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Differential Mortality Rates Among Tuskegee Syphilis Study Participants

I. Background

The mortality rates of the Tuskegee Syphilis Study participants have not been examined rigorously since 1955. Based on preliminary data presented in an undated Tuskegee Study Flow Chart (1973) it appears that if persons lost to follow-up are assumed to be dead, the mortality of control participants was higher than that of syphilitics in 1948 and in 1951-54—but higher mortality for syphilitics in 1960-66. The purpose of this study is to compare the interval mortality rates of the two groups from the onset of the study through 1973. This study seems particularly important at this point in time to respond to charges made by Attorney Gray in his suit against DHEW, CDC, etc.

II. Methodology

Of about 435 syphilitic and 180 control participants entering the study between 1932 and 1940, about 311 syphilitics and 127 controls died before 12/31/73. Since the number of deaths per year in each group is small, the rates will be calculated for the following time periods: before 1940, 1940-1944, 1945-1949, 1950-1954, 1955-1959, 1960-1964, 1965-1969, 1970-1973. The death rates for each group will be the number of deaths per time period divided by the number of person-years of observation—and will be death rates per 1000 person years for each group. Thus, the rate for the first time period will be:

$$\frac{\text{(No. of deaths) Before 1940} \times \text{(12 months/year)} \times \text{(1000)}}{\text{Sum of the following:}}$$

1. For those alive in 1940: No. of person-months in study prior to 1940.
2. For those dying before 1940: No. of person-months alive between entry into study and date of death.
3. For those lost to follow-up before 1940: No. of months between entry into study and last date known to be alive before 1940.

Rates for subsequent five-year periods would be calculated on the same basis—substituting the onset of the time period for the date of entry into the study.

A more detailed analysis might consider other variables: age or year of onset of syphilis, any treatment received (heavy metals, antibiotics), cause of death (if known). If these variables are easily coded, they should be included in the line listing. Because dates and ages on individual clinic records may be inconsistent, a decision must be made as to which date or age to choose—or all of them should be listed for analysis. Four data items are essential for each person in this study:

1. ID No. (must include designation of control or syphilitic)
2. Date entry into study
3. Status as of 12/31/73 (ALIVE, DEAD, LOST TO FOLLOW-UP)
4. Date of death, or date last observed to be alive (if lost to follow-up), or status (living) on 12/31/73.

Additional data of interest:

1. Age at entry into study
2. Birthdate (list all dates given)
3. Date onset syphilis, if known
4. Cause of death, if known
5. Was autopsy performed? (yes/no)
6. *Treatment status—indicate, at minimum, first year of any treatment which may be antibiotics.*

III. Comment

This study makes the following assumptions:

The study and control group differ in risk of mortality—only in that the study group had essentially untreated late latent syphilis. Otherwise, they had no difference in age distribution, socioeconomic status, occupational (hazard) differences, health care differences.

If these assumptions are valid, then the mortality experience of the two groups may be compared for each time period following onset of the study—without examining age-specific mortality rates. This comparison permits examination of the time during which syphilitics had excess mortality—and whether this excess was greater during the earlier or later part of the study. If syphilis "burns out" or "kills" during the first 20–30 years of illness, then the mortality rates may be approximately the same during the latter years of the study.

If the mortality experience of the two groups is similar after 1950, then, regardless of the ethics of the decision, at that time, it may be argued that withholding of penicillin in the early 1950's had minimal or no effect on the mortality of syphilitics who survived until the advent of penicillin. On the other hand, if mortality remains consistently higher for syphilitics than controls during each time period—then it seems reasonable that syphilis continued to have a long-term adverse effect on syphilitic participants, and withholding penicillin may have contributed to their lower mortality.

IV. Resources

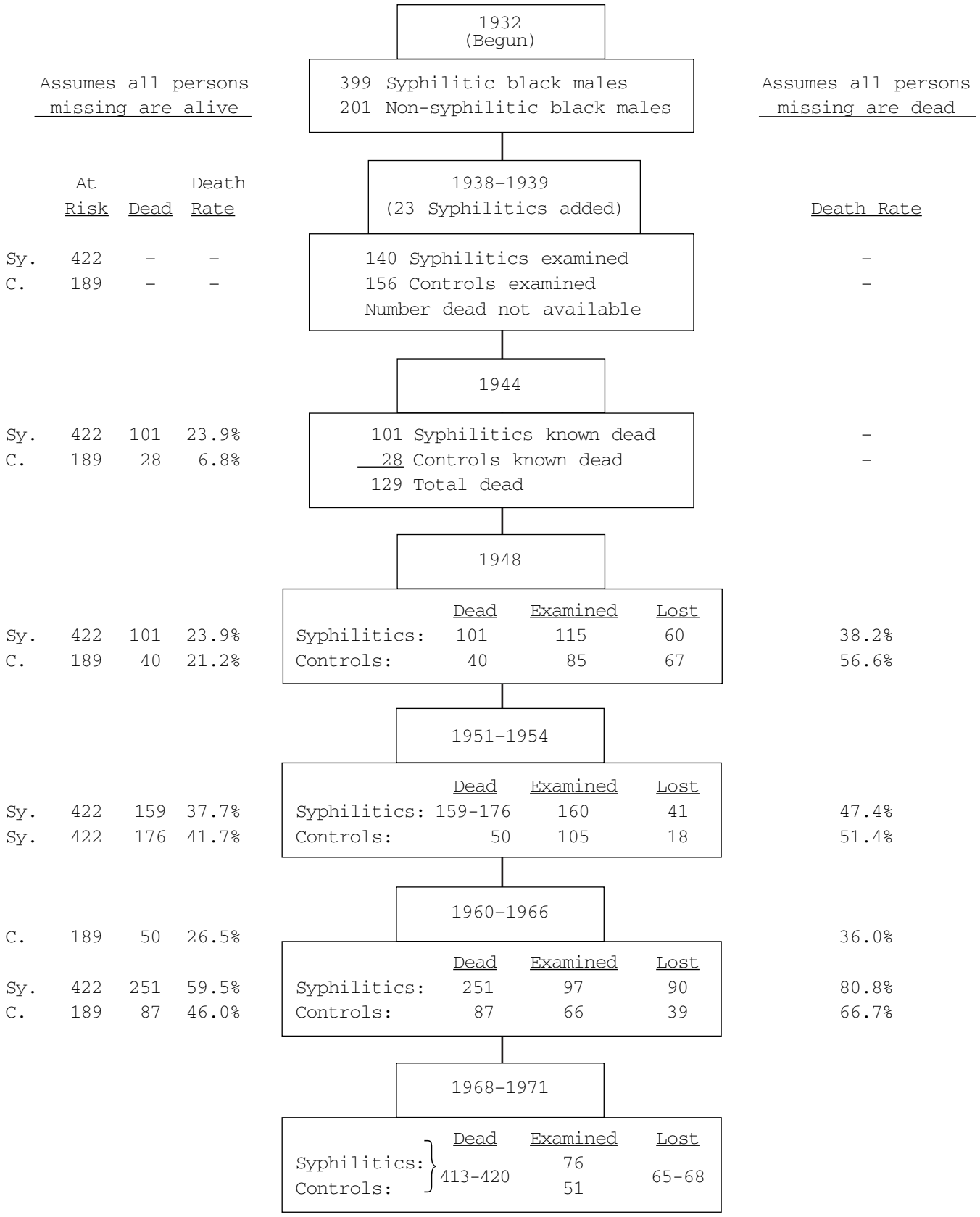
Ms. Genevieve Holcomb, VD Statistical Unit estimates that one week of her full time uninterrupted efforts would be required to prepare a line-listing of the four essential data items—with minimal additional time for the other 5 items which might be useful in more detailed analyses.

I believe it would take no more than 1-2 weeks of a statistical assistant's time with a calculator to calculate the pertinent period mortality rates.

No more than 1 week should be required to review previous mortality analyses on the Tuskegee Study Participants and write a short analytical report of the findings.

The study design is simple and could easily be performed at CDC. However, the interpretation of results may be more difficult. And the reception of the conclusions by persons outside the CDC may make this a controversial study. There may, therefore, be an advantage to contracting the data analysis with a statistician-demographer outside CDC who has had experience in public health, and in life table analyses. This person would (presumably) be more capable of considering alternative methods of analysis, and the final analysis might be more acceptable to to the public.

TUSKEGEE STUDY FLOW CHART



In 1938-39, 12 persons in the control group were found to have syphilis and were switched from the control to the syphilis group. 11 other syphilis patients were added to the syphilis group.