

Etiologic Factors in Carcinoma of the Penis*

Robert Schrek, M.D., and Herman Lenowitz, M.D.

(From the Tumor Research Unit and the Department of Urology, Veterans Administration, Hines, Illinois)

(Received for publication November 12, 1946)

The main objective of this paper is to evaluate the significance of certain etiologic factors in carcinoma of the penis. The factors considered are venereal disease, circumcision, and the age and race of the patients.

A second objective is to illustrate the use of control groups in a statistical study. The use of controls is routine in experimental work and every experimental group is checked by one or more controls. In statistical studies on cancer, however, control groups are not as frequently used. This paper exemplifies several types of control groups and considers the necessity and advantages in the use of controls in statistical work.

Clinical and control groups.—The first table summarizes some statistics on the clinical and control groups studied. The clinical group under investigation consisted of 139 men with carcinoma of the penis. These patients were admitted to Hines Veterans Hospital during the 14 year period from 1931 to 1944. A detailed report on these men was published by Lenowitz and Graham (1).

1931 to 1944. For most purposes, this group is too large and cumbersome and has, therefore, limited value as a control.

A second control group, B, was composed of 236 men admitted during 1931 to 1944 with carcinoma of the kidney. This group was useful in studying the incidence of venereal disease. It could not be used, however, to determine the incidence of circumcision because these patients had not been questioned in regard to this factor.

A third group, C, was set up consisting of 209 patients who were admitted consecutively to the tumor clinic in 1944. These patients were interviewed by Mr. Philipp Zinkgraf for a study conducted by the U. S. Public Health Service.

The last group included 4 men with carcinoma of the penis and 2 Jewish men. For theoretical reasons, it seemed advisable to exclude these 6 patients leaving a new control group, D, of 203 men with tumor.

The number of colored men in the last control group

TABLE I: STATISTICAL DATA ON PATIENTS WITH CARCINOMA OF PENIS AND ON PATIENTS IN THE CONTROL GROUPS

Group	No. of patients	Year of admission	World War II veterans, %	Average age ± Standard deviation	
				All patients	Excluding World War II veterans
<i>Clinical group</i>					
Men with carcinoma of penis	139	1931-1944	0.0	49.26 ± 9.11	—
<i>Control groups</i>					
A. All men with tumor	14,472	1931-1944	3.8	—	—
B. Men with carcinoma of kidney	236	1931-1944	0.4	48.96 ± 6.64	—
C. Unselected men with tumor	209	1944	16.7*	50.96 ± 11.61	55.31* ± 6.74
D. Selected men with tumor	203	1944	16.7*	51.01 ± 11.58	55.36* ± 6.77
E. Colored men with tumor	55	1945	36.4*	46.23 ± 13.29	54.50* ± 6.67
F. Colored men with other diseases	113	1945	52.2*	40.60* ± 13.11	52.87* ± 5.34

* Percentage or average is significantly different from that for the clinical group (P is less than .01).

The first control group, A, consisted of the 14,472 male patients admitted to the hospital with tumor during

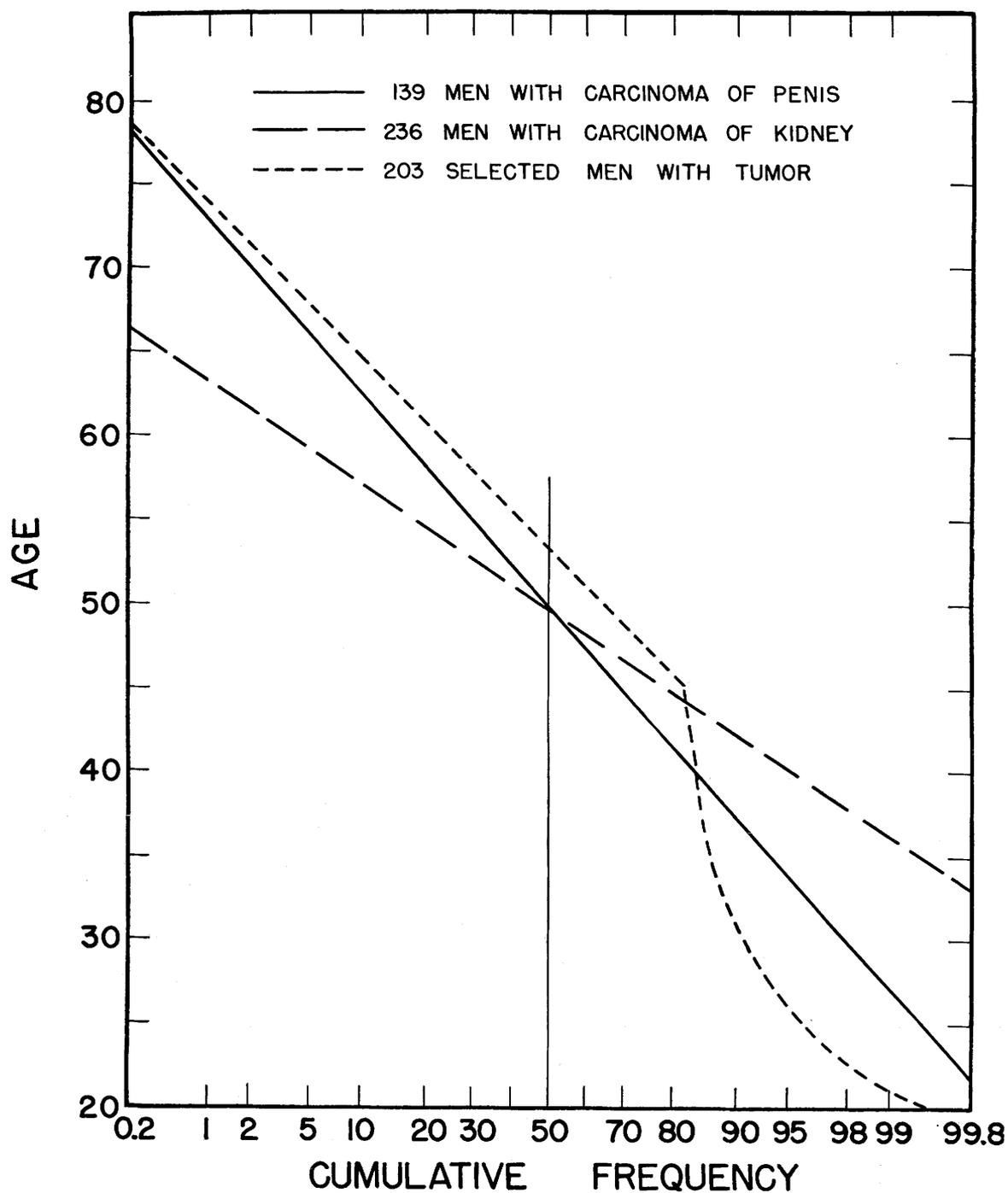
* Presented at the Annual Meeting of the American Association of Pathologists and Bacteriologists March 8, 1946 (*Am. J. Path.*, 22:637-638, 1946).

Published with the permission of the Chief Medical Director, Department of Medicine and Surgery, Veterans Administration, who assumes no responsibility for the opinions expressed or the conclusions drawn by the authors.

was insufficient for some of the studies. Therefore, all colored men who happened to be in the hospital on a certain day in July, 1945 were interviewed. This procedure yielded 2 new control groups, E and F, consisting of 55 colored men with tumor and 113 with other diseases.

Age.—To understand the age distribution of the clinical and control groups, it is first necessary to consider the composition of the population from which the

patients are derived. During 1931 to 1941, the patients of this hospital were obtained from a fixed group which consisted chiefly of veterans of World War I and to a lesser extent of Spanish American War veterans. The average age of the population from which the patients were derived was, therefore, increasing from



DESCRIPTION OF FIGURE 1

FIG. 1.—Cumulative frequency curve of age distribution of clinical group including 139 patients with carcinoma of penis. Curve plotted on arithmetic probability paper.

year to year. From 1942 to 1944 veterans of World War II were also admitted to the hospital and in rapidly increasing numbers.

The 139 patients with carcinoma of the penis were admitted during 1931 to 1944 and none of them were World War II veterans. The age distribution of the clinical group is represented in Fig. 1 by means of a cumulative frequency curve constructed on arithmetic probability paper. First of all, it is seen that the curve is a straight line. This finding indicates that the frequency curve is symmetrical or normal (2). The group had an average age of 49.26 years with a standard deviation of 9.11 years. The 39 colored men in the group had a significantly lower average age (46.35) and a lower standard deviation (5.25) than the white men (50.40 ± 10.00 years).

The control group, B, consisted of 236 men admitted during 1931 to 1944 with cancer of the kidney. Only one of the patients (0.4 per cent) served in World War II. The cumulative frequency curve (Fig. 1) is also a straight line. A comparison of this curve with that for the clinical group shows that the lines intersect at the point for 50 per cent and that the slope of the line for the control group is slightly less than that for the clinical group. The average age is 48.96 years which is practically identical with the 49.26 years for the clinical group. The standard deviation is 6.64 years which is significantly less than the 9.11 for the patients with cancer of the penis. The adequacy of this group B as a control is considered later.

Control group D consisted of 203 selected men with tumor who were admitted during 1944. The group had, therefore, a high percentage (16.7 per cent) of World War II veterans. The mixture of the young men from the second World War and the older veterans of the previous wars resulted in the irregular age distribution shown in Fig. 1. The curve for this group consists of two distinct parts. The first part representing 80 per cent of the patients in the group is a straight line. The second part of the curve is curvilinear and includes all of the World War II veterans. The curve exemplifies the value of this type of graph. It shows distinctly that the group of patients is derived from two distinct populations. In spite of the high percentage of World War II veterans the average age of the group (51.01 years) and the standard deviation (11.58) are not appreciably different from that for the clinical group (49.26 ± 9.11 years).

If the World War II veterans are excluded from this control group D, the age distribution has a cumulative frequency curve which is a straight line. The curve is distinctly higher but parallel to that for the clinical group. The average age of the subsidiary control group D' is significantly higher (55.31 years) than that for

the clinical group (49.26). It is to be noted that both groups were drawn from a fixed population which is gradually aging. The patients of the control group were admitted in 1944 while those for the clinical group during 1931 to 1944 (average date of admission was February, 1937). The men in the control group were admitted then, on the average, 7 years after those of the clinical group and were 6 years older.

In comparison with the clinical group, it should be noted that the control group D (selected men with tumor) includes a number of relatively young patients and that the subsidiary group F' (group F but excluding World War II veterans) have a relatively high average age. The question arises now whether group D or D' are adequate controls for the clinical group. In judging a control group, one has to take into consideration the factors that are being studied. In an investigation on the incidence of cancer, age has to be rigidly controlled. In this paper the incidence of cancer in the control groups was not studied. The factors that were considered included (a) the incidence of circumcision in infancy and boyhood, (b) the incidence of venereal disease and (c) the percentage of colored men. One would not expect that these factors should be greatly affected by minor variations in age. Therefore, it would seem that either group D or D' would be adequate as a control. As a further precaution both groups D and D' were used. In all cases, the statistical constants for group D and subgroup D' were approximately the same in spite of the differences in the average ages. This finding supports the belief that age is not a vital factor in these studies.

Similar analyses were made on control group E, 55 colored men with tumor and F, 113 colored men without tumor. These groups have a high percentage of World War II veterans (36.4 and 52.2 per cent respectively) and low average ages (46.23 and 40.60 years). Excluding World War II veterans, the average ages (54.50 and 52.87 years) were approximately as high as that for the subsidiary control group D' (55.31 years).

In determining the statistical constants for the factors studied in this paper, it was found that there were no large differences in the statistical constants for group E and F and the subgroups E' and F', in spite of the higher average ages for the subgroups. In one case, however, there did appear a minor, but interesting, difference between the groups for colored patients and the corresponding subsidiary groups which exclude World War II veterans (see Table IV).

It may be concluded from this analysis of the age distributions that the groups B, D, E, and F are adequate controls to the clinical groups for the particular factors considered in this paper.

Venereal disease.—Table II shows that a history of

syphilis was obtained in a greater percentage of patients in the clinical than in the control groups both for white men (32 and 7.6 per cent respectively) and for colored (67 and 17.5 per cent). Similarly gonorrhoea was more frequent in men with cancer of the penis than in the control patients (36 and 22.0 per cent respectively for white men and 72 and 42.1 per cent for colored). In fact, the men with cancer of the penis had syphilis approximately 4 times as frequently, and gonorrhoea about twice as frequently as that obtaining in the control groups. Only 48 per cent of the white patients with

appreciably affect the percentages in the table. The observed differences in the percentages do not appear to be the result of the selection of cases or to other fortuitous factors. The differences in the incidence of venereal disease in the clinical and control groups are statistically and biologically significant. Men with cancer of the penis have relatively a very high incidence of syphilis and a moderately high incidence of gonorrhoea.

To aid in the evaluation of the finding of a correlation between cancer of the penis and venereal disease, it is necessary to consider the problem whether a patient

TABLE II: VENEREAL DISEASE IN PATIENTS WITH CARCINOMA OF PENIS AND IN CONTROL PATIENTS

Group	No. of patients	Syphilis	Percentage of patients with history of Gonorrhoea	Both diseases	Neither disease
WHITE MEN					
<i>Clinical group</i>					
With carcinoma of penis	100	32	36	16	48
<i>Control groups</i>					
Total	409	7.6*	22.0*	3.9*	74.3
B. With carcinoma of kidney	221	9.0	26.2	4.1	69.7
D. Selected men with tumor	188	5.9	17.0	3.7	80.9
COLORED MEN					
<i>Clinical group</i>					
With carcinoma of penis	39	67	72	46	8
<i>Control groups</i>					
Total	183	17.5*†	42.1*†	9.3*†	49.7*†
B. With carcinoma of kidney	15	47	53	20	20
E. Negroes with tumor	55	18	44	11	49
F. Negroes with other diseases	113	13.3	39.8	7.1	54.0

* Percentage is significantly different from that for clinical group ($P < .01$).

† Percentage is significantly different from that for total of white control groups ($P < .01$).

penile cancer and only 8 per cent of the colored were free of a history of venereal disease. These figures may be contrasted to 74.3 and 49.7 per cent of the white and colored men with negative histories for venereal disease in the control groups. Recalculation of Table II after excluding veterans of World War II did not

with one venereal disease is more prone to develop the other. *A priori*, one would expect that there is a correlation in the incidence of syphilis and gonorrhoea. The incidence of syphilis was calculated in patients with and without gonorrhoea (Table III). In white patients of the control groups, syphilis occurred in a much higher

TABLE III: INCIDENCE OF SYPHILIS IN MEN WITH HISTORY OF GONORRHOEA

Group	No. of patients		Percentage of men with syphilis	
	With gonorrhoea	Without gonorrhoea	With gonorrhoea	Without gonorrhoea
WHITE MEN				
<i>Clinical group</i>				
Men with carcinoma of penis	36	64	44†	25
<i>Control groups</i>				
Total	90	319	17.8*	4.7
B. With carcinoma of kidney	58	163	16	6.7
D. Selected men with tumor	32	156	22	2.6
COLORED MEN				
<i>Clinical group</i>				
Men with carcinoma of penis	28	11	64	73
<i>Control groups</i>				
Total	76	106	21	14
B. Men with carcinoma of kidney	7	7	28	57
E. Colored men with tumor	24	31	25	13
F. Colored men with other diseases	45	68	18	10

* Percentage is significantly different from that for patients without gonorrhoea ($P < .01$).

† Percentage is probably significantly different from that for patients without gonorrhoea ($P = .01$ to $.05$).

percentage of men with gonorrhoea than in those without (17.8 and 4.7 per cent respectively). The other percentages are based on small groups and are not definitely significant. The data support the *a priori* assumption that men with a history of gonorrhoea have a relatively high incidence of syphilis.

Circumcision.—A detailed analysis of the incidence of circumcision is presented in Table IV. Of 39 colored and 100 white men with carcinoma of the penis, none were circumcised before the age of 6. In contrast, 17.9 per cent of the colored and 12.8 per cent of the white non-Jewish men in the control groups were circumcised

control groups (2.1 and 3.7 per cent). The circumcisions during the ages 17 to 35 years occurred usually while the men were in the Army during World War I and II.

The findings suggest that circumcision performed early in life protected white and colored men against carcinoma of the penis but circumcision later in life had no effect on the incidence of penile cancer.

Is the low incidence of carcinoma of the penis in men circumcised early in life due to or associated with a low incidence of venereal disease? Table V shows that a negative history of venereal disease was given by 83 per cent of the white and 50 per cent of the colored men

TABLE IV: CIRCUMCISION IN PATIENTS WITH CARCINOMA OF PENIS AND IN CONTROL PATIENTS

Group	No. of patients in group	Percentage of patients circumcised				
		At age of			Prior to admission	
		0-5 years	6-16 years	17-35 years	4-8 years	0-3 years
WHITE MEN						
<i>Clinical group</i>						
Men with carcinoma of penis	100	0	2	5	3	21
<i>Control group</i>						
D. Selected men with tumor	188	12.8*	2.1	3.7	0.5	0.0*
COLORED MEN						
<i>Clinical group</i>						
Men with carcinoma of penis	39	0	0	3	3	18
<i>Control groups</i>						
Total	168	17.9*	3.0	3.6	0.0	3.0*
E. Colored men with tumor	55	24	2	0	0	4
F. Colored men with other diseases	113	15.0	3.5	5.3	0.0	2.7
WHITE MEN EXCLUDING WORLD WAR II VETERANS						
<i>Control group D</i>	154	11.7	2.6	4.5	0	0
COLORED MEN EXCLUDING WORLD WAR II VETERANS						
<i>Control groups—total</i>	89	24†	2	5	0	1

† Percentage is significantly higher than that for the corresponding white control group.

* Percentage is significantly different from that for the corresponding clinical group.

early in life. The difference in the percentages for the clinical and control groups is statistically significant.

The incidence of circumcisions in white men during the ages of 6 to 16 years and 17 to 35 years was the same for the clinical (2 and 5 per cent) as for the con-

circumcised early in life, and by 82.9 and 52.8 per cent of the white and colored uncircumcised patients. Evidently men who were circumcised early in life had the same incidence of venereal disease as non-circumcised men. The non-occurrence of carcinoma of the penis

TABLE V: INCIDENCE OF VENEREAL DISEASE IN CIRCUMCISED AND NON-CIRCUMCISED MEN IN THE CONTROL GROUPS

Group	No. of patients in group	Percentage of patients with history of			
		Syphilis	Gonorrhoea	Both diseases	Neither disease
WHITE MEN					
<i>Control group</i>					
D. Selected men with tumor					
Not circumcised	152	6.6	14.5	4.0	82.9
Circumcised at age of 0-5 years	24	0	17	0	83
Circumcised at age of 6-35 years	12	8	50	8	50
COLORED MEN					
<i>Control groups</i>					
Total, E and F					
Not circumcised	123	15.5	40.7	8.9	52.8
Circumcised at age of 0-5 years	30	13	43	7	50
Circumcised at age of 6-35 years	15	13	40	7	53

in circumcised men is not the result of a low incidence of venereal disease.

Race.—It is seen in Table VI that, of the 139 men with carcinoma of the penis, 28.1 per cent were colored. In contrast, the percentage of colored patients in the control groups was approximately 7 per cent or only one-fourth of that found for the clinical group. The difference in the percentage colored for the clinical and control groups is statistically significant. In another study (3) based on the mortality statistics of the United States for 1930 to 1934, the percentage colored for men with cancer of other genitourinary sites (chiefly penis) was significantly higher than that for all men with cancer (14.74 and 4.61 per cent, Table VI). The finding of a high percentage colored for carcinoma of the penis both in Hines Veterans Hospital and in the Mortality Statistics of the whole country indicates strongly that this high percentage is not only statistically but is biologically significant.

the white men. Circumcisions early in life were found in 17.9 per cent of colored and 12.8 per cent of the white men. The difference in the percentages is not definitely significant. On excluding the World War II veterans, the colored men had a significantly higher incidence of early circumcisions than white men (24 and 11.7 per cent, Table IV). It may at first seem surprising that such a large number of colored men were circumcised during infancy or babyhood. The high incidence may be attributed to the tendency of interns and residents, particularly in the South, to circumcise colored infants born in hospitals. Incidentally, it may be pointed out that the figures show that this tendency is decreasing. The young colored veterans of World War II were circumcised less frequently as infants than the older colored veterans of World War I.

Lack of circumcision is then not the factor which is responsible for the high incidence of carcinoma of the penis among colored men.

TABLE VI: RACIAL DISTRIBUTION OF PATIENTS WITH CARCINOMA OF PENIS AND OF CONTROL PATIENTS

Group	No. of patients	Percentage colored
<i>Clinical group</i>		
With carcinoma of penis	139	28.1
<i>Control groups</i>		
A. All men with tumor	14,472	6.8*
B. With carcinoma of kidney	236	6.4*
D. Selected men with tumor	203	7.4*
<i>Mortality Statistics, U. S. 1930-1934</i>		
With cancer of other genitourinary sites	1,411	14.74
All men with cancer	278,860	4.61*

* Percentage is significantly different from that for corresponding clinical group.

The relatively high percentage of colored patients in the group with carcinoma of the penis suggests that Negroes have a higher incidence of this tumor. The questions arise whether the frequency of this tumor in Negroes is due to (a) a lower incidence of circumcision in colored men, (b) a greater incidence of venereal disease, or (c) a racial susceptibility to penile cancer. These three factors can be tested statistically.

The relative incidence of circumcisions in white and colored men of the control groups is shown in Table IV. It is seen that, in the early age groups, the percentage of Negroes with circumcisions was slightly but not significantly higher than the corresponding percentages for

The factor of venereal disease is considered in Table II. In the control groups, the colored men had approximately twice the incidence of syphilis as white men (17.5 and 7.6 per cent) and twice the incidence of gonorrhea (42.1 and 22.0 per cent). The difference in the percentages are significant. Only one half of the colored but three-fourths of the white men were free of venereal disease. Evidently Negroes contracted venereal disease about twice as frequently as white men.

Is the high incidence of venereal disease in colored patients responsible for the high incidence of carcinoma of the penis among Negroes? This problem was studied by analyzing the 14,472 men with tumor into

TABLE VII: ESTIMATED INCIDENCE OF CARCINOMA OF PENIS IN WHITE AND COLORED PATIENTS WITH AND WITHOUT VENEREAL DISEASE

Group	Estimated number of men in group		Estimated percentage of men with carcinoma of penis	
	White	Colored	White	Colored
All men with tumor admitted 1931-1944	13,490	982	0.74	3.97
With tumor but without history of venereal disease	10,003	488	0.48	0.62
With tumor and history of syphilis	1,022	172	3.13	15.12
With tumor and history of gonorrhea	528	91	3.03	19.78
With tumor and history of both venereal diseases	2,968	413	1.21	6.78

groups with and without venereal disease and estimating the incidence of penile cancer in each group. The data presented in Table VII were not corrected for circumcised and Jewish patients, but these two factors did not affect the conclusions that may be drawn from the table.

Of the 14,472 patients from the tumor clinic, 10,003 white and 488 colored men were, it is estimated, free of venereal disease. Of these 0.48 per cent of the white and 0.62 per cent of the colored patients are believed to have had cancer of the penis. The difference in the percentages is not statistically significant. From this finding it would seem that white and colored men who do not develop venereal disease are equally susceptible to carcinoma of the penis. There is then no evidence of any unusual susceptibility of Negroes to carcinoma of the penis or of any immunity of white men to this lesion.

In 1,022 white men with a history of syphilis approximately 3 per cent had cancer of the penis, while in 172 colored syphilitic patients 15 per cent had penile cancer. Similarly, 1.21 per cent of the white and 6.78 per cent of the colored men with gonorrhoea had, it is calculated, carcinoma of penis. Even if the factors of syphilis and gonorrhoea are controlled, the colored men still had a higher incidence of this tumor. Evidently venereal disease by itself did not account for the high incidence of carcinoma of the penis in colored men.

DISCUSSION

Venereal disease.—It has been shown that patients with carcinoma of the penis have a very high incidence of venereal disease. Evidently there is a correlation between the tumor and the infection. This finding can be interpreted in one of two ways. Either syphilis and gonorrhoea are predisposing causes of carcinoma of the penis or there is some other factor that predisposes both to venereal disease and to penile cancer. Statistics by itself cannot give an answer as to which interpretation is correct. From a knowledge of the pathogenesis of these diseases, it seems evident that gonorrhoea is not a direct cause of cancer of the penis. Presumably some other factor predisposes both to gonorrhoea and to cancer of the penis.

Racial factors.—Carcinoma of the penis occurs relatively frequently in Negroes, is infrequent in white, non-Jewish men and is practically unknown in Jews. Is this distribution due to inherited racial characteristics or is it dependent on environmental factors?

Carcinoma of the penis has not been observed in non-Jewish men who were circumcised early in life. Presumably, the absence of cancer of the penis in Jews is explained by their religious practice of circumcision eight days after birth. It does not then seem necessary to formulate the hypothesis of an inherited racial immunity.

The high incidence of carcinoma of the penis in Negroes raises the question of racial susceptibility. The present data have shown that colored men free of venereal disease have penile cancer as infrequently as white men. There did not seem to be a racial susceptibility in colored men free of venereal disease. The findings suggest that environmental, not racial, factors determine the incidence of carcinoma of the penis.

Poor sex hygiene.—Since venereal disease and racial immunity have been excluded as being primary etiologic factors in cancer of the penis, the question arises whether poor sex hygiene is a predisposing cause. Poor sex hygiene is not, of course, a single factor but consists of a group of correlated habits such as promiscuity, lack of prophylaxis, infrequent or inadequate washing, and failure to obtain early medical treatment for minor inflammatory penile lesions.

It seems proper to judge the sex hygiene of a group of men by the incidence of venereal disease. Its high incidence among colored men is an indication of the poor sex habits practiced by many Negroes. The high incidence of both syphilis and gonorrhoea in men with cancer of the penis is probably an indication that patients with penile cancer had practiced poor habits. Apparently, poor sex hygiene predisposes both to venereal disease and to carcinoma of the penis.

In venereal disease, the primary disposing factors are promiscuity and lack of prophylaxis. In cancer of the penis, the primary predisposing factors may be such factors in sex hygiene as the infrequent or inadequate washing of the genitalia and the improper care of inflammatory penile lesions.

The hypothesis that poor sex hygiene is a predisposing factor in penile cancer explains the high incidence of venereal disease and the high percentage of Negroes in the 139 patients studied.

Circumcision.—One of the most interesting findings of the present study is that circumcision early in life apparently protects against carcinoma of the penis but circumcision during boyhood or manhood has no appreciable effect on the incidence of the tumor. It would have been of interest to know the exact reasons for the circumcisions in the clinical and the control groups, but this information was not available.

What protects men circumcised early in life against penile cancer? That they do not practice any better sex hygiene is indicated by the incidence of venereal disease among these men. It is possible that circumcision lessens the accumulation of smegma and dirt and in this way inhibits cancer. If this hypothesis is correct, one would expect that circumcision during boyhood should also protect against cancer of the penis. There is a possibility that the individual circumcised early in life is protected against penile cancer not by

cleanliness but by some other process, the nature of which is not known.

There is, then, a factor—circumcision—which occurs in the infant and which affects the incidence of tumor in the adult. Perhaps other factors operating in infancy determine whether the adult develops other types of cancer. When the clinician or the research worker takes a history of a patient with cancer of the stomach, for example, the patient is questioned with regard to occupation, diet, and other factors that affect the adult. Perhaps it would be more important to ask about the patient's feeding habits as an infant.

Etiologic factors.—The present findings suggest that there are two fundamental etiologic factors in carcinoma of the penis. The first is circumcision in early life. This seems to offer by an unknown method almost complete protection against penile cancer later in life. This factor suffices to explain the almost complete absence of this tumor in Jewish men. The second etiologic factor, poor sex hygiene, seems to be responsible for the following statistical findings: (a) the high incidence of venereal disease in men with carcinoma of the penis, (b) the relatively greater frequency of carcinoma of the penis in colored men, (c) the high incidence of venereal disease in colored men, and (d) the high incidence of syphilis in men with a history of gonorrhea. It may be concluded that carcinoma of the penis can be prevented either by good sex hygiene or by circumcision early in life.

Control groups.—A previous paper (4) has presented a discussion on the types of control groups that may be used in statistical studies in cancer. This work exemplifies the use of several different types of control groups. A review of Tables I to IV shows that there

was good agreement in the data obtained for the different control groups.

It should be noted in passing that the data on venereal disease and circumcision in patients with carcinoma of the penis (Tables II and IV) are, by themselves, interesting and descriptive. No conclusions, however, can be drawn when one studies the clinical group by itself. A comparison of the clinical and the control groups, as in Tables II and IV, leads to conclusions that are almost as clear-cut and decisive as in a planned experiment.

SUMMARY AND CONCLUSION

As compared with the control groups, the group with carcinoma of the penis contained a high percentage of Negroes, had a high incidence of syphilis and gonorrhea, a very low incidence of circumcisions early in life and the same incidence of circumcision during boyhood and early manhood. Positive correlations were obtained for the factors carcinoma of the penis, syphilis, gonorrhea, and the colored race. The common denominator in these four factors appears to be poor sex hygiene. The incidence of carcinoma of the penis could be reduced either by early circumcision or by good hygiene.

REFERENCES

1. LENOWITZ, H., and GRAHAM, A. P. Cancer of the Penis. *J. Urol.*, **56**:458-484. 1946.
2. SCHREK, R. Logarithmic Frequency Distributions. *Human Biol.*, **13**:1-22. 1941.
3. SCHREK, R. The Racial Distribution of Cancer. II. Tumors of the Kidney, Bladder, and Male Genital Organs. *Ann. Surg.*, **120**:809-812. 1944.
4. SCHREK, R., and ALLABEN, G. R. Statistical Analysis of 2,407 Admissions to the Tumor Clinic of Veterans Hospital, Hines, Illinois. *Cancer Research*, **5**:539-546. 1945.