering from psychiatric disturbance, ranging from various forms of neuroses to psychoses.

A psychologist employed in a teaching psychiatric department was approached by the author to work out the scoring scale using Table 4 and Table 5 mentioned previously. His conclusions were:

(a) when form A is used, as in this study, a Lie Score of 6 or more shows that "faking good" is likely to have occured and hence these forms should be regarded with considerable scepticism (these cases were eliminated on the basis of this Lie Score in the author's study)

(b) most extroverted groups mean scores

$$E_A \geqslant 13.4$$

most introverted groups mean scores

$$E_A \leqslant 11.1$$

(c) most neurotic groups mean scores

$$N_A \geqslant 10.5$$

(d) the overall mean values of normal groups are (with standard deviation (SD) in brackets)

$$E_A = 12.07 \ (4.37)$$

$$N_A = 9.07 \ (4.78)$$

While extensive standardization studies have not been carried out separately in Australia, such studies as there are on Australian populations have always used the normative control data supplied in Table 4, because of the anticipated similarity of response between British

and Australian subjects based on the common cultural derivation. (Davies et al, 1968; Hetzel et al, 1973; McMichael, 1972; Hart, 1974). Moreover the results of these studies support this proposition as EPI scores between comparative British and Australian normal subjects appear to differ only slightly, as for example university students (McMichael, 1972). McMichael found the mean EPI scores of Monash University students to be: E = 14.2 (3.5), N = 10.4 (4.4) in 1969 using 2031 inventories, while 347 British undergraduates scored: E = 13.4 (4.2), N = 11.0 (4.8). Similarly, Davies et al (1968) in a comparison of medical students found:

TABLE 26

Australian and British medical students:
Mean EPI scores (Davies et al, 1968)

Medical students	Number	Mean age (SD)	EPI scores $\bar{x}$ E (SD)	EPI scores $\bar{x}$ N (SD)
Australian	2363	20.1 (3.4)	13.1 (3.9)	8.1 (4.4)
British	13*	20.9 (4.4)	13.6 (3.7)	9.1 (3.6)

No significant difference on Students' t test.

* these are the figures used by Davies, taken from Eysenck's normative data

10.3 Previous studies of venereal disease patients using the EPI

These studies have been carried out in English VD clinics mainly by Wells (1969, 1970a, and 1972) and on VD sufferers and controls among Australian troops in Vietnam by Hart (1973a, 1973b, and 1974). Before discussing briefly their findings, it is relevant to mention that Eysenck published a paper on personality and sexual behaviour (1972), in which he described the relationship of extroversion and neuroticism to sexual behaviour, and raised the following hypotheses:

> extroversion constitutes a major dimension of personality related to anti-social behaviour .... and (also diverse) sexual behaviour ....
>
> extroverts will have intercourse earlier than introverts; they will have intercourse more frequently and with different persons ....
>
> high neuroticism scorers are characterised by a labile autonomic system and are thus susceptible to fear and anxiety to a degree which may make them less likely to indulge in sexual behaviour, particularly outside the legal bounds of matrimony....

and

> high neuroticism scorers .... are characterized by low satisfaction and high guilt feelings .... (particularly) the worry about sexual activities ....

In his 1969 study, Wells administered the EPI to 151 successive patients of both sexes when they attended the Black Street VD Clinic in Glasgow. The results showed distinctive differences between the scores for men and women, for the different sources of contact and for those who defaulted and those who completed their treatment. This is summarized in Table 27:

TABLE 27

EPI scores of VD clinic attenders (Wells, 1969)

	MALES (50)		FEMALES (59)	
CATEGORY	E Mean(SD)	N Mean(SD)	E Mean(SD)	N Mean(SD)
All subjects	13.5(3.7)	11.8(4.1)	10.8(4.1)	12.5(4.8)
Source				
casual	14.4(3.3)	12.3(3.4)	11.5(4.2)	13.8(3.6)
friend	11.8(4.2)	10.8(4.7)	11.2(3.2)	11.4(4.5)
marital	11.6(2.3)	11.0(3.7)	9.5(4.7)	12.4(5.9)
Treatment				
completed	12.4(4.4)	9.7(4.7)	10.4(3.9)	12.7(4.1)
defaulted	12.8(3.5)	11.1(4.3)	11.5(3.6)	12.8(5.6)

In 1970, Wells amplified these studies by investigating 326 successive patients attending the VD Clinic at Glasgow, but also included the occurrence of a factor (dimension of personality) identified as Psychoticism (Eysenck's PEN inventory, 1969). From the findings of both these studies he concluded as follows:

(i) Male patients differ from the normal population only in that they are significantly more extroverted, but female patients are more introverted and significantly more neurotic.

(ii) Women infected by casual consorts score more highly on extroversion than innocent wives but the latter differ from the normal population in scoring higher in neuroticism and psychoticism.

(iii) In both sexes the group nearest to the normal population, from which they do not differ significantly, are those infected by friends.

In collaboration with Schofield, Wells (1970b), attempted to study the social aspects such as the meeting places of contacts and locations of infection (sexual intercourse) and used these findings in health education by concentrating on "target" sites for anti-VD propaganda.

In 1971, Wells and Schofield studied homosexual men using the EPI. Homosexual male patients only differed from heterosexual males in that they scored highly for neuroticism (N = 13.4 (5.6)), more particularly those classified as "passive" (N = 13.9 (5.6)).

Gavin Hart (1974) studied the trends in extroversion and neuroticism among two groups of Australian men stationed in Vietnam in 1972. The first group consisted of VD clinic attenders and the second a control series randomly sampled from soldiers of similar rank in the area under study. The study samples comtained both volunteers (regular soldiers) and conscripts (national servicemen). The army selected conscripts randomly by date of birth so that the conscript controls give some point of reference to the average Australian male of this age group (20 - 22 years). The volunteers by contrast represent a selected occupational group. Only fifty-two per cent of the clinic patients were actually found to be suffering from some form of VD, of which forty-one per cent were infected with gonorrhoea and thirty-five per cent with non-gonococcal urethritis. In addition to the parameter of the EPI scores, a detailed sociological questionnaire including incidence of intercourse with prostitutes in Vietnam is presented in his unpublished thesis at the University of Adelaide (1974).

The EPI scores for the group with VD from the clinic series, is presented in a summarized form in Table 28.

TABLE 28

EPI scores of clinic patients with VD

(Hart, 1974)

CATEGORY	EPI scores				No. of patients
	E		N		
	Mean	S.E.	Mean	S.E.	
Married	13.84	0.57	11.33	0.71	43
Single	13.59	0.28	10.04	0.37	167
Conscript	13.36	0.36	9.96	0.49	74
Volunteer	13.80	0.33	10.48	0.43	136
Total	13.64	0.24	10.30	0.33	210

Like Wells, Hart found an association of extroversion with venereal disease, and he relates this to the underlying association of extroversion with those aspects of anti-social behaviour which also lead to venereal infection. It would be misleading to try to summarize the extensive analyses that Hart presents in his thesis in relation to the social determinants of venereal disease, but the essential points he makes regarding the EPI findings

are summarized as (in addition to the previously mentioned association of VD with extroversion):

(1) individuals whose personality scores fell in the high extroversion high neuroticism quadrant contributed disproportionately to the morbidity from venereal disease. Venereal disease was more frequent among volunteer soldiers, those under 21, single men, those with less than three years secondary education, those with high alcohol intake, and those with greater frequency of army charges;

(2) neuroticism was a more prominent feature of soldiers who indulged in sexual practices of limited social acceptibility such as intercourse in the open or frequent masturbation;

(3) there was a positive association between extroversion and alcohol intake, civil arrests and military charges, and intercourse with prostitutes in Vietnam, which led him to conclude that :

> the relationship of certain sociological parameters to venereal infection may be of a secondary nature, in that all are primarily related to the personality of the individual
>
> and :
>
> this further highlights the need to consider venereal disease as a behavioural problem, the control of which requires focus on the fundamental personality of the individual.

10.4 Present study of NSU patients

The results of the EPI scores obtained from the NSU patients in this study are presented and analysed in this section.

The discussion centres mainly on the findings in relation to the objectives of the research, that is, an examination of the first hypothesis. Even though these EPI scores constitute an original study of NSU patients exclusively, it is interesting to compare the trends and mean values obtained by the author with those obtained by the previous studies described in section 10.3 conducted by Wells and Hart, and also the abnormal standardization group shown in Table 5 of the EPI manual (Eysenck, 1964). This is graphically presented in Figure 16, page 193.

10.4.1 Individual scores, frequency distribution of groups, and overall mean values

The individual scores of the patients are best presented in a scattergram, as the two dimensions of personality are described as orthogonal vectors by Eysenck as shown in his model (Fig.1. of the manual, 1969, p.6). This scattergram is shown in Appendix 10.

For meaningful interpretation of these individual scores, they are further analysed into groups showing

extroversion, introversion and neuroticism by means of frequency distribution tables based on the previously calculated standardization data. Finally, the overall mean scores are analysed in relation to the normative data supplied.

TABLE 29

Frequency distribution of Extroversion - Introversion scores (values of E) within the NSU sample

CATEGORY	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)
1. Those scoring between 11.1 and 13.4	54	22.6
2. Those scoring over 13.4	109	45.6
3. Those scoring below 11.1	76	31.8
	239	100.0

It will be seen later in Table 31, that the overall mean E scores in the NSU patients do not differ significantly from normative data, but Table 29 shows that a good proportion (46%) were found to be extroverted. This finding is discussed in section 10.4.2 in relation to sexual behaviour.

TABLE 30

Frequency distribution of Neuroticism scores (values of N) within the NSU sample

	CATEGORY	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)
1.	Those scoring less than 10.5	98	41.0
2.	Those scoring between 10.5 and 14	56	23.4
3.	Those scoring over 14	85	35.6
		239	100.0

Greater significance can be attached to the N scores from these patients (Table 31). The tendency to neuroticism is quite strong as 59 per cent show this trait varying from $10.5 < N < 14$ (23.4%) to $N > 14$ (35.6%).

TABLE 31

Overall mean scores in relation to control data

GROUP	Number	Age Mean(SD)	EPI scores E scale Mean(SD)	EPI scores N scale Mean(SD)
Normals	2000	27.45(12.00)	12.07(4.37)	9.07(4.78)
NSU pts.	239	25.90(8.13)	12.51(4.99)	11.81(5.65)
Significance (0.05 level)			$t = 1.30$ Not significant	$t = 7.20$ $P < 0.001$

10.4.2 The dimensions of Extroversion - Introversion and sexual behaviour

The tendency to extroversion that is generally seen in VD clinic attenders (Wells, 1969; Hart, 1974) can also be seen in this group (46%). As mentioned before a number of hypotheses have been put forward to explain this phenomenon, as for instance, extroverts are likely to have a greater number of different partners (Eysenck, 1972). Schofield, describing the psychological background to the sexually transmitted diseases states (1975, pp. 45,46):

> a number of 'erring' husbands are extroverted and commit adultery, following domestic crises .... that only an amount of extroversion is needed in a man to enable him to pick up an unknown woman and persuade her to have coitus on their first, and possibly only, meeting.

Introversion, on the other hand, has been described in relation to sexual behaviour as follows (Hart, 1977, p.142):

> introversion is a specific feature of those reluctant to engage in overt sexuality. Introverts often experience their first intercourse in their twenties and tend to avoid promiscuous sexual behaviour even in stressful situations.

To explore these hypotheses on extroversion and sexual behaviour with particular reference to this study, crosstabulations of the E scores with the variables of number of sexual partners and frequency of intercourse were carried out.

TABLE 32

Relationship of Extroversion - Introversion to Number of Sexual Partners

No. of sexual partners in six months.	No. of patients	Personality (E Scale)		
		Extroverts	Normals	Introverts
		($\geq$13.4)	(11.1 to 13.4)	($\leq$11.1)
Regular partner only	66	22	20	24
Regular partner mainly (recent casual episode)	56	24	14	18
Casual partners less than 3	74	40	11	24
Casual partners more than 3	39	23	8	8
Missing values	3	0	1	2
	239	109	54	76

X^2 = 9.30 df = 6
(not significant at 0.05 level)

In this study the association between extroversion and the number of sexual partners is not significant; but there is an interesting difference within the NSU sample between extroverts and introverts regarding frequency of intercourse.

TABLE 33

Relationship of Extroversion with reported frequency of intercourse

PERSONALITY (E scale)	No. of patients	FREQ. OF I/C: twice weekly, or more		once weekly, once fortnightly or more		monthly to irreg. incl. no I/C	
		No.	%	No.	%	No.	%
Extroverts* (13.4)	109	47	(43)	50	(46)	12	(11)
Introverts* (11.1)	76	17	(23)	44	(57)	15	(20)
Normals (11.1 to 13.4)	54	22	(41)	25	(44)	7	(15)

*X^2 = 9.18 df = 2

P < 0.025 for extroverts against introverts

Extroverts report a greater frequency of intercourse when compared to Introverts but this is not much different from that reported by normals. The real significance, is that introverts are less likely to report a high frequency of intercourse (twice weekly or more), and this in fact was predicted.

10.4.3 The dimension of Neuroticism and therapeutic outcome

With regard to this trait, the hypothesis that is relevant to this study is the one that neuroticism is associated with excessive guilt, shame and worry, and refusal to accept reassurance even after adequate treatment.

In order to examine this hypothesis in relation to N scores, the recurrence rate of NSU in this cohort of 239 patients over twelve months was documented along with the presence and extent of the complication of venereoneurosis (after Hart, 1974) which will be subsequently defined by certain criteria and also illustrated by typical case histories.

1. Neuroticism and the reported recurrence rate

Owing to the lack of a known cause for NSU and the considerable variation in its severity, assessment of treatment in terms of a "cure" remains difficult. One source of this difficulty is the inability to distinguish clearly between relapse and reinfection as unlike gonorrhoea, the recent sexual intercourse may not be the sole transmitting factor of the new episode of NSU.

In order to avoid this confusion the author uses the term recurrence to define a fresh episode of NSU clearly demarcated from its precedent episode by a period free from consistent symptoms of

dysuria and discharge (Wright, 1969), and absence of sufficient polymorphs on Gram-stained smear.

TABLE 34

Clinical record of recurrence of NSU in 12 months in the study sample

NO. OF RECURRENCES	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)
No recurrence	92	38.5
One	73	30.5
Two	36	15.1
Three	17	7.1
Four	8	3.3
Five	10	4.2
More than five	3	1.3
	239	100.0

The patients in the study were observed at successive points in the twelve months following their entry into the sample pool, when they reported back to the VDCC either with a fresh problem related to NSU or for any other reason. Every effort was made to encourage the patients to cooperate in the research by reporting back to the clinic when fresh symptoms occurred.

TABLE 35

Relationship of Neuroticism to the reported number of recurrences of NSU

RECURRENCES	No. of Patients	N scale	
		Stable ($N \leqslant 10.5$)	Neurotic Traits ($N > 10.5$)
nil	92	34	58
One	73	36	37
Two	36	10	26
Three	17	8	9
Four	8	3	5
Five	10	6	4
More than Five	3	1	2
	239	98	141

$X^2 = 7.17$ df = 6

(not significant at 0.05 level)

The association between N scores and the number of recurrences was not found to be significant in this study. This statistical observation is quite consistent with the clinical observation made by the author (independently and without knowledge of the N scores) that some NSU patients suffer from frequent recurrences and yet show only slight anxiety with satisfactory resolution of symptoms after each episode, whereas another group of NSU patients may suffer from a single and second attack only, and yet show marked anxiety and persistence of symptoms even after treatment. Indeed, some "NSU" patients may show no objective evidence of urethritis, yet suffer from all the suggestive symptoms aggravated by neurotic anxiety. This is described in the next section.

2. N scores and the clinical syndrome of venereoneurosis

Anxiety is a common feature seen in patients attending venereal disease clinics (Boneff, 1971; Hart, 1974). Pedder and Goldberg (1970a), one of whom developed the General Health Questionnaire (Goldberg, 1969), administered the same to 219 consecutive new patients attending James Pringle House, the venereology clinic of the Middlesex Hospital, London. One hundred and eight of these were males and the age and social class of the

patients are presented, as well as the mean scores for groups by age, sex, class and diagnosis. The findings are that 23.6 per cent of the males were assessed to have potential psychiatric problems. This contrasted with the rate of referral for psychiatric investigation previously experienced in the same clinic, 0.3 per cent (Pedder, 1970b) and indicates that busy clinicians frequently overlook the psychological sequelae of exposure to venereal infection. This fact has also been underscored by Hart in his review of the psychological aspects of venereal disease (1977, pp. 143 - 152). Hart in 1974, also originated the term venereoneurosis to describe a more severe disturbance than simple anxiety. He found the term venereophobia (Kite and Grimble, 1963) inappropriate to describe the clinical conditions seen by him and defined the term venereoneurosis in the following way (Hart, 1974 pp. 276):

> the designation, venereoneurotic reaction, may be confined to those persons, who having been exposed to venereal disease, are preoccupied with bodily processes which they imagine indicate the onset or incomplete cure of venereal disease .... the behaviour is classically irrational, (and) reluctance to accept rational reassurance is therefore a marked feature

In his book Sexual Maladjustment and Disease (1977, p. 149) Hart describes this irrational behaviour:

> penile manipulation is important both as a marker of venereoneurosis and as a direct contribution to the production of urethral discharge .... proponents of this practice usually identify themselves when asked to produce some discharge from the penis. In contrast to the cautious manipulation of other patients, these individuals attack the organ with such vigor, squeezing the glans or wringing the whole shaft that they appear intent on its destruction.

Psychiatric diagnoses are generally made by intuitive clinical assessment and therefore hard to define, but behaviour characteristics can be a good guide to aiding this process. The psycho-pathology of neuroses is outside the scope of this thesis and psychiatrists themselves are divided on this issue. In his book Guide to Psychiatry, Sim, (1968) states (p.386):

> the basis for neurotic reaction, whatever form it may take, is laid down in early childhood and that recent events which trigger off the reaction have attacked a peculiarly vulnerable <u>personality</u> ..... there have been many attempts at aetiology (sic) .... it would be better to discuss the group as a variety of reactions and deal with each in turn.

There is a certain amount of obsessive-compulsive behaviour attached to venereoneurosis. Although hypochondriasis is the main feature, where the obsessive-compulsive element is pronounced, the prognosis is bad from the psychiatric point of view, whereas the prognosis for affective

disturbance seen in the majority of patients, is good (Kite et al, 1963; Pedder et al, 1970b).

NSU is a disease that is not completely defined like gonorrhoea, in the aspects of a known cause, definitive treatment and epidemiological follow-up of sex partner. It is not surprising that this causes uncertainty and added anxiety. In the author's experience at the VDCC, some degree of anxiety is quite normal in NSU patients and this often resolves by proper management and this point will be amplified in part four. However, this common anxiety reaction seen in most NSU patients is different from the psychosomatic disturbance seen in some NSU patients, which, in this study, has been termed venereoneurosis after Hart. This group is identified clinically and presents with varying degrees of severity. Thirty nine patients could be classified in this group. Three case histories will be cited as typical examples of this syndrome to clarify the diagnosis.

Case illustration one : J.C. was a university student, aged 23, Australian born and single. He had no regular sexual partner and his sexual experience in the previous six months was related to infrequent intercourse with two partners, also students, and there was no history of homosexual activity. His main sexual outlet was masturbation using pictures of nude females and he experienced guilt over this: "I am ashamed of what I have done to my Playboy magazines, doctor."
He could not define his symptoms and their precise duration, but felt a peculiar sensation "inside" and complained of a sticky meatus "every morning for a long time - some months."
By his own admission, he had had only one diagnosed attack of NSU at the VDCC, in spite of frequent check-ups at the University Health Service, and he felt convinced that the medical attendants there "were wrong because they have no experience with this condition" (even though the laboratory tests were done at the same laboratory as the clinic).
On that occasion the diagnostic criteria for NSU both on physical examination and pathological tests (including a morning urine sample) were not fulfilled, but he was given a week's course of tetracycline 500 mg, two tablets four times a day for seven days, but when he insisted on more tablets and x-rays this psychological complication became apparent. He stated that he had had no intercourse for at least six weeks for fear of developing NSU and was getting

depressed because of the implications it held for his future marital life and even his capacity for fathering children.

Case illustration two : H.G. was an automobile mechanic, aged 28, single, and had been in Australia for twelve years, having immigrated from Poland. He had had two attacks of NSU documented at the VDCC in February, 1976 and July, 1976, and was seen again with the present episode in August, 1976. No objective criteria for the presence of NSU were found and the symptomatology was vague. He had been trained as an apprentice in Australia, but did his schooling in Poland and had a limited command of English. He had been to numerous other doctors, including a urologist, but no suggestion of underlying psychiatric disturbance was made. He had been treated with various antibiotics including at one stage, ten injections of penicillin given on alternate days (useless in NSU). He had marked hypochondriasis, complaining also of headache and exaggerating the normal muscular strain his work involved. He drank heavily and refused to link this with dysuria. He demanded a "cure" and further antibiotics.

Patients who are migrants hailing from non-English speaking countries, can, in these circumstances, not be properly understood and may constitute a difficult problem in management. Moreover, their limited English

may make psychological exploration of the underlying nature of their particular problem difficult. Even after allowing for these facts, there is no doubt that this patient was suffering from a neurotic reaction.

Case illustration three : J.J. was a married man, aged 28, and a sales manager of a large and successful firm. He had travelled interstate on a business conference, and claimed that during the celebrations he got inebriated and in an unpremeditated encounter with a casual female partner, aquired his "woes." When he first came to see the author in June 1976, he did have a thin discharge and signs of NSU, but his main preoccupation seemed to be the prospect of having infected his wife on his return. Accordingly, his wife was asked to come to the clinic, but as the patient wished to keep his extra-marital episode from her, he decided not to ask her to come in, no doubt after a good deal of anguish. She was then treated epidemiologically with tetracyclines through her own local doctor.

At this stage the patient's emotional state was understandable, but his symptoms persisted for about three weeks without objective signs even after the addition of trimethoprim-sulphamethoxazole. What confirmed the neurotic state of mind, however, was his subsequent visits in August 1976, with vague symptoms of backache and testicular aches

and no objective signs. Meanwhile, he had consulted a urologist privately, had urethroscopy, prostatic massage and I.V.P. performed. He constantly checked and squeezed his penis and his marital relations had suffered as he dreaded "the sharpness inside after intercourse." He was most regretful of his "moral lapse" and had told his wife about it several times. This marriage would not have survived without the joint counselling of the couple by the author supplemented by the cooperation of a sympathetic gynecologist.

In summary, the neurosis is clinically identified as an over-reaction to the symptoms of NSU. Such persons are preoccupied with urethrorrhoea and any urethral secretion, even a minute quantity of clear serous fluid seen physiologically (especially in the morning) is considered by the patient as a fresh attack. The other bodily pre-occupation is the vague often "painful" sensations in the genitalia, the penis and the testes, and as previously mentioned, squeezing the penis to look for discharge is a common obsession.

Not surprisingly, the EPI scores for this group which had been predetermined, showed a measure of difference which is significant; crosstabulation of occupation and level of education with venereoneurosis did not show a significant measure of association.

TABLE 36

Mean EPI scores of the group with venereoneurosis.

	E scale			N scale		
No. of patients	Mean	(SD)	(SE)	Mean	(SD)	(SE)
39	9.28	(5.33)	(0.85)	14.95	(5.53)	(0.89)
Significance	$t = 3.26$ ($P < 0.05$)			$t = 6.56$ ($P < 0.05$)		

When compared with the control population, this group is found to be significantly more introverted and neurotic. Appendix 11 tabulates the individual scores for this group.

An introverted patient who develops a neurotic reaction to NSU is a concept which many venereologists will find quite easy to accept. Oriel (1978), a world authority on NSU, states that such patients literally spend years in clinic attendance, and Siboulet from France (1960) stated that more than half of his patients with NSU needed some form of psychotherapy and he thought the tortuous course of the urethritis was responsible for this.

The author, who has had previous experience in the management of psychiatric illness, had to refer two of the patients from the thirty nine in this group to psychiatrists for treatment of severe depression and suicide risk. The remaining thirty seven were managed with supportive psychotherapy. Antibiotics were avoided as far as possible and urinary alkalinzers (potassium citrate) encouraged when "pseudo-NSU" without objective signs was complained of. These patients demand treatment and some medication even placebo becomes necessary, and it is critical to the doctor-patient relationship which is the only hope of resolving this complication. In the section on recommendations (part four) the technique of utilizing the doctor-patient relationship is explained.

3. EPI scores and the variable of age

Eysenck reported the trend for E and N scores to decline with advancing age (1964, p. 18):

> the reasons for this are speculative, but for comparative purposes, these trends should be borne in mind by research workers

Hart (1974) found decreased extroversion and neuroticism with advancing age whereas Wells (1970) reported that in his study extroversion declined with age.

The findings of this study are shown in Tables 37 and 38.

TABLE 37

Relationship of Extroversion to age of NSU patients

AGE GROUPS	No of Patients	PERSONALITY (E scale) Extroverts ($\geq$ 13.4)	Normals (11.1 to 13.4)	Introverts ($\leq$ 11.1)
10-19	39	25	7	7
20-29	94	40	21	33
30-39	54	29	12	13
40-49	47	13	14	20
50 and over*	5	2	0	3
	239			

* data too small on its own for calculation, so added together.

$X^2 = 14.12$ df = 6

$P < 0.05$

These findings are consistent with the reported trend as significantly more extroverts in the younger age groups and more introverts in the older age groups are observed.

TABLE 38

Relationship of Neuroticism to age of NSU patients

AGE GROUPS	No. of Patients	PERSONALITY (N scale) Stable ($N \geq 10.5$)	Neurotic ($N > 10.5$)
10-19	39	18	21
20-29	94	38	56
30-39	54	24	30
40-49	47	18	29
50 and over	5	0	5
	239		

$X^2 = 4.32$ df = 4
(not significant at 0.05 level)

The association of age with the N scale is not found to be significant. This chould be attributed to the low number of older people in this sample (only five patients are 50 years and over), as attenders at VD clinics generally comprise the younger age groups.

Figure 16, is a graphical illustration of the author's findings in NSU patients with those of previous studies on VD clinic attenders mentioned in this chapter. It also depicts the mean values of the NSU patients suffering from venereoneurosis compared with patients suffering from psychiatric illness, as described by Eysenck. As the study sample consists of NSU patients only, useful cross-comparisons can be made with other groups.

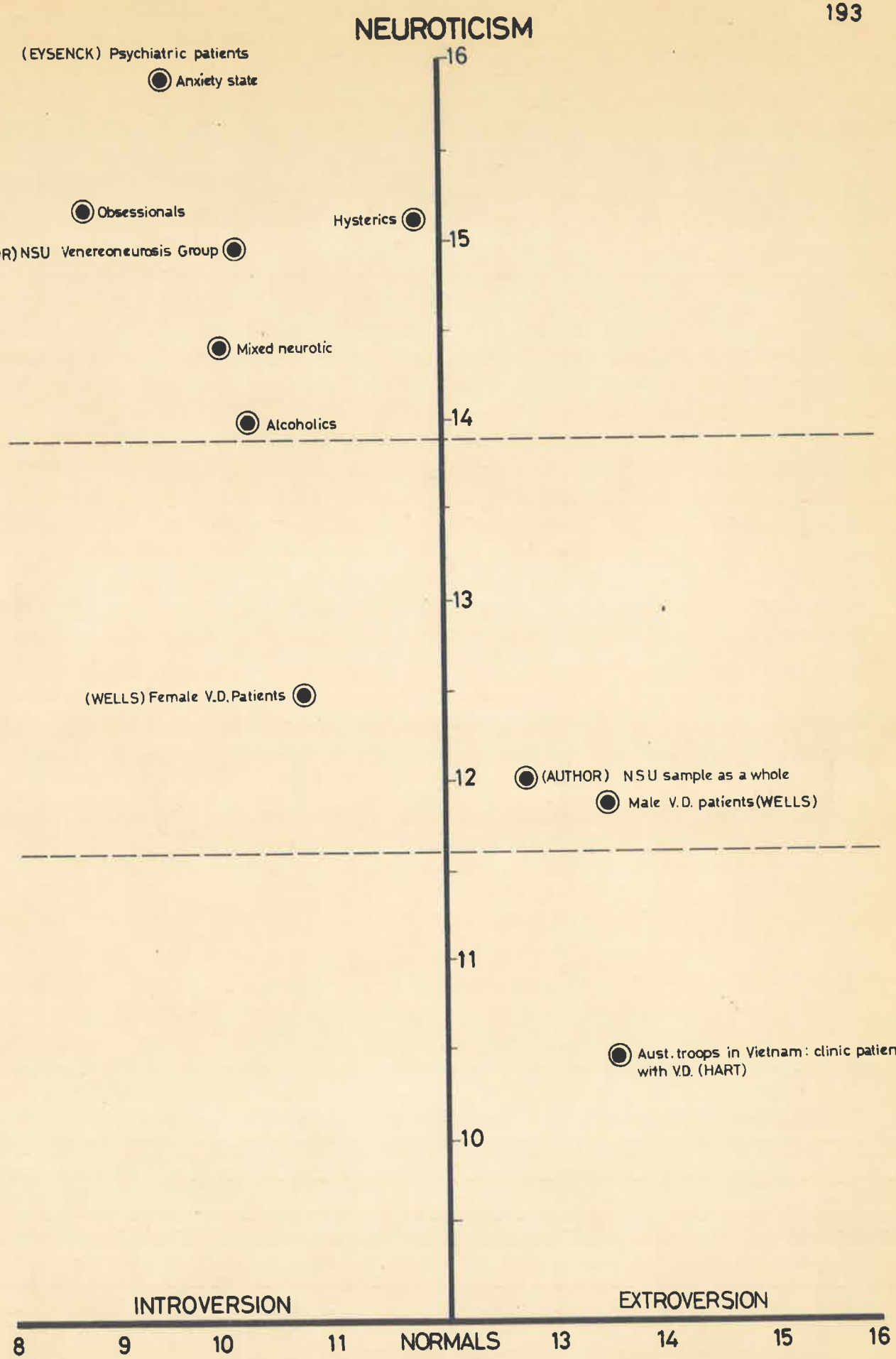


Fig.16. Mean EPI scores for VD patients (WELLS) psychiatric patients (EYSENCK and EYSENCK), Australian soldiers (HART) and NSU patients (AUTHOR): Comparison of findings.

11. SOCIO-ECONOMIC STATUS AND SEXUAL RELATIONSHIPS OF NSU PATIENTS COMPARED WITH MALES SUFFERING FROM GONORRHOEA AT THE VDCC.

These findings are presented in order to examine the second hypothesis, namely that within the population of clinic attenders, males suffering from NSU differ from their counterparts with gonorrhoea, with respect to the variables mentioned above. In the discussion on these findings, the author takes into account the self-selection bias inherent in studying clinic populations and therefore conclusions are related mainly to the two subgroups of males from the parent population of clinic attenders.

11.1 Socio-economic status (after Congalton)

This was obtained by converting the recorded occupation into socio-economic ranks using the same nine point scale mentioned earlier in Chapter 9, for both groups. The results are shown in Table 39 and by means of a histogram in Figure 17.

LEGEND TO FIGURE 17

Summary of composition of groups [detailed chart available in Appendix 6b.].

GROUP A — *High ranking professionals such as doctors, dentists, solicitors, architects, engineers, professors and also top clergymen; directors and owners of large businesses.*

GROUP B — *Executives, established farmowners, and some other professionals but excluding those in Group C.*

GROUP C — *This group covers mainly those professionals with tertiary qualifications short of a degree but with high social standing, e.g. nurses, teachers, physiotherapists.*

GROUP D — *Tradesmen, technicians, policemen are placed here, as well as entertainers, artists, publicans, insurance agents.*

GROUP E — *Office assistants, clerks, sports and recreation workers, salesmen - generally skilled workers.*

GROUP F — *Lower paid sales staff such as shop assistants - generally semi-skilled workers.*

GROUP G — *Unskilled workers.*

GROUP H — *Chronically unemployed, invalid pensioners, age pensioners.*

GROUP I — *Full-time students - University, C.A.E., or other institutions.*

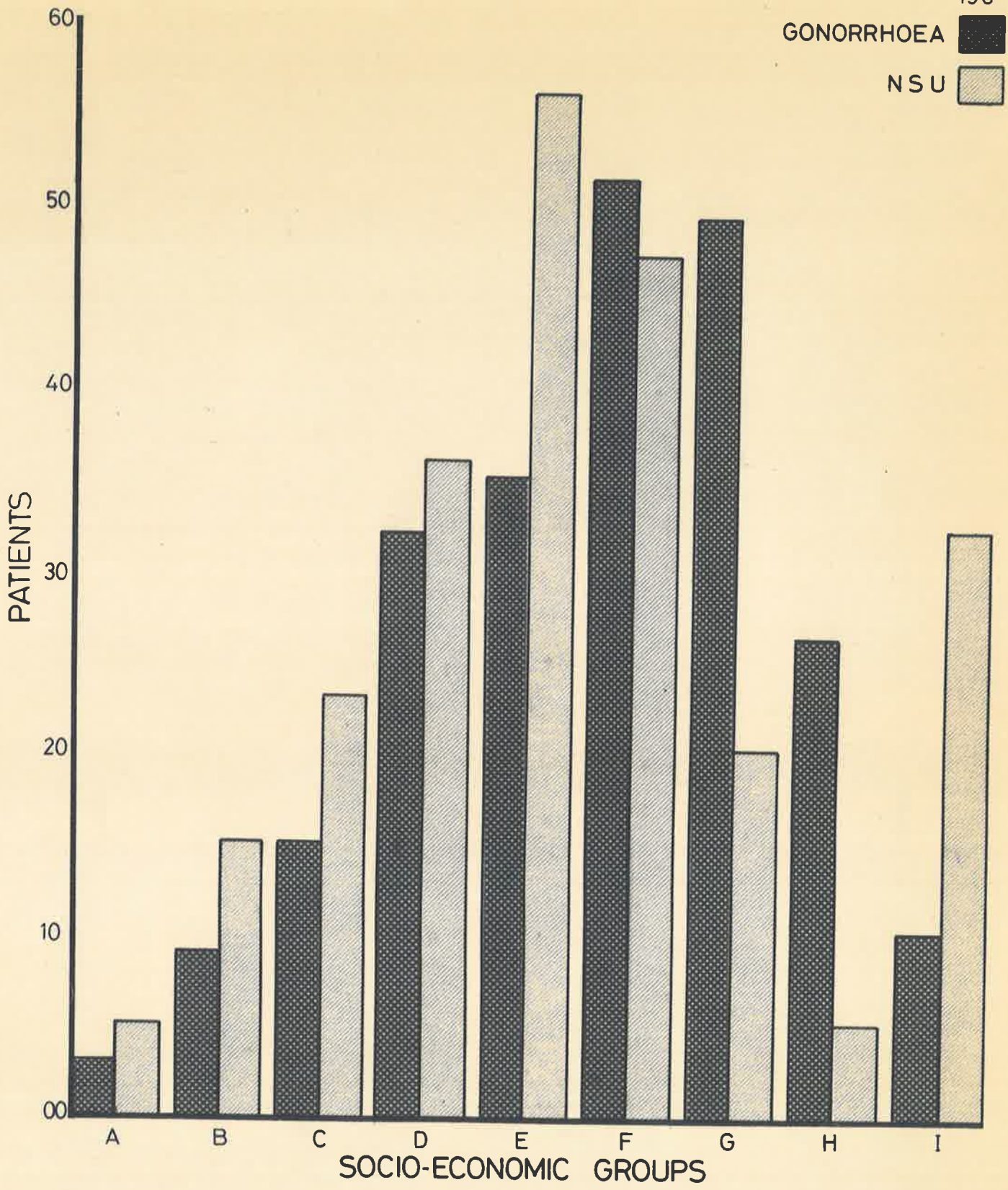


Fig. 17. Occupational status (modified after Congalton) See legend for composition of groups.

TABLE 39

Comparison of males suffering from gonorrhoea and NSU by socio-economic status.

GROUP (in order of Rank except for I)	GONORRHOEA		NSU	
	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)
A	3	1.3	5	2.1
B	9	3.9	15	6.3
C	15	6.5	23	9.6
D	32	13.9	36	15.0
E	35	15.2	56	23.4
F	51	22.1	47	19.7
G	49	21.3	20	8.4
H	26	11.3	5	2.1
I	10	4.5	32	13.4
	230	100	239	100

$X^2 = 46.71$ df = 8

$P < 0.001$

The above table suggests that the occupational background of patients with gonorrhoea differs significantly from that in NSU, with more NSU patients in the upper classes relative to gonorrhoea. The last category (group I) is also significant as most of the full time students are at University or Colleges of Advanced Education, and therefore potential sources of Groups A to C, and in keeping with the consistent trend, more NSU cases fall in this group than gonorrhoea.

These class differences identified for the first time in Australia, are similar to trends observed overseas (Morrison, 1968; Rosedale, 1959 in the UK; Holmes et al, 1975 and Jacobs et al, 1975, USA). In these overseas studies age standardization was not considered relevant to the hypothesis about the class differences. The bias involved in self-selection of patients coming to VD clinics has been considered. While the finding that NSU seems to occur more often than gonorrhoea in the higher socio-economic categories may be true in the clinical setting described in the studies, it might also reflect the fact that those in the higher sector of the socio-economic bracket are more likely to consult their private physicians. This is certainly true in the USA where most cases of gonorrhoea and NSU, treated in a private physician's office go unreported. As mentioned earlier, at the VDCC, experience has shown that because it is the major institution in South Australia (Chapter 4, p.90), dealing with specialist facilities in the STDs (including on site laboratory investigations), it attracts people from the entire spectrum of the socio-economic scale. Nevertheless, it is pointed out that the data derived are only a true reflection of the social class of gonorrhoea and NSU patients who are clinic attenders.

Another theory that may account for these class differences is that the milder symptoms and spontaneous remission rate in some cases of NSU may cause people in some

categories to disregard symptoms and not seek medical advice, and therefore people in the lower socio-economic categories may figure less prominently in statistics on NSU. With the present limitation of knowledge regarding the exact etiology of NSU, it is not rational to suggest that there are in fact differences in the degree of susceptibility.

In this cross-sectional analysis there was no overlap of the two conditions at the time selection was made, and studies have shown that histories of previous gonorrhoea were more frequent among men who had gonorrhoea, while histories of NSU were more frequent among men with NSU, (Holmes et al, 1975). Jacobs and Kraus, 1975, studied 400 consecutive men suffering from urethritis at a VD clinic in Georgia, 185 of whom (46%) had gonorrhoea and 214 (54%)NSU.* The frequency of previous urethritis was about 60% in both groups and "there was a marked tendency for patients with either type of urethritis to have had prior documented episodes of the same type of urethritis." The relative prevalence of the two diseases differed markedly in black and white patients. In white patients NSU accounted for 68% of the cases, whereas in black patients, gonococcal urethritis accounted for 60% of cases ($P < 0.005$). Fifty two per cent of the patients studied were white.

*The remaining one had another cause for urethritis.

Holmes et al, (1975) in a study conducted at the Seattle-King County VD Clinic, compared 116 patients with NSU and 72 men with gonorrhoea. The former included a higher proportion of whites ($P < 0.02$), more years of education ($P < 0.01$), a lower proportion of unemployed ($P < 0.05$), a higher proportion of students ($P < 0.05$) and a higher level of socio-economic status ($P < 0.01$).

In a study by Morrison (1963) in Sheffield, NSU was more than twice as common among white men as among coloured immigrants, while the reverse was true with gonorrhoea.

In all these cases, the most likely explanation is that socio-economic factors, rather than racial, are in operation. As Morrison states, "it might be that the main difference lies in the type of sexual partner in the two groups;" this is described in the next section.

11.2 Status of sexual partner

Comparability of the variable was evaluated by (a) marital status of patient (b) sexual history relating to source of infection and whether the sexual partner was a regular consort or casual. Additional information was obtained as to whether the partners were of the same sex (homosexual activity) or in some cases, intercourse occured with partners of both sexes (bisexual activity) and this is described in section 11.3.

11.2.1 Marital status of patients

The frequency distribution of this variable is compared in both groups of patients (Table 40) and graphically presented in Figure 18.

TABLE 40

Comparison of patients by marital status

MARITAL STATUS	GONORRHOEA		NSU	
	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)
Single	175	76.1	149	62.3
Married	32	13.9	40	16.8
Defacto	10	4.3	22	9.2
Separated	12	5.2	17	7.1
Divorced	0	0	10	4.2
Widowed*	1	0.5	1	0.4
	230	100	239	100

* this data too small for calculation of X^2 so added together

$X^2 = 18.6 \quad df = 4$

$P < 0.005$

There are significantly more single patients in the gonorrhoea group, and more married and defacto categories in NSU. The theory that could be applied here is that the single, unattached male has a greater likelihood of seeking

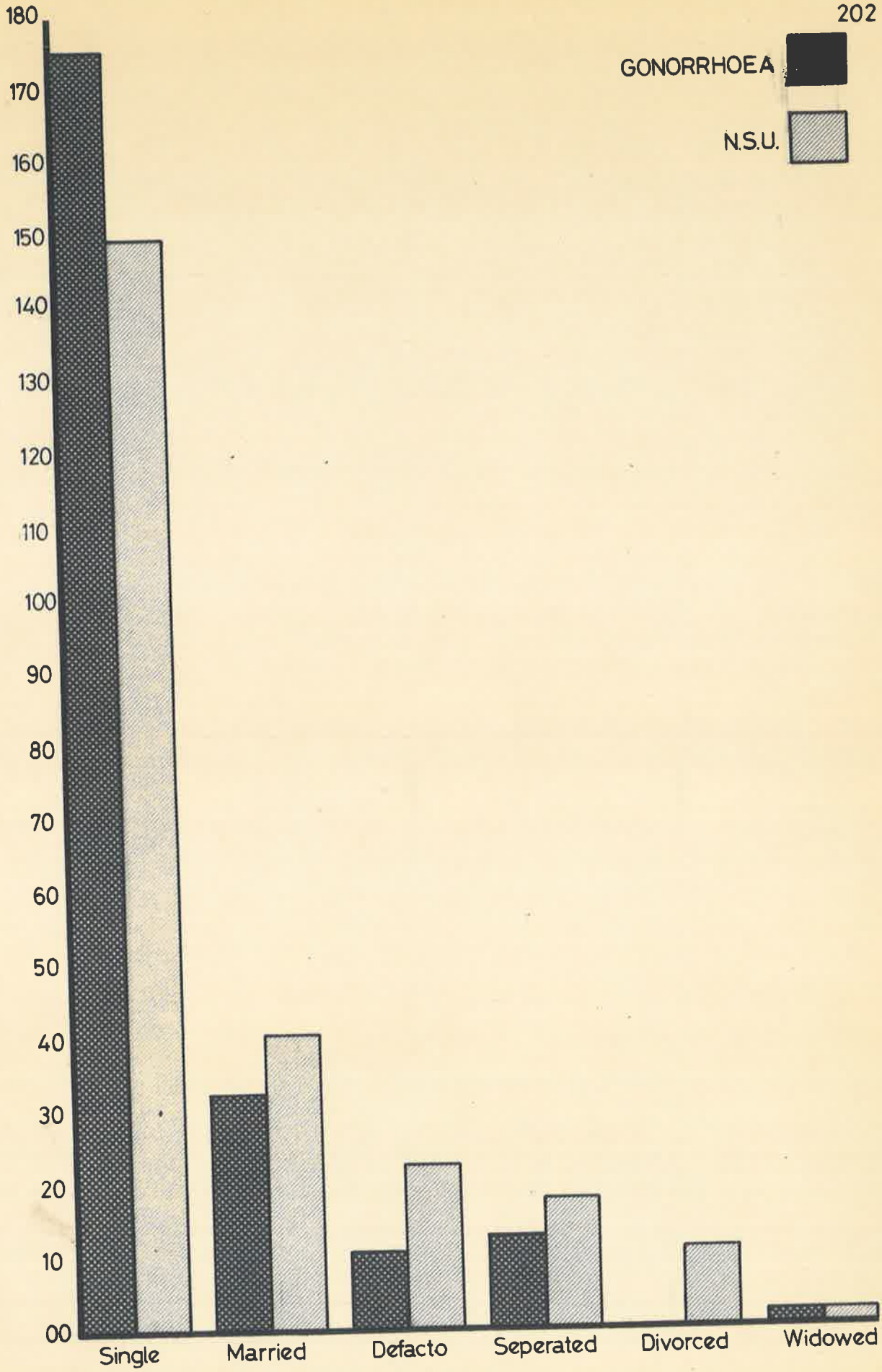

GONORRHOEA
N.S.U.
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
00
Single
Married
Defacto
Seperated
Divorced
Widowed
Marital Status

Fig. 18.

casual partners and is more likely to get gonorrhoea. To investigate this thought further, the pattern of 'promiscuity' or the role of casual intercourse as it applies to the men suffering from the two types of urethritis, is presented in Table 41.

11.2.2 History relating to sexual partners

TABLE 41

Comparison of patients by type of sexual partner

CATEGORY	GONORRHOEA		NSU	
	ABSOLUTE FREQUENCY	%	ABSOLUTE FREQUENCY	%
1.One partner only (marital, defacto, boyfriend)	8	3.4	66	27.6
2.One regular partner, but recent episode of outside intercourse (friend pick-up or prostitute)	28	12.3	56	23.4
3.Casual partners only (less than 3 in six months)	111	48.2	75	31.4
4.Casual partners only (more than 3 in six months)	83	36.1	39	16.3
5.No partners	0	0	3	1.3
	230	100	239	100

$X^2 = 80.49$ $df = 4$

$P < 0.001$

The first comment to be made is that it is generally difficult to get an accurate history of sexual behaviour; but with suitable rapport and interviewing skills and in the relevant setting of a confidential record dealing with sexually transmitted diseases, the history is quite reliable.

There is an obvious difference, seen from Table 41, in the extent of casual partners, with males suffering from gonorrhoea showing a greater incidence of casual intercourse. The fact that the NSU group had a regular consort in 51 per cent of cases (even though 24% also had recent casual intercourse) has been commented on before in Chapter 8 in the discussion on the sexual behaviour of the males suffering from NSU.

The author's study is the first of its kind in Australia to show these differences, as part of a total picture of epidemiological factors in NSU. A summary of overseas studies, from the limited literature available (Rosedale 1969; Csonka 1965 and others) is shown on page 129 of Chapter 8, but the common finding is the reduced incidence of extra-marital or casual intercourse in NSU relative to gonorrhoea. In this connection, a study by Holmes et al (1975) in America, confirms the trends found by British workers. Holmes reported that of 116 men with NSU and 72 men with gonorrhoea, the mean number of total sex partners was much higher for the latter group ($P < 0.01$).

11.3 Homosexual activity

Out of the two hundred and thirty nine cases of NSU studied, 11 or 4.6% had sexual intercourse with a partner of the same sex (male) within the period of six months. Seven of these stated that they had no intercourse with a member of the opposite sex in the last six months, that is, they regarded themselves as homosexuals, and 4 regarded themselves as bisexual.

The corresponding figure for the gonorrhoea males is: 35 had acquired the infection homosexually (15.2%), of whom 24 stated they were exclusively homosexual and 11 that they were bisexual. These findings are tabulated for statistical analysis as follows:

TABLE 42

Comparison of homosexual activity in patients suffering from gonorrhoea and NSU

	GONORRHOEA		NSU	
SEXUAL ACTIVITY	ABSOLUTE FREQ.(%)	RELATIVE FREQ.(%)	ABSOLUTE FREQ.(%)	RELATIVE FREQ(%)
HOMOSEXUAL (including bisexual)	35	15.2	11	4.6
HETEROSEXUAL	195	84.8	228	95.4

$X^2 = 14.93$ $\quad df = 1$

$P < 0.001$

From the figures in this study it appears that homosexual activity is more likely to be associated with gonorrhoea than NSU. Unfortunately, it was not possible to obtain accurately the history of prevalance of homosexual activity in males attending the VDCC as a whole, but the 1977 Health Report for the state of South Australia (Annual Report of the VDCC, 1977) showed that out of 1228 males notified as having gonorrhoea in South Australia, 145, or 12 per cent had acquired their infection homosexually. These notifications include cases diagnosed outside the VDCC as well (private practitioners and hospitals) and it is possible that the history of homosexual activity was under-estimated as it may not have been sought after as diligently as in interviews at the VDCC.

Hart (1977) has made the distinction between 'homosexual activity' and 'homosexuals.' The former is a type of sexual behaviour, whereas the latter involves psychological factors of sexual preference and erotic arousal. Accurate statistics on the incidence of male homosexuals in society, are not available. Kinsey et al (1948) while finding that occasional homosexual behaviour especially in adolescence was common, reported that 13 per cent of adult males had more homosexual than heterosexual behaviour for at least three years, with 4 per cent being exclusively homosexual. Spencer (1959), in a study of

unselected Oxford undergraduates found 8 per cent admitting to a persistent homosexual inclination. West (1968) observes that until more precise knowledge is available, it seems reasonable to assume that 5 per cent of males in Western society are homosexuals.

A theoretical basis for the interpretation of Table 42 is attempted. The author can only speculate on the different theories regarding the origin of NSU. One of them is based on the hypersensitivity of the patient's urethra to some common but not necessarily universal element of the female genital tract. This could be a commensal or allergen. This would explain the phenomenon, in some men with two or more regular female consorts, of repeated recurrence after intercourse with a particular woman and not another. It could also explain the sudden onset of the condition after some months or years of marriage when there has been no extra-marital contact by either partner. The lack of this vaginal element may account for the lower rate in homosexuals, whereas the gonococcus is known to thrive in the mucous membrane of the rectum.

Another explanation is that a social factor may be responsible, as homosexuals are believed to indulge in promiscuous behaviour more frequently (Saghir et al, 1969) and thus have greater risk of acquiring gonorrhoea.

This finding of the difference in homosexual activity between gonorrhoea and NSU patients has not been mentioned in the literature before (to the best of the author's knowledge) and this original observation needs to be repeated in other studies with bigger numbers and, if possible, a sexually active control population, to see if it is valid.

12. OTHER ASPECTS OF THE DESCRIPTIVE EPIDEMIOLOGY OF NSU (ALCOHOL INTAKE AND PHYSICAL EXERTION)

12.1 History of (?) precipitating factors

In the present state of our knowledge on NSU it is not possible to define any "precipitating" or predisposing factors (other than sexual intercourse). In this section an attempt is made to record patients' answers to questions 19 and 20 of the NSU questionnaire (Appendix 5), relating to alcohol intake and physical exercise prior to onset of symptoms. The author is not attempting to correlate these factors with a possible incubation period for NSU, as the findings are not convincing. Moreover, the mechanism of these factors is neither understood nor supported by all and may well involve only a physiological hypersecretion. The data items are difficult to collect accurately, human nature being what it is, but based on the answers provided, the following tables are presented.

12.2 Alcohol intake

Owing to the limitations of human memory and from the experience of the pilot study, it was decided to record the intake in the last seven days only, prior to symptoms. From the patient's reply in his own terms it was possible to

record the consumption in grams using an accurate conversion table (Appendix 6C). As this appendix shows, all the usual varieties of drinks normally consumed by South Australians are grouped sensibly in 3 subtotals and then added up in the Grand Total.

The tally represents that particular week's consumption of alcohol only, and hence should not be taken as an index of the drinking pattern of these male NSU patients. There are many sources for this information regarding the drinking behaviour of Australians and one such reference is a health survey by Selge (1975), conducted in South Australia during 1972-1973.

TABLE 43

Alcohol intake last 7 days prior to symptoms

CATEGORY	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)
1. Nil or less than 20 gm	132	55.2
2. Up to 40 gm	80	33.5
3. Up to 80 gm	21	8.8
4. Over 80 gm	1	0.4
5. Missing values (can't remember)	5	2.1
	239	100

When looking at these data, one must keep in mind the generalisation made by research workers in Australia that most people underestimate the quantity they drink, especially when answering health surveys. It is hard to imagine that this table presents a true picture of the usual pattern of alcohol consumption amongst young South Australian males. As mentioned earlier this table only represents one particular week of their life (in some cases missing the Friday-weekend "binge"). However, the point to make here is that even after projecting for corrected amounts, it appears that the majority of these NSU patients had not consumed an excess amount of alcohol prior to their symptoms, with only 9.2% reporting intake up to and over 80 gm which would constitute moderate to heavy drinking.

At present there is no evidence linking alcohol with the etiology of NSU in any biochemical mechanism (other than the toxic effect), nor is there any reported evidence of experimental animal studies on alcohol and chlamydial infection. The usual reason given for abstinence from alcohol in the management of NSU is the time honoured relationship between alcohol and intercourse, but there is some benefit also from protecting the urethral lining against the chemical trauma of alcohol.

It is the epidemiological impression of the author and other Australian colleagues (personal communications) that some of the patients with recurrent NSU, seem to get the symptoms a few days after a heavy bout of drinking. However, the answers on alcohol intake in this study do not give any further lead on the etiology of NSU.

12.3 Physical exertion

The answers to question 20 are shown in Table 44.

TABLE 44

Physical exertion 7 days prior to NSU symptoms

CATEGORY	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY(%)
1. Mild i.e. sedentary job only	177	74.1
2. Moderate i.e. sedentary job plus active sport or manual labour	44	18.4
3. Severe i.e. manual labour plus active sport/athletic training and similar	14	5.9
4. Missing values	4	1.6
	239	100

Physical exercise has sometimes been associated with the onset of NSU, especially running, cycling and athletics including weight-lifting. But the association is tenuous and no theories to explain the mechanism are forthcoming or indeed possible. Often this is only a concept in the mind of patients rather than medical men. For example, a common name for NSU is 'strain' which stems from ideas that the condition follows prolonged coitus or other strenuous physical activity (NHMRC handbook, 1978). There is no evidence from Table 44 to support any link.

PART FOUR

CONCLUSIONS AND RECOMMENDATIONS

"The doctor can combine clinical research with professional care, the objective being the aquisition of new medical knowledge, only to the extent that clinical research is justified by its therapeutic value for the patient."

(Recommendations guiding doctors in clinical research adopted by the 18th World Medical Assembly, Helsinki, Finland; printed in the World Medical Journal, September, 1964).

13. SUMMARY OF PRESENT KNOWLEDGE ON NSU IN RELATION TO THIS STUDY

13.1 Epidemiology (Extent of the problem)

Urethritis is no doubt the most common sexually transmitted disease (STD) in the human male. The proportions of gonococcal and non-gonococcal divisions, however, may vary from place to place but most venereologists think that the latter is increasing at a faster rate. This is the experience not only of Western countries where statistics are collected (such as the U.K, USA, Europe, Australia and New Zealand), but also the developing nations of Asia in so far as their urban and affluent sections are concerned, as for instance, Singapore (Jorgensen, 1977).

The true incidence of NSU is not likely to be established with our present limitation of knowledge regarding a specific diagnostic test and lack of reporting of private cases. Also as pointed out earlier, the milder symptoms and spontaneous remission rate may cause (i) the patient to disregard symptoms and seek no treatment and/or (ii) the physician may not label mild cases as NSU. These factors may account for the differences in diagnostic rates between one country and another, or just as important, between one community and another.

Since 1951 the Ministry of Health in the UK, has published incidence figures for NSU showing a steady rise in England over the past ten years, not unlike the marked rise of gonorrhoea (Morton, 1972). This is shown in Table 2, part one.

If instead of annual returns, the quarterly returns are used, a new and striking feature becomes apparent - both gonorrhoea and NSU share the same incidence swing within the year - namely a periodic increase in summer and a decrease in winter. These two observations point to similar epidemiological factors operating in both conditions and the most plausible one appears to be that both diseases are sexually transmitted.

The statistical research conducted by the author shows the same seasonal variation at the VDCC (Figure 13) and also shows in Figure 15, the extent of NSU in a defined population of VD clinic attenders. Twenty four per cent of all new diagnoses (new cases and new episodes) were due to NSU as against eleven per cent due to gonorrhoea (both sexes).

13.2 Clinical aspects

The etiology of NSU is disputed. It is seen from the research microbiology shown in Chapter 3, that Chlamydia trachomatis is the probable infective agent in up to fifty per cent of cases (Oriel, 1978). These organisms, also called trachoma inclusion conjunctivitis (TRIC) agents, possess certain characteristics of viruses and some features of bacteria. Other possible causes are listed in Figure 8.

The incubation period is also not fully established and varies widely from a "few days up to about six weeks" (Thin, 1978 p.322). It is commonly two to three weeks.

The clinical features and diagnostic criteria have been described earlier and the main aim of presenting this chapter is to show that the medical knowledge regarding NSU is not complete, and that although research work has clarified several problems associated with this condition, particularly in the area of causative organisms, there are many aspects of the subject which are not understood, and investigations deserve the support of health authorities.

The treatment of NSU is less satisfactory than the treatment of gonorrhoea and syphilis (Thin, 1978). Many antibiotics have been tried, but it is generally accepted that the most useful group of drugs are the tetracyclines. The optimum dose and duration of treatment is controversial, so the author will quote one world authority in full, (Thin, 1978 p.322):

> the optimum dose and duration of treatment is at present undecided but oxytetracycline 250 mg. four times a day for ten days is probably the minimum that should be given. Many consider three weeks of treatment more effective. Ambulant patients at work have difficulty in remembering to take tablets four times a day and it may be better to prescribe one of the newer tetracyclines which can be given twice daily, such as Vibramycin. Patients should avoid intercourse and alcohol while taking the tablets.
>
> If one regime fails to produce an improvement, try a different drug for a further three weeks.

The management of NSU in some cases is difficult and unsatisfactory. This is particularly the case where emotional sequelae have occurred.

The role of the female in the transmission of NSU has so far not been clearly identified. Earlier studies such as those conducted by Rosedale (1959) on female consorts demonstrated no significant pathology in the female, and empirical treatment of the female did not appear to reduce

the recurrence rate in her male contact. This was before the discovery of chlamydial infection.

Thin (1978) considers that epidemiological treatment of female contacts of NSU with tetracycline could be considered as he feels that "the man's condition is less likely to relapse when intercourse is resumed."

14. PSYCHO-SOCIAL BACKGROUND OF NSU PATIENTS IN THIS STUDY

The source of this information is the 25 item questionnaire (Appendix 5) newly designed for this study. The data-base from which the items of this questionnaire were drawn, was provided by clinical experience, the impressions gained by colleagues and evaluation of the literature relevant to the subject. The aim is to get a better picture of the disease from the point of view of descriptive epidemiology, and help clinicians understand the "total person" suffering from NSU rather than concentrating on just the local urethritis. Moreover, the questionnaire is reproducible and can be used by others as a structured guide.

The socio-economic background of the NSU patients is described in terms of its individual components - occupational status by prestige (Chapter 9.1) and level of education (Chapter 9.2). Chapter 9.4 discusses the significance of these findings especially in relation to health education and its role in the control of VD. The social and educational status of the individual although significantly higher than the general community, did not correlate with his knowledge or awareness of the facts

regarding NSU, as might be expected, and this has implications for patient counselling, which will be amplified in the next section.

The psychological background of the NSU patients, is described by a study of two components (a) Personality Inventory results (EPI) of the NSU patients and (b) the reaction of the patients to acquiring NSU, especially recurrent NSU, varying from mild anxiety to the emotional sequelae of venereoneurosis. The clinical criteria for the identification of venereoneurosis are described together with illustrative case histories.

The EPI results are described, analysed and discussed in Chapter 10. It is noted that the NSU population as a whole, scored higher than normal on the N-scale (neuroticism) ($N = 11.8$; $P < 0.05$), when compared to controls but the group found to have venereoneurosis had predominantly high N-scores ($N = 14.9$; $P < 0.05$). This group also scored highly on introversion ($E = 9.3$; $P < 0.05$) suggesting a personality type who is introverted and neurotic. Clinicians should be more aware of the potential for developing emotional sequelae in NSU and there is scope for preventing or minimizing the impact of this by better recognition of this syndrome in the particular type of patient and counselling accordingly at the initial contact.

The tendency to extroversion and sexual behaviour is described, and while there is no significant relationship with the number of sexual partners, there is a significant difference in the NSU group where extroverts report a greater frequency of intercourse than introverts (Chapter 10.4). Other aspects of sexual behaviour providing some point of reference to the variety and extent of contemporary practices, are analysed in Chapter 8.

From the therapeutic point of view, the finding that a number of the patients had a regular relationship with one partner (although some had a casual episode) is worth commenting on. Other workers in the few overseas studies that have been done, found this to be the case as well, and these findings are presented in Chapters 8.2 and 11.2. The explanation put forward is that this could be expected if NSU were a syndrome due to several different causes including some of non-venereal origin (Boyd et al, 1958). However, it is difficult to imagine that NSU is not in some way related to sexual intercourse (Morton, 1975). Rosedale (1959) suggests that the relatively high incidence of this condition in faithful married men and defacto relationships and the considerable recurrence rate, imply a mechanism which is more complicated that a straightforward transmission as in gonorrhoea. There is a greater incidence of casual partners in men suffering from gonorrhoea. The above discussion is directed at making the point that in these

domestic situations, tactful handling of contact-tracing (interview regarding source of infection) is required. It is also relevant to mention that these studies preceded the advances in the knowledge of isolation of agents such as Chlamydia trachomatis which threw new light on transmission of NSU.

The relatively lower incidence of homosexual activity in patients with NSU, compared to gonorrhoea and the hypothetical explanation of this, is presented in Chapter 11.3

15. SUGGESTIONS FOR IMPROVED MANAGEMENT OF NSU

15.1 General approach

Urethral irritation and discharge in the male may by physiological due to spermatorroea, concentration, precipitation or crystalisation of the constituents of urine; or it may be caused by mechanical or chemical irritation commonly due to sexual intercourse, contraceptive creams or vigorous local washes. The urethritis may also be the result of infection of the proximal urinary tract such as cystitis or nephritis or it may be due to Trichomonas vaginalis, or some of the specific causes shown in Figure 8.

After excluding gonorrhoea, present evidence suggests that the majority of non-gonococcal urethritis is due to non-specific causes although this includes chlamydial infections. This group forms a distinct clinical entity characterized by history of sexual activity but with a longer incubation period (up to 4 weeks); history of dysuria and a variable discharge, usually mucopurulent, less copious and more easily seen in the morning; spontaneous remission in some cases but with a definite response to appropriate antibiotics in many cases. This clinical entity can be identified by the term NSU.

As mentioned in part two regarding the objectives of the study, the principal concern here is with the psycho-social variables in the management of NSU, but the extensive research on the viral origin of NSU reviewed in Chapter 3, suggests that possibly 50 per cent of NSU is due to chlamydial infection.

The management of NSU starts first of all with establishing criteria for diagnosis and maintaining firmly these criteria in the absence of a uniformly specific laboratory test. The above clinical definition serves to provide these diagnostic criteria supported by the presence of polymorphs on Gram-stained smear without intracellular diplococci.

The physician should carefully inquire about the possibility of inadvertent or surreptitious use of antibiotics which could cause a negative smear to be obtained in a patient with gonococcal urethritis.

A patient who presents with dysuria and/or urethral discharge should be evaluated initially by a thorough history and examination (essential in ruling out other causes), and then investigation by urethral swabs along the lines suggested by the following chart (Figure 19). A calcium alginate tipped swab (CALGISWAB: Wilson Diagnostics, Inc., Illinois) is preferred if available, because of its size which is more acceptable to the patient.

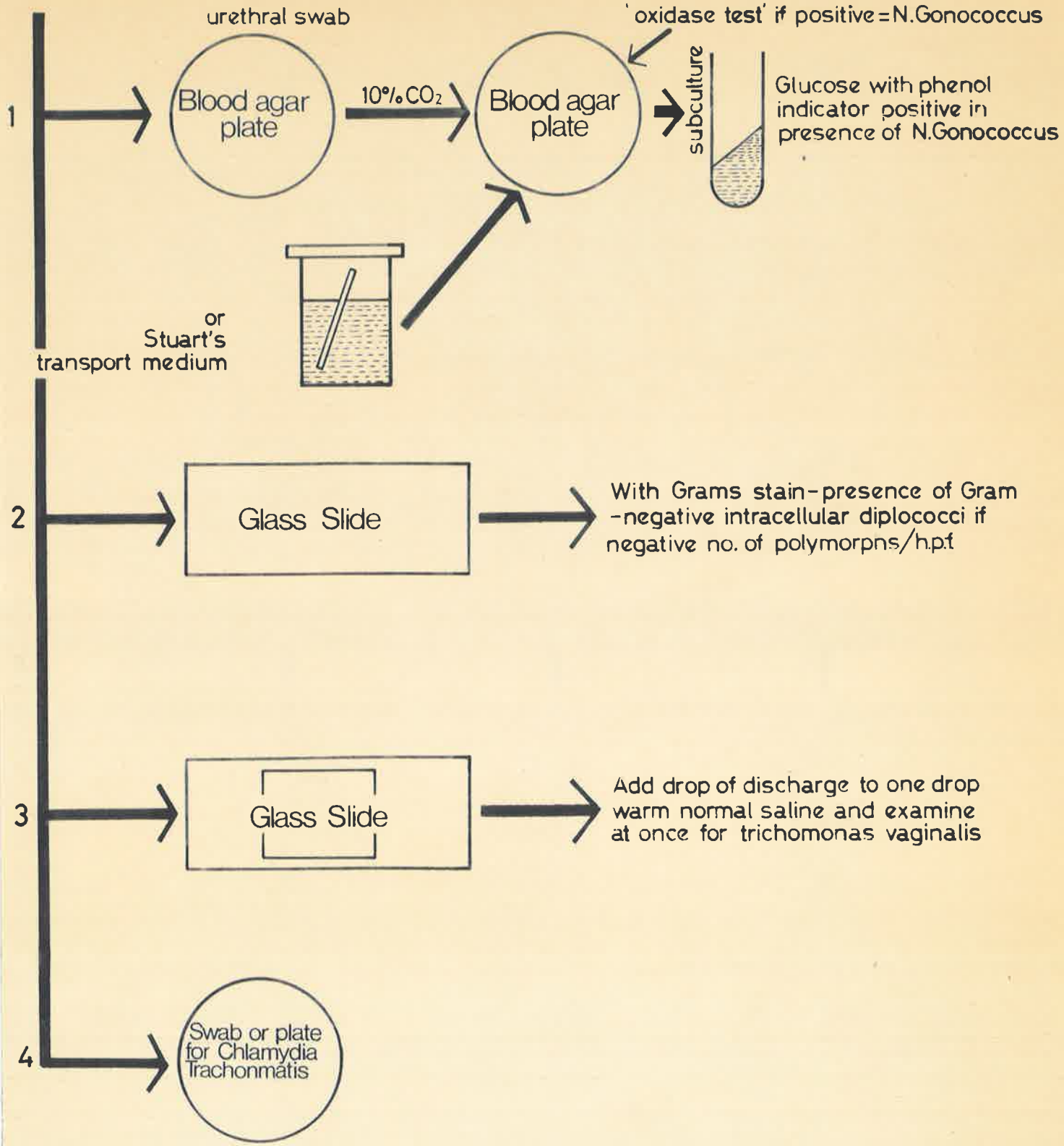


Fig.19. Schematic chart of the investigation of urethral discharge or urethritis in the male.

A thorough history is not only essential in providing an accurate diagnosis, but more importantly it allows the patient to ventilate his anxieties and misconceptions. The first interview is the most critical period of management in NSU (Hart, 1977) and this will be qualified in the section on the doctor-patient relationship.

15.2 Implications for the doctor-patient relationship

A positive doctor-patient relationship is important especially where an emotionally labile patient is concerned. For example, even in an organic condition like diabetes, the juvenile diabetic has been shown to "forget" to take his insulin injection more readily, if his medical attendant is cold and aloof, than if he is warm and attentive, especially if the patient tends to be neurotic (Clayer, 1972).

The doctor-patient relationship can be a therapeutic tool in itself (Avery, 1977). In this section the question is not so much "do we need to reinforce doctor-patient relationship" in NSU, but rather are there ways of improving or fostering it. Some of these as applicable to NSU, are:

(1) The first interview is the most critical period of management. The patient with NSU, like so many other VD clinic attenders, is often embarrassed

and may have irrational fears based on ignorance. A certain portion of NSU patients as seen from this study, are neurotic to start with and it is to this group that the clinician's attention is directed often, by the behaviour of the patient at the first interview. (Hart, 1977).

(2) In addition to appropriate affect, the clinician should take a thorough history and thereby allow the patient to ventilate some of his guilt in the form of complaints, often illogical in a medical sense.

(3) The use of CALGISWAB which is less than a tenth of the size of the routine cotton-tipped swab in urethral penetration does wonders for patient morale regarding follow-ups and new episodes.

(4) The credibility and confidence of the doctor in stating firmly the facts regarding NSU and prophylactic reassurance, where applicable, can be an important factor in the resolution of symptoms for most patients. Where psycho-neurosis has progressed to a chronic state with depression, it is better to send the patient for psychiatric treatment as simple reassurance in this case is not the appropriate management and it may produce a credibility gap and damage

the doctor-patient relationship.

(5) Further antibiotics and multiple pathology investigations are avoided if clinically not indicated. These foster the patients' hypochondriasis and dependency needs. This is especially so in the case of venereoneurosis. The temptation for a busy doctor (general practitioner or venereologist) to resort to this physical model in these demanding patients is considerable, but the emphasis should be placed on patient counselling, and perhaps a patient education guide. In some cases of "urethrophobia", Potassium Citrate can be used as a placebo, if the patient cannot be managed without drugs.

15.3 Implications for health education: Patient education guideas prepared by the author

The medical profession, with venereologists in particular remains divided and uncertain on the purpose, scope and methodology of health education, and the contribution its effective application can make to the prevention and control of disease (Rowntree, 1975). This is largely due to the ignorance of doctors regarding the techniques of health educators in the full utilisation of of the behavioural sciences and the long range planning of comprehensive programmes.

However, what the medical profession has always accepted and sometimes practiced is the one-to-one patient education in the doctor's office. This is also a form of health education and a very effective one (Pamnany, 1977).

While health education involves more than the simple transmission of knowledge, some diseases are peculiar in that popular misconceptions in the patient's mind when cleared by a doctor, are sufficient to alleviate distress and promote health. NSU is a good example of this, as the disease is similar to gonorrhoea and yet may occur in a steady partnership without outside intercourse (in some cases only) thus creating doubts about fidelity in the partner's mind. The medical attendance of both partners in such a situation is sometimes necessary to minimise the impact of the trivial urethritis from becoming a major marital disruption.

Although the absence of any specific cause obviously limits the investigation of female consorts, many venereologists stress the importance of their examination and treatment. However some consideration should be given to the domestic upheaval which may be caused by such an examination when neither partner admits extra-marital intercourse. Here again, the benefit of joint interview or some form of education pamphlet is considerable (Figure 20). The treatment of regular consorts with the

NSU (NON SPECIFIC URETHRITIS)

NSU is a common condition that affects men in somewhat the same way as gonnorrhoea, although it is a quite different disease. Its cause is not completely determined, but it is believed to be virus like organisms in many cases. Unlike gonorrhoea, it may not be related to recent intercourse.

Usually two or more weeks after infection a man notices a discharge and sometimes burning on passing urine. The NSU discharge is usually watery or milky. It comes and goes, being usually seen in the morning. It often clears up in a few days or weeks even without treatment.

NSU is sometimes quite hard to distinguish from gonorrhoea and any man with a penile discharge should consult a doctor so that an accurate diagnosis can be made and the correct treatment begun promptly.

NSU sometimes accompanies gonorrhoea when it may persist after the gonorrhoea is cured.

While NSU usually responds to treatment, in some cases it does not clear quickly and even when it does clear it may recur again or a person may be re-infected.

NSU is usually a mild disease and in Australian experiences is very seldom followed by any serious after effects even when it persists or recurs.

Women can be carriers of NSU infection but apparently seldom suffer any ill effects themselves, and do not necessarily need investigation and treatment, although further research is required.

oOo oOo oOo

In order to clear this condition quickly, please take ALL the tablets according to the instructions, which are also on the label of the bottle.

Do not have sexual intercourse for at least two to four weeks or longer if the symptoms are not cleared.

Because alcohol may inflame the lining of the pipe (urethra), do not drink for at least two weeks.

Do not squeeze your penis to look for a discharge or put any tissue paper or cloth around your penis (except ordinary underwear which can be washed).

Sometimes it takes longer than two weeks for all the symptoms to clear up.

Fig. 20. Author's patient education guide.

same antibiotic as the men recieve, after checking for a cause of vaginitis, has been suggested earlier (Thin, 1978).

From the results of the personality studies, it is possible to hypothesize that the development of venereoneurosis has its origins in the personality of the individual (high N scores), but sometimes can be iatrogenic, for inadequate management will foster neurosis in a temperamentally predisposed patient. Venereoneurosis is most amenable to treatment in the period immediately after the first recurrence. The management requires a thorough knowledge of the natural course and treatment of NSU and consequently, the condition should be managed by the venereologist. Unfortunately there are very few trained venereologists in Australia, although attention was drawn to medical ignorance and the inadequacy of training as early as 1967 by Adams from Sydney. However, the patient should be referred to a psychiatrist if there is severe depression with suicide risk, concurrent psychosis, or obsessive compulsive neurosis. The last mentioned has a poor prognosis even with psychiatric management and the patient often gives a history of longstanding urethritis and treatment from one physician to another.

Public education programmes should be carefully worded so as not to aggravate the psychological sequelae of NSU. The neurotic personality will be well fed by propaganda which stresses undue concern about VD (Hart, 1977). Atwater (1974) reporting on the experience of a VD clinic in the USA, shows that such propaganda may increase the attendance rate substantially, yet few of the new attenders have VD. A greater advantage would be to use a patient-education pamphlet which reassures good prognosis, at the same time giving full factual information. Such a pamphlet has been prepared by the author (Figure 20).

In summary then, in addition to (1) antibiotics, (2) skill and understanding at the time of interview (3) reassurance once the diagnosis has been made (4) instruction and education to ensure patient compliance and (5) follow-up to check on the outcome of treatment - these are the cornerstones to the successful management of NSU.

APPENDICES

APPENDIX 1

Patient Attendances at the VDCC by month

1976

VENEREAL DISEASES CONTROL CENTRE

ATTENDANCES

	MALE				FEMALE				TOTAL			
	TOTAL	Ave.* Per Day	New + Pat./ Epis.	Ave. Per Day	TOTAL	Ave. Per Day	New Pat./ Epis.	Ave. Per Day	TOTAL	Ave. Per Day	New Pat./ Epis.	Ave. Per Day
1976												
JAN.	678	34	347	17	462	23	192	10	1,140	57	539	17
FEB.	669	33	323	16	423	21	169	8	1,092	54	492	24
MAR.	702	31	342	15	508	22	215	9	1,210	53	557	24
APR.	662	35	327	18	438	23	158	8	1,100	58	485	26
MAY	612	31	271	14	438	22	199	10	1,050	53	470	24
JUNE	665	32	323	15	476	23	167	8	1,141	55	490	23
JULY	642	29	340	15	449	20	188	9	1,091	49	528	24
AUG.	603	27	323	15	382	17	165	8	985	44	488	23
SEP.	530	23	333	15	345	16	186	8	875	39	519	23
OCT.	583	29	342	17	337	17	166	8	920	46	508	25
NOV.	590	27	313	14	448	20	194	9	1,038	47	507	23
DEC.	571	27	300	15	461	21	169	8	1,032	48	469	23
TOTAL	7,507	29.8	3,884	15.5	5,167	20.4	2,168	8.5	12,674	50.2	6,052	23.8
1975 TOTAL	6,995	28	3,823	15	6,062	20	2,209	10	12,057	48	6,032	25

Summary of Data on Defaulters (N = 21)

PARAMETER	CATEGORY	NUMBER OF CASES (21)
Age	Mean Age	24.3
Marital Status	1. Single	15
	2. Married	2
	3. Defacto	3
	4. Separated	1
	5. Divorced	0
	6. Widowed	0
Country of Birth	1. Australasia	12
	2. U.K.	2
	3. Mediterranean	4
	4. Northern Europe	2
	5. Asia, America, other	1
Socio-economic status by occupation	9 Point Scale	
	1	0
	2	0
	3	2
	4	3
	5	9
	6	0
	7	5
	8	2
	9	0
Homosexual Practice	No. of homosexuals/bisexuals	0

APPENDIX 3

EYSENCK PERSONALITY INVENTORY

by H. J. Eysenck and Sybil B. G. Eysenck

PERSONALITY QUESTIONNAIRE

FORM A

NAME..... AGE.....

OCCUPATION..... SEX.....

N= ☐ E= ☐ L= ☐

Instructions

Here are some questions regarding the way you behave, feel and act. After each question is a space for answering "YES" or "NO".

Try to decide whether "YES" or "NO" represents your usual way of acting or feeling. Then put a cross in the circle under the column headed "YES" or "NO". Work quickly, and don't spend too much time over any question; we want your first reaction, not a long-drawn out thought process. The whole questionnaire shouldn't take more than a few minutes. Be sure not to omit any questions.

Now turn the page over and go ahead. Work quickly, and remember to answer every question. There are no right or wrong answers, and this isn't a test of intelligence or ability, but simply a measure of the way you behave.

AUSTRALIAN COUNCIL FOR EDUCATIONAL RESEARCH
Frederick Street, Hawthorn, Victoria 3122

E ○ N ○ L ○ ☐☐☐☐☐☐☐☐☐☐

FORM A

		YES	NO
1.	Do you often long for excitement?	○	○
2.	Do you often need understanding friends to cheer you up?	○	○
3.	Are you usually carefree?	○	○
4.	Do you find it very hard to take no for an answer?	○	○
5.	Do you stop and think things over before doing anything?	○	○
6.	If you say you will do something do you always keep your promise, no matter how inconvenient it might be to do so?	○	○
7.	Does your mood often go up and down?	○	○
8.	Do you generally do and say things quickly without stopping to think?	○	○
9.	Do you ever feel "just miserable" for no good reason?	○	○
10.	Would you do almost anything for a dare?	○	○
11.	Do you suddenly feel shy when you want to talk to an attractive stranger?	○	○
12.	Once in a while do you lose your temper and get angry?	○	○
13.	Do you often do things on the spur of the moment?	○	○
14.	Do you often worry about things you should not have done or said?	○	○
15.	Generally, do you prefer reading to meeting people?	○	○
16.	Are your feelings rather easily hurt?	○	○
17.	Do you like going out a lot?	○	○
18.	Do you occasionally have thoughts and ideas that you would not like other people to know about?	○	○
19.	Are you sometimes bubbling over with energy and sometimes very sluggish?	○	○
20.	Do you prefer to have few but special friends?	○	○
21.	Do you daydream a lot?	○	○
22.	When people shout at you, do you shout back?	○	○
23.	Are you often troubled about feelings of guilt?	○	○
24.	Are *all* your habits good and desirable ones?	○	○
25.	Can you usually let yourself go and enjoy yourself a lot at a gay party?	○	○
26.	Would you call yourself tense or "highly-strung"?	○	○
27.	Do other people think of you as being very lively?	○	○

		YES	NO
28.	After you have done something important, do you often come away feeling you could have done better?	○	○
29.	Are you mostly quiet when you are with other people?	○	○
30.	Do you sometimes gossip?	○	○
31.	Do ideas run through your head so that you cannot sleep?	○	○
32.	If there is something you want to know about, would you rather look it up in a book than talk to someone about it?	○	○
33.	Do you get palpitations or thumping in your heart?	○	○
34.	Do you like the kind of work that you need to pay close attention to?	○	○
35.	Do you get attacks of shaking or trembling?	○	○
36.	Would you always declare *everything* at the customs, even if you knew that you could never be found out?	○	○
37.	Do you hate being with a crowd who play jokes on one another?	○	○
38.	Are you an irritable person?	○	○
39.	Do you like doing things in which you have to act quickly?	○	○
40	Do you worry about awful things that might happen?	○	○
41.	Are you slow and unhurried in the way you move?	○	○
42.	Have you ever been late for an appointment or work?	○	○
43.	Do you have many nightmares?	○	○
44.	Do you like talking to people so much that you never miss a chance of talking to a stranger?	○	○
45.	Are you troubled by aches and pains?	○	○
46.	Would you be very unhappy if you could not see lots of people most of the time?	○	○
47.	Would you call yourself a nervous person?	○	○
48.	Of all the people you know, are there some whom you definitely do not like?	○	○
49.	Would you say that you were fairly self-confident?	○	○
50.	Are you easily hurt when people find fault with you or your work?	○	○
51.	Do you find it hard to really enjoy yourself at a lively party?	○	○
52.	Are you troubled with feelings of inferiority?	○	○
53.	Can you easily get some life into a rather dull party?	○	○
54.	Do you sometimes talk about things you know nothing about?	○	○
55.	Do you worry about your health?	○	○
56.	Do you like playing pranks on others?	○	○
57.	Do you suffer from sleeplessness?	○	○

PLEASE CHECK TO SEE THAT YOU HAVE ANSWERED ALL THE QUESTIONS

```
C0MMENT      EYSENCK PERSONALITY SCORING PROGRAMME                          EPI001
      DIMENSION I(57), NAME(2)                                              EPI002
  100 PRINT 101                                                             EPI003
  101 F0RMAT (1H1, 17HINDIVIDUAL SC0RES)                                    EPI004
      SUME = 0.0                                                            EPI005
      SUMN = 0.0                                                            EPI006
      SUML = 0.0                                                            EPI007
      SUMSQE = 0.0                                                          EPI008
      SUMSQN = 0.0                                                          EPI009
      SUMSQL = 0.0                                                          EPI010
      XEN = 0.0                                                             EPI011
      XEL = 0.0                                                             EPI012
      XLN = 0.0                                                             EPI013
      N = 0                                                                 EPI014
    1 READ 2, NAME, I                                                       EPI015
    2 F0RMAT (215,57I1)                                                     EPI016
      IF (NAME(1) - 99999 ) 03, 07, 03                                      EPI017
    3 IE = (30- (I(1)+I(3)+I(8)+I(10)+I(13)+I(17)+I(22)+I(25)+I(27)+        EPI018
     1      I(39)+I(44)+I(46)+I(49)+I(53)+I(56)))+I(5)+I(15)+I(20)+I(29)+EPI019
     2      I(32)+I(34)+I(37)+I(41)+I(51)-9                                EPI020
      IN = (48 - (I(2)+I(4)+I(7)+I(9)+I(11)+I(14)+I(16)+I(19)+I(21)+      EPI021
     1      I(23)+I(26)+I(28)+I(31)+I(33)+I(35)+I(38)+I(40)+I(43)+I(45)+EPI022
     2      I(47)+I(50)+I(52)+I(55)+I(57)))                                EPI023
      IL = (6 - (I(6)+I(24)+I(36))+I(12)+I(18)+I(30)+I(42)+I(48)+        EPI024
     1      I(54) - 6                                                      EPI025
      FE = FLOATF(IE)                                                       EPI026
      FN = FLOATF(IN)                                                       EPI027
      FL = FLOATF(IL)                                                       EPI028
      SUME = SUME + FE                                                      EPI029
      SUMN = SUMN + FN                                                      EPI030
      SUML = SUML + FL                                                      EPI031
      SUMSQE = SUMSQE + FE**2                                               EPI032
      SUMSQN = SUMSQN + FN**2                                               EPI033
      SUMSQL = SUMSQL + FL**2                                               EPI034
      XEN = XEN + FE * FN                                                   EPI035
      XEL = XEL + FE * FL                                                   EPI036
      XLN = XLN + FL * FN                                                   EPI037
      PRINT 04, NAME, IE, IN, IL                                            EPI038
    4 F0RMAT(1H0,2I5,2X2HE=I3,5X2HN=I3,5X2HL=I3)                            EPI039
      N = N + 1                                                             EPI040
      IF(SENSE SWITCH 2) 05, 01                                             EPI041
    5 PUNCH 06, NAME, IE, IN, IL                                            EPI042
    6 F0RMAT(5I5)                                                           EPI043
      G0 T0 01                                                              EPI044
    7 FN = FLOATF (N)                                                       EPI045
      XBARE = SUME / FN                                                     EPI046
      XBARN = SUMN / FN                                                     EPI047
      XBARL = SUML / FN                                                     EPI048
      DEVE = SUMSQE - SUME**2/FN                                            EPI049
      DEVN = SUMSQN - SUMN**2/FN                                            EPI050
      DEVL = SUMSQL - SUML**2/FN                                            EPI051
      VARE = DEVE /(FN - 1.0)                                               EPI052
      VARN = DEVN /(FN - 1.0)                                               EPI053
      VARL = DEVL /(FN - 1.0)                                               EPI054
      SDE  = SQRTF (VARE)                                                   EPI055
      SDN  = SQRTF (VARN)                                                   EPI056
      SDL  = SQRTF (VARL)                                                   EPI057
      REN  = (XEN - SUME*SUMN/FN)/SQRTF(DEVE * DEVN)                        EPI058
      REL  = (XEL - SUME*SUML/FN)/SQRTF(DEVE * DEVL)                        EPI059
      RLN  = (XLN - SUML*SUMN/FN)/SQRTF(DEVL * DEVN)                        EPI060
      PRINT 08,XBARE,XBARN,XBARL,VARE,VARN,VARL,SDE,SDN,SDL,SUME,SUMN,      EPI061
     1SUML,SUMSQE,SUMSQN,SUMSQL,REN,REL,RLN                                 EPI062
    8 F0RMAT(1H1,18HSUMMARY STATISTICS/1H0,15X1HE9X1HN9X1HL/1H0,5HMEANS.    EPI063
     15X3F10.5,/1H0,8HVARIANCE,2X3F10.5,/1H0,7HSTD DEV,3X3F10.5,/1H0,4HSSEPI064
     2UMS,6X3F10.0,/1H0,9HSUMS SQRS,1X3F10.0,/1H0,12HCORRELATIONS,/1H0,  EPI065
     36HE WITH N,F9.4,/1H0,6HE WITH L,F9.4,/1H0,6HN WITH L,F9.4,)         EPI066
      IF (NAME(2)-99999) 09,100,09                                          EPI067
    9 PRINT 10                                                              EPI068
   10 F0RMAT (1H1,14HEND 0F PR0GRAMME)                                      EPI069
      ST0P                                                                  EPI070
      END                                                                   EPI071
```

APPENDIX 5

DEPT. OF COMMUNITY MEDICINE - V.D.C.C.

THESIS ON N.S.U. IN THE HUMAN MALE 75-77.

QUESTION NUMBER	QUESTION	COLUMN NUMBER
1.	PATIENT IDENTIFICATION	1-3
2.	DATE	5-10
3.	AGE	12-13
4.	MARITAL STATUS	15
5.	COUNTRY OF BIRTH - PATIENT FATHER MOTHER	17-18 19-20 21-22
6.	OCCUPATION	24
7.	LEVEL OF EDUCATION	26
8.	EYSENCK PERSONALITY INVENTORY	28-32
9.	HAVE YOU HAD ANY EDUCATION ON SEX? IF SO FROM WHOM?	34
10.	HAVE YOU HAD ANY EDUCATION ON V.D.? IF SO FROM WHOM?	36
11.	IN THE LAST SIX MONTHS, THE FREQUENCY OF SEXUAL INTERCOURSE IN YOUR CASE IS:	38
12.	IN THE LAST SIX MONTHS, YOUR SEXUAL PARTNER/PARTNERS HAVE BEEN AS FOLLOWS:	40
13.	THE SEX OF THESE PARTNERS IS:	42
14.	THE MAXIMUM FREQUENCY OF INTERCOURSE ON ANY OCCASION, IN THE LAST SIX MONTHS, HAS BEEN:	44
15.	IN RELATION TO YOUR PARTNERS ANATOMY, WOULD YOU TELL ME HOW YOU HAVE HAD INTERCOURSE. I.E. WHERE HAVE YOU INTRODUCED YOUR PENIS?	46
16.	HAVE YOU EVER USED A CONDOM DURING THE LAST SIX MONTHS?	48
17.	IN THE LAST FOUR WEEKS, IF YOU HAVE HAD INTERCOURSE, HAS YOUR PARTNER/PARTNERS, BEEN ON ANY CONTRACEPTION?	50

APPENDIX 6

DEPARTMENT OF COMMUNITY MEDICINE - V.D.C.C.

THESIS ON NSU IN THE HUMAN MALE 75 - 77.

CODING SHEET FOR QUESTIONNAIRE

1. Serial Number

2. nil

3. In years

4.
1. Single
2. Married
3. Widowed
4. Divorced
5. Defacto
6. Separated
7. Other

5. See code sheet attached (Appendix 6A)

6. See code sheet attached (Appendix 6B)

7.
1. None or less than primary
2. Secondary but not completed Leaving Certificate
3. Leaving
4. Trade level qualification
5. Technical level qualification
6. Matriculation
7. College of Advanced Education
8. University Student
9. University Graduate

8. See sheet attached

9.
1. No
2. Yes from father
3. Yes from mother
4. Yes from both
5. Yes from school teacher
6. Yes from sibling
7. Yes from peer group
8. Yes from books and films
9. Yes from lectures

10. " (Same as 9.)

APPENDIX 6 (Cont'd.)

11.
1. No intercourse
2. Daily
3. More than twice weekly
4. Twice weekly
5. Once weekly
6. More than once fortnightly
7. Once fortnightly
8. About once a month
9. Irregular but less than 8

12.
1. Regular partner only
2. Regular partner but recent casual episode
3. Casual partners only less than 3
4. Casual partners only more than 3
5. Partner/s are mainly prostitutes (massage parlors, health studios, escort agencies)
6. Regular partner but casual episode with prostitute

13.
1. All female
2. All male
3. Both male and female

14.
1. Once
2. Twice
3. Thrice, etc.

15.
1. Vagina only
2. Rectum only
3. Vagina mainly, rectum occasionally
4. Rectum mainly plus mouth
5. Vagina mainly, but rectum and mouth occasionally
6. Vagina mainly but oral cavity without rectum
7. Mouth mainly

16.
1. No never
2. Rarely
3. Only in the last four weeks

17.
1. None
2. Yes, the pill only
3. Yes, one of the partners has been on the pill
4. Yes, but none of them have been on the pill
5. Yes, tubal ligation
6. Yes, other

18.
1. Yes, same frequency as usual
2. Yes, but greater frequency
3. Yes, but I have had oral or rectal intercourse which I do not have usually
4. No intercourse at all, but have masturbated
5. No intercourse, and no masturbation

APPENDIX 6 (Cont'd.)

19.
1. Nil or less than 20 gm.
2. 20 - 40 gm.
3. 40 - 80 gm.
4. More than 80 gm.

(For conversion see alcohol ready reckoner attached Appendix 6C).

20.
1. Mild - sedentary job, no sport
2. Moderate - sedentary job and active sport
3. Severe - manual job and active sport, athletic training

21.
1. It is the same as gonorrhoea
2. From intercourse in the last few days
3. Maybe from infection from my partner or 'strain' or virus
4. I don't know (or) the cause is not established

22.
1. Resolved in 7 days on 500 mg. QID tetracycline
2. Resolved in 14 days on above for 1 week only
3. Resolved in 21 days or 28 days after addition of Trimethoprim-Sulpha methoxazole to the above regime
4. Symptoms persist after 28 days i.e., no interim period of relief of symptoms, which would demarcate a return of symptoms as a recurrence

23.
0. No recurrence
1. 1 recurrence
2. 2 recurrences etc.

24.
1. Yes, with tetracycline
2. Yes, with pessaries/tablets for vaginitis
3. Yes, both
4. Not treated

25.
1. No psychological complications
2. Anxiety - neurosis

APPENDIX 6A

CODE SHEET FOR COUNTRY OF BIRTH. QUESTION NO. 5

Part 11 : Code Lists

Chapter 11.1 : Code Lists - General

Section 11.1.1 : Birthplace

Sub-section 11.1.1.1 : Birthplace Code List

BIRTHPLACE CODE LIST

Code	Birthplace
	Australasia
00	Australia (a)
01	New South Wales
02	Victoria
03	Queensland
04	South Australia
05	Western Australia
06	Tasmania
07	Northern Territory
08	Australian Capital Territory
10	Norfolk Island
11	Cocos (Keeling) Islands
12	Christmas Island
13	Papua
14	New Guinea (Trust Territory)
16	New Zealand
	Europe
17	England
18	Wales
19	Scotland
20	Northern Ireland
21	Ireland, Republic of
22	Ireland, Undefined (b)
23	Malta
24	Other Commonwealth Countries in Europe
25	Albania
26	Austria
27	Belgium
28	Bulgaria
29	Czechoslovakia
30	Denmark
31	Estonia
32	Finland
33	France
34	Germany
35	Greece.
36	Hungary
37	Italy
38	Latvia
39	Lithuania
40	Netherlands
41	Norway
42	Poland
43	Portugal
44	Romania
45	Spain
46	Sweden
47	Switzerland
49	Ukraine
50	U.S.S.R. (n.e.i.)
51	Yugoslavia
52	Other European Countries
	Asia
53	Ceylon
54	Cyprus
55	Hong Kong
56	India
57	Malaysia
58	Pakistan
59	Singapore
60	Other Commonwealth Countries in Asia
61	West Irian
62	Thailand
63	Burma
64	China
65	Indonesia
66	Israel
67	Japan
68	Lebanon
69	Philippines
70	Syria
71	Turkey
72	Other Asian Countries
	Africa
74	Republic of South Africa
75	Commonwealth Countries in Africa
76	United Arab Republic (Egypt
77	Other African Countries
	America
78	Canada
79	Other Commonwealth Countries in America
84	United States of America (including Hawaii)
85	Other American Countries

(7 October 1970 - Operative 1971, and subsequent years)

Code	Birthplace
	Pacific Islands
86	Fiji
87	Solomon Islands
88	Other Commonwealth Pacific Islands
89	Nauru
90	New Caledonia
91	New Hebrides
92	Other Pacific Islands
	At Sea and Unspecified
98	At Sea
99	Unspecified

(a) Use 00 (Australia) for birthplace of parents of bridegroom and bride instead of codes 01 to 08 for individual States.

(b) If any additional information available, code to 20 or 21, using list, map or gazettes when necessary to determine allocation. Only if information inadequate should code 22 be used.

(7 October 1970)

APPENDIX 6B

CODE SHEET FOR QUESTION 6

OCCUPATIONAL STATUS IN AUSTRALIA

7 - Point Scale. Summary only. (For detailed list of all occupations refer to Appendix B: Status and Prestige in Australia by A. A. Congalton, F. W. Cheshire Publishing Pty. Ltd., Melbourne 1969.)

SCALE OF OCCUPATIONAL STATUS IN AUSTRALIA

GRADE	PROFESSIONALS	PROPRIETORS AND MANAGERS	OFFICE AND SALES WORKERS	FARMERS	SKILLED WORKERS	SEMI-SKILED WORKERS	UNSKILLED WORKERS	RANK
A	1.57 DOCTOR 1.58 UNIVERSITY PROFESSOR 1.81 SOLICITOR 1.86 ARCHITECT 1.92 ENGINEER, professional	1.98 DIRECTOR, large financial or industrial enterprise						1
	2.03 DENTIST 2.19 VETERINARY SURGEON 2.32 CLERGYMAN, with university degree	2.01 OWNER BUSINESS, valued at more than £50,000						
	2.32 UNIVERSITY LECTURER 2.47 SCHOOL PRINCIPAL							
B	2.75 NEWSPAPER EDITOR	2.54 MANAGER, large financial or industrial enterprise 2.62 COMPANY MANAGER, large business 2.66 OWNER BUSINESS, valued at £15,000-£50,000 2.97 DEPARTMENTAL MANAGER, large business	2.68 REGISTERED PUBLIC ACCOUNTANT 2.71 DEPARTMENTAL HEAD IN GOVERNMENT SERVICE	2.89 GRAZIER				2
	3.02 PHYSIOTHERAPIST 3.16 CLERGYMAN, some university training but not a degree 3.28 SECONDARY SCHOOL TEACHER 3.73 SOCIAL WORKER 3.73 TRAINED NURSE 3.83 CLERGYMAN, no university training 3.87 CAPTAIN, in the Permanent Army 3.90 TRAINED LIBRARIAN	3.35 OWNER BUSINESS, valued at £7,500-£15,000 3.50 SALES MANAGER, large business 3.53 OFFICE MANAGER, general 3.55 DEPARTMENTAL MANAGER, general 3.61 WORKS MANAGER, large business	3.47 ACCOUNTANT, to a business	3.07 GENTLEMAN FARMER, well established, does not supervise directly the work on his property 3.31 LARGE FARM OWNER, supervises work on own land, but seldom works actively on it 3.40 GENTLEMAN FARMER, reasonably well established, does not supervise directly the work on his property 3.44 SHEEP FARMER, well established 3.90 DAIRY FARMER, well established				3
	4.29 PRIMARY SCHOOL TEACHER	4.04 OWNER BUSINESS, valued at £1,500-£7,500	4.21 PRIVATE SECRETARY, to executive 4.36 REAL ESTATE AGENT 4.43 RADIO ANNOUNCER	4.30 FARMER, actively operates own land with hired help 4.31 FARMER, owner, operates land with family 4.33 FARM MANAGER, supervises property	4.45 WATCHMAKER, own business			4
C	4.65 AIR HOSTESS 4.65 NEWS REPORTER	4.97 OWNER BUSINESS, valued at less than £1,500	4.63 LAND AGENT 4.70 INSURANCE AGENT 4.75 POSTMASTER 4.95 BANK CLERK or TELLER		4.59 ELECTRICIAN, own business 4.83 JOBBING MASTER BUILDER 4.91 CARPENTER, own business 4.99 PLUMBER, own business			
		5.81 PUBLICAN	5.18 BOOKKEEPER 5.28 STENOGRAPHER 5.39 COMMERCIAL TRAVELLER 5.52 GOVERNMENT OFFICE CLERK 5.66 MOTOR CAR SALESMAN 5.74 SALESMAN, bookstore 5.90 SALESMAN, furniture store 5.92 SALESMAN, department store	5.09 SHAREMILKER, owns cattle or machinery 5.11 FARMER, tenant, operates land with family 5.85 FARMER, tenant, owns no capital, animals or machinery	5.07 POLICEMAN 5.20 INDUSTRIAL FOREMAN 5.53 UNDERTAKER 5.67 ELECTRICIAN, wages 5.93 PRINTER, wages 5.97 MOTOR MECHANIC, wages	5.71 BEAUTY OPERATOR		5
		6.09 BOOKMAKER	6.09 ROUTINE OFFICE CLERK 6.14 POST OFFICE CLERK 6.26 TELEPHONE OPERATOR	6.50 FARM LABOURER, established	6.02 BAR MANAGER 6.07 FITTER 6.13 CARPENTER, wages 6.15 TRAINER, racehorse 6.20 TELEPHONE REPAIRMAN 6.21 PAINTER, wages 6.27 BUTCHER, wages 6.30 PLASTERER, wages 6.38 BRICKLAYER 6.44 COOK, restaurant 6.48 ENGINE DRIVER or FIREMAN	6.10 BARBER 6.22 FIREMAN 6.37 MACHINIST 6.42 JOCKEY 6.44 HOUSEKEEPER 6.49 TAXI DRIVER		6
D			6.55 SHOP ASSISTANT 6.95 SALES PERSON, chain store	6.53 SHEARER 6.77 DROVER 6.91 JACKAROO		6.53 BUILDING CONSTRUCTION WORKER 6.56 CARRIER or HAULIER 6.57 STOREMAN 6.64 BUS DRIVER 6.70 MINER 6.73 RAILWAY CONDUCTOR 6.75 TRAM CONDUCTOR or DRIVER 6.84 PETROL STATION ATTENDANT	6.66 FACTORY OPERATIVE 6.90 MILK DELIVERYMAN	
				7.11 SHEARER 7.33 FARM LABOURER, migratory 7.38 LABOURER, seasonal		7.01 LORRY or TRUCK DRIVER 7.11 RAILWAY SHUNTER 7.13 RAILWAY PORTER 7.21 PACKER 7.23 BARMAN 7.36 BARMAID 7.38 WHARF LABOURER	7.12 NIGHTWATCHMAN 7.14 WAITRESS 7.18 DOMESTIC WORKER 7.19 CANE CUTTER 7.25 ITINERANT WORKER 7.26 JANITOR 7.42 CHARWOMAN 7.44 LABOURER, unskilled 7.47 ROADSWEEPER	7

CODE SHEET FOR QUESTION 19.

ALCOHOL CONVERSION TABLE

1. Multiply grams by number consumed.
2. Sub-total each sub-section.
3. Refer grand total to the coding in the questionnaire.

BEER (including Coopers)

	Grams	No.
Bottle.....	25	
Pint.....	15	
Schooner.....	10	
Butcher.....	5	
	Sub-total	

SPIRITS (including whisky, rum, gin, brandy usually 26 nips to the bottle)

	Grams	No.
Nip (1 fl. oz.)	10	
Half nip (½fl. oz.)	5	
	Sub-total	

WINES (bottle = 26 oz., flagon = 3 bottles)

		Grams	No.
Claret, Hock	bottle	80	
	usual glass	10	
Port, Sherry	bottle	110	
	usual glass	10	
		Sub-total	

GRAND TOTAL

THE UNIVERSITY OF ADELAIDE COMPUTING CENTRE

PROGRAM.....

PROGRAMMER.....

JOB NAME.....CHARGE CODE.....

DATE.....

PAGE.....OF.....

DATA CODING FORM

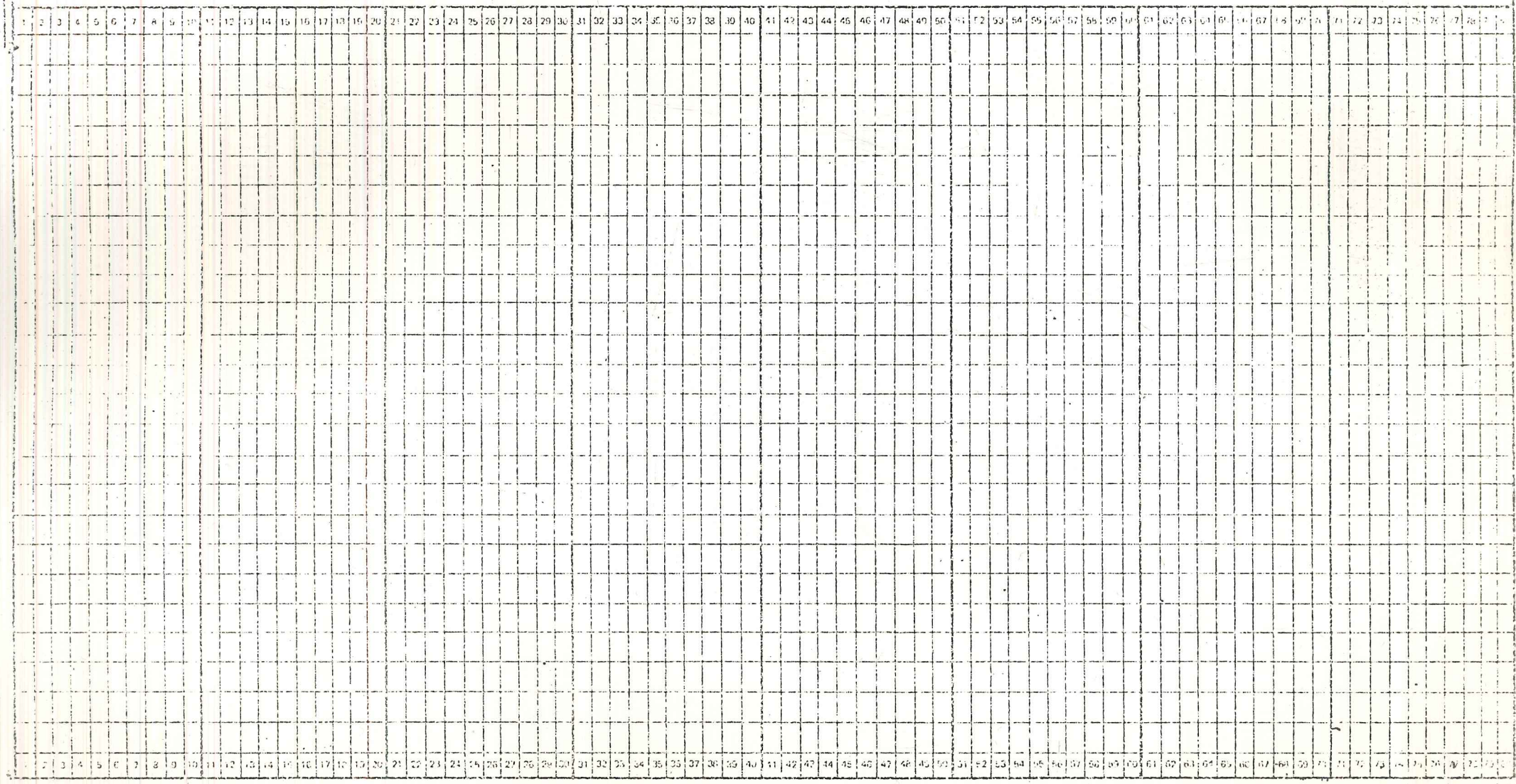
NOTE

ALPHA.....Ø I Z

NUMERIC.....0 1 2

CONSTANT INFORMATION

FIELD HEADINGS



APPENDIX 7.

APPENDIX 8

DEPARTMENT OF COMMUNITY MEDICINE

UNIVERSITY OF ADELAIDE .

Computer Programme for Data Analysis compiled from the Statistical Package for the Social Sciences.

VOGELBACK COMPUTING CENTER
NORTHWESTERN UNIVERSITY

S P S S - - STATISTICAL PACKAGE FOR THE SOCIAL SCIENCES

VERSION 6.50 -- APRIL 1, 1976

```
                FILE NAME       NSUSTUDY, NSU IN THE HUMAN MALE
                DATA LIST       FIXED/1 NOS 1-3, AGE 12-13, MARSTAT 15, CBPT 17-18, CBF 19-20,
                                CRM 21-22, OCCUP 24, SXO 42, FRIC 38, NPART 40, TYPIC 46, CPAR 50
                                EPIEX 28-29, EPIN 30-31, EDUC 26, SXEDUC 34, VDEDUC 36, NSUED 58,
                                CHFRIC 52, ALCHO 54, EXER 56, RESP 60, NOREC 62, COMP 71

THE DATA LIST PROVIDES FOR  24 VARIABLES AND  1 RECORDS (*CARDS*) PER CASE.  A MAXIMUM OF   71 COLUMNS ARE USED ON A RECORD.

DUMP OF THE CONSTRUCTED FORMAT STATEMENT..
        (F3.0,8X,F2.0,1X,F1.0,1X,3F2.0,1X,F1.0,17X,F1.0,T38,F1.0,1X,F1.0,5X,F1.0,3X,F1.0
        ,T28,2F2.0,T26,F1.0,7X,F1.0,1X,F1.0,21X,F1.0,T52,F1.0,1X,F1.0,1X,F1.0,3X,F1.0,1X
        ,F1.0,8X,F1.0)

                INPUT MEDIUM    CARD
                N OF CASES      UNKNOWN
                VAR LABELS      MARSTAT,MARITAL STATUS/CBPT,COUNTRY OF BIRTH OF PATIENT/SXO, SEXU
                                AL ORIENTATION/FRIC, FREQUENCY OF INTERCOURSE/NPART,NO OF SEXUAL
                                PARTNERS/TYPIC, TYPE OF INTERCOURSE/CPAR, CONTRACEPTIVE METHOD/
                                EPIEX, EXTROVERSION INTROVERSION SCORE/EPIN, NUEROTICISM SCORE/
                                EDUC, EDUCATIONAL STATUS/SXEDUC, SEX EDUCATION/VDEDUC VD EDUCATIO
                                N /NSUED,HOW DOES PT THINK NSU ACQUIRED/CHFRIC, CHANGE IN FREQUEN
                                CY OF INTERCOURSE/ALCHO, ALCHOL INTAKE LAST 7 DAYS/EXER, PHYSICAL
                                 EXERTION LAST 7 DAYS/RESP, RESPONSE TO TREATMENT REGIME/
                                NOREC, CLINIC RECORD OF RECURRENCES/COMP,COMPLICATIONS
                RECODE          CBPT(00 THRU 16=1)(17 THRU 22=2)(23,24,35,37,45,=3)(25 THRU 34,36
                                ,38 THRU 52=4)(53 THRU 72 77=5)(78 THRU 85=6)
                RECODE          CBF (00 THRU 16=1)(17 THRU 22=2)(23,24,35,37,45,=3)(25 THRU 34,36
                                ,38 THRU 52=4)(53 THRU 72 77=5)(78 THRU 85=6)
                RECODE          CRM (00 THRU 16=1)(17 THRU 22=2)(23,24,35,37,45,=3)(25 THRU 34,36
                                ,38 THRU 52=4)(53 THRU 72 77=5)(78 THRU 85=6)
                RECODE          EDUC(1,2,3,=1)(4,5,=2)(6,7,8,9,=3)/ SXEDUC(1=1)(2,3,4,=2)(5=3)
                                (6,7,=4)(8,9,=5)/ VDEDUC(1=1)(2,3,4=2)(5=3)(6,7,=4)(8,9,=5)
                RECODE          EPIEX (1 THRU 13=1)(14 THRU 18=2)(19 THRU HI=3)(1 THRU 10=4)/
                RECODE          EPIN (1 THRU 9=1)(10 THRU 14=2)(15 THRU HI=3)/
                RECODE          NPART(1,2,6,=1)(3,4,=2)(5=3)
                RECODE          AGE(1 THRU 14=1)(15 THRU 19=2)(20 THRU 24=3)(25 THRU 29=4)
                                (30 THRU 49=5)(50 THRU HI=6)
                VALUE LABELS    AGE (1) UNDER 15 (2) UNDER 20 (3) UNDER 25 (4) UNDER 30 (5) UNDER
                                50 (6) OVER 50/
                                MARSTAT (1) SINGLE (2) MARRIED (3) WIDOWED (4) DIVORCED
                                (5) DEFACTO-ATTACHED (6) SEP/
                                SXO (1) HETEROSX (2) HOMOSX (3) BIX/
                                FRIC (1)NIL (2) DAILY (3) TWICEWK (4) ONCEWK (5) ONCEFORT (6) MO
                                (7) IRREG/
                                NPART (1) REGULAR (2) CASUAL (3) PROS/
                                TYPIC (1) VAG (2) RECTAL (3) VAGRECT (4) RECTORAL (5) VAGORALRECT
                                (6) VAGORAL (7) ORAL/
                                CPAR  (1) NIL (2) PILL (3) ONEPILL (4) NOPILL (5) TUBES (6)OTHER/
                                EDUC (1) PRIM (2) SEC (3) LEAVING (4) TRADE (5) TECH (6) MATRIC
```



```
                                (7) CAE (8) UNI (9) GRAD/
                                SXEDUC (1) NO (2) PARENT (3) TEACHER (4) PEERS (5) MEDIA/
                                VDEDUC (1) NO (2) PARENT (3) TEACHER (4) PEERS (5) MEDIA/
                                NSUED (1) ICCAS (2) ICREG (3) STRAIN (4) DONTKNOW/
                                CHFRIC (1) SAME (2) MORE (3) ORDRECT (4) MAST (5) NIL/
                                ALCHO (1) NIL (2) TO206M (3) TO806M (4) OVER806M/
                                EXER (1) MILD (2) MODERATE (3) SEVERE/
                                RESP (1) 7TETRA (2) 14TETRA (3) 21TO2RPLUSSUTM (4) PERSIST/
                                COMP (1) NIL (2) REITERS (3)PROSTAT (4) EPIDORCH (5) STR (6) ANX
                READ INPUT DATA

END OF FILE ON FILE
AFTER READING    220 CASES FROM SUBFILE NSUSTUDY
```

APPENDIX 9

CASE SHEET OF PATIENT

VDCC, ADELAIDE.

VENEREAL DISEASES CONTROL CENTRE

Clinic No.

Surname..... Given Names ..... Birth Date...../...../..... Age..... Date...../...../.....

(Indicate name by which usually known)

Address/es ..... Country of Origin..... Years in Australia.....

Notfn. No

..... Occupation.....

Marital Status—
S M W D Sep. D/f

..... Place of Work.....

Referred by—
C.T. Self Friend P.D. Hosp. Oth

Phone No..... Contacting Address, including Phone No.....

History: (symptoms, duration, recent treatment, dates and types contacts) and examination.....

Previous S.T.D. History—

Allergies, other relevant illnesses—

Provl. Diagnosis .....

Final Diagnosis .....

Initial investigations and results.....

Initial Treatment .....

Next Visit ☐ Epidemiology Required Yes ☐ No ☐ Defer ☐

FOLLOW UP AND NEW EPISODES (RULE OFF EARLIER EPISODE)

Date	History and Examination	Bacteriology	Serology V	W	K	R	F	Urine	Treatment	Due Next Visit	Diagnosis of New Episodes	Epid. Required	Notfn

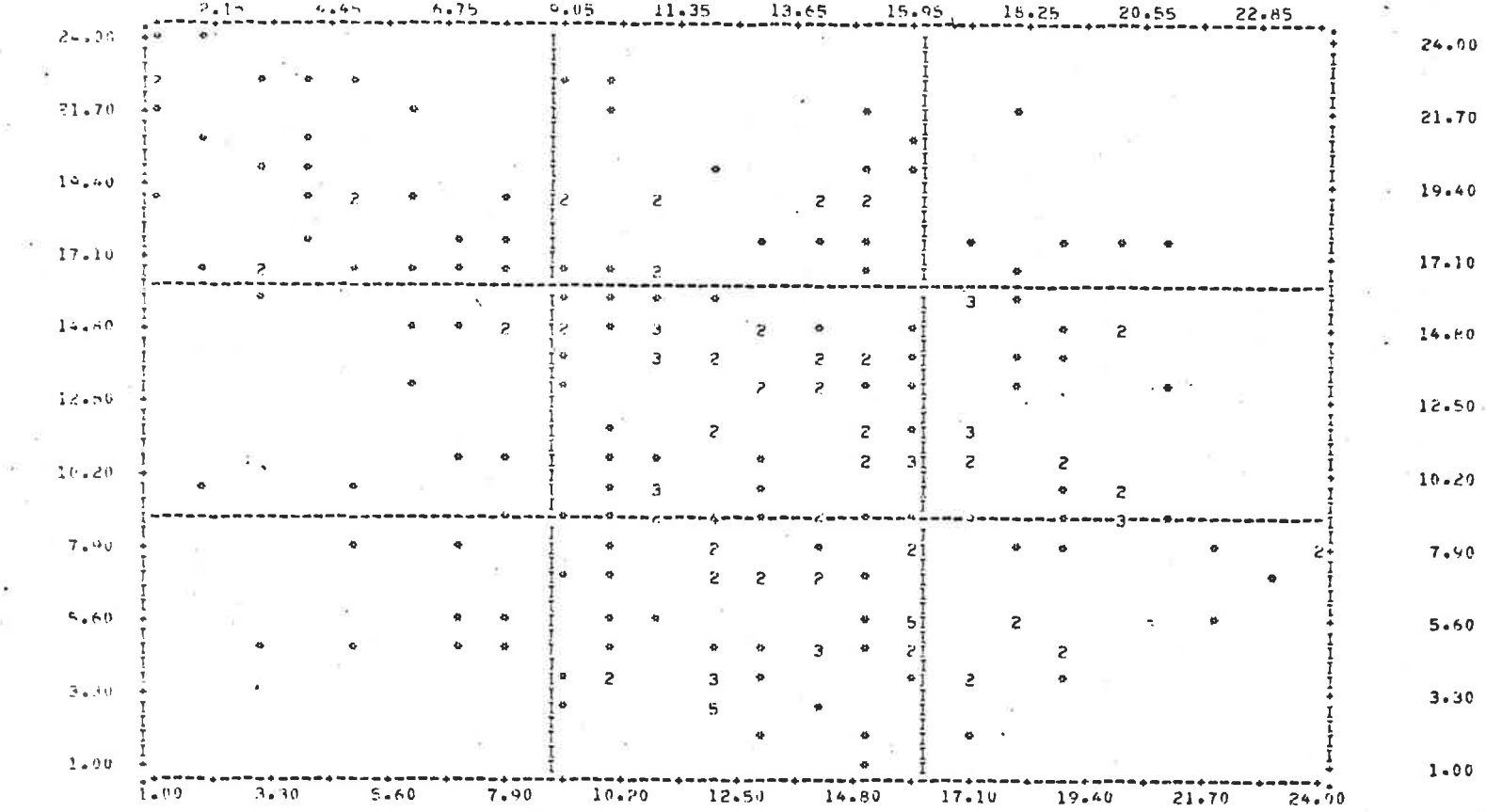
77/11/08 PAGE 2

```
SCATTERGRAM    EPIN WITH EPIEX/
STATISTICS     1,3
FINISH
```

GIVEN 2 VARIABLES. INITIAL CM ALLOWS FOR 3926 CASES, MAXIMUM CM ALLOWS FOR 11606 CASES.

77/11/08 PAGE 3

FILE ^SUSTUDY (CREATION DATE = 77/11/08) NSU IN THE HUMAN MALE
SCATTERGRAM OF (ROW) EPIN NEUROTICISM SCORE (ACROSS) EPIEX EXTROVERSION INTROVERSION SCORE



77/11/08 PAGE 4

STATISTICS..

CORRELATION (R)=	-.35592	SIGNIFICANCE R =	.00001		
PLOTTED VALUES =	239	EXCLUDED VALUES=	0	MISSING VALUES =	0

APPENDIX 11

E and N scores of patients comprising the group with venereoneurosis

NSU PATIENTS

E and N scores of the group with venereoneurosis

Patient	EPI scores (individual values)	
	E	N
1	15	14
2	10	16
3	19	11
4	04	07
5	18	18
6	09	23
7	05	06
8	18	21
9	05	14
10	09	20
11	14	10
12	09	10
13	02	24
14	09	17
15	03	09
16	05	09
17	10	16
18	02	15
19	11	20
20	17	18
21	12	19
22	17	10
23	02	18
24	15	15
25	11	17
26	05	23
27	11	17
28	13	15
29	07	23

Patient	EPI scores (individual values)	
	E	N
30	05	18
31	15	16
32	02	19
33	15	09
34	04	03
35	12	15
36	02	21
37	05	16
38	03	03
39	12	08
Mean	9.28	14.9
SD	5.33	5.53
SE	0.85	0.89
t	3.26	6.56
P	< 0.05	< 0.05

APPENDIX 12

Crosstabulation of recurrence rate of N.S.U. with socio-economic indicators (occupation and level of education)

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FILE NSUSTUDY (CREATION DATE = 77/11/02) NSU IN THE HUMAN MALE

CROSSTABULATION OF EDUC EDUCATIONAL STATUS BY NOREC CLINIC RECORD OF RECURRENCES PAGE 1 OF 1

EDUC	NOREC 0	1.	2.	3.	4.	5.	6.	ROW TOTAL
1.	46 41.4 50.0 19.2	30 27.0 41.1 12.6	15 13.5 41.7 6.3	11 9.9 64.7 4.6	2 1.8 25.0 .8	6 5.4 60.0 2.5	1 .9 33.3 .4	111 46.4
2.	25 36.8 27.2 10.5	21 30.9 28.8 8.8	10 14.7 27.8 4.2	4 5.9 23.5 1.7	5 7.4 62.5 2.1	2 2.9 20.0 .8	1 1.5 33.3 .4	68 28.5
3.	21 35.0 22.8 8.8	22 36.7 30.1 9.2	11 18.3 30.6 4.6	2 3.3 11.8 .8	1 1.7 12.5 .4	2 3.3 20.0 .8	1 1.7 33.3 .4	60 25.1
COLUMN TOTAL	92 38.5	73 30.5	36 15.1	17 7.1	8 3.3	10 4.2	3 1.3	239 100.0

RAW CHI SQUARE = 10.38695 WITH 12 DEGREES OF FREEDOM. SIGNIFICANCE = .5821

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FILE NSUSTUDY (CREATION DATE = 77/11/02) NSU IN THE HUMAN MALE

CROSSTABULATION OF OCCUP BY NOREC CLINIC RECORD OF RECURRENCES PAGE 1 OF

OCCUP	NOREC 0	1.	2.	3.	4.	5.	6.	ROW TOTAL
1.	3 60.0 3.3 1.3	0 0 0 0	2 40.0 5.6 .8	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	5 2.1
2.	5 33.3 5.4 2.1	7 46.7 9.6 2.9	0 0 0 0	1 6.7 5.9 .4	0 0 0 0	2 13.3 20.0 .8	0 0 0 0	15 6.3
3.	9 39.1 9.8 3.8	8 34.8 11.0 3.3	2 8.7 5.6 .8	3 13.0 17.6 1.3	1 4.3 12.5 .4	0 0 0 0	0 0 0 0	23 9.6
4.	15 41.7 16.3 6.3	12 33.3 16.4 5.0	5 13.9 13.9 2.1	2 5.6 11.8 .8	2 5.6 25.0 .8	0 0 0 0	0 0 0 0	36 15.1
5.	19 33.9 20.7 7.9	19 33.9 26.0 7.9	8 14.3 22.2 3.3	4 7.1 23.5 1.7	2 3.6 25.0 .8	4 7.1 40.0 1.7	0 0 0 0	56 23.4
6.	17 36.2 18.5 7.1	10 21.3 13.7 4.2	11 23.4 30.6 4.6	3 6.4 17.6 1.3	2 4.3 25.0 .8	1 2.1 10.0 .4	3 6.4 100.0 1.3	47 19.7
7.	7 35.0 7.6 2.9	5 25.0 6.8 2.1	2 10.0 5.6 .8	4 20.0 23.5 1.7	0 0 0 0	2 10.0 20.0 .8	0 0 0 0	20 8.4
8.	3 60.0 3.3 1.3	2 40.0 2.7 .8	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	5 2.1
COLUMN TOTAL	92 38.5	73 30.5	36 15.1	17 7.1	8 3.3	10 4.2	3 1.3	239 100.0

(CONTINUED)

77/11/02 PAGE 2

FILE NSUSTUDY (CREATION DATE = 77/11/02) NSU IN THE HUMAN MALE

CROSSTABULATION OF OCCUP BY NOREC CLINIC RECORD OF RECURRENCES PAGE 2 OF

OCCUP	NOREC 0	1.	2.	3.	4.	5.	6.	ROW TOTAL
9.	14 43.8 15.2 5.9	10 31.3 13.7 4.2	5 15.6 13.9 2.1	0 0 0 0	1 3.1 12.5 .4	1 3.1 10.0 .4	0 0 0 0	32 13.4
COLUMN TOTAL	92 38.5	73 30.5	36 15.1	17 7.1	8 3.3	10 4.2	3 1.3	239 100.0

RAW CHI SQUARE = 48.20440 WITH 48 DEGREES OF FREEDOM. SIGNIFICANCE = .4644

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Note

The format of writing and editing of this thesis is in accordance with the guidelines laid down in the following reference. These guidelines have been followed with regard to items such as capitals, punctuation, abbreviations, quotations as well as bibliographical citations. Journals and books are underlined (in the absence of italics), whereas the titles of articles are placed in inverted commas; the edition of a book (year) is placed in brackets next to the author's name.

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