DIARRHEA - DYSENTERY — Use of Mortality Data as a Guide for Field Investigations

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Through his work in Hidalgo County, Tex., Dr. James Watt has shown that fly control will reduce the incidence of dysentery-diarrhea and its resultant mortality. Since extension of his findings might be of benefit to other areas in the United States which have an unduly high dysentery-diarrhea mortality, a study was undertaken to determine whether such areas existed.

To locate affected areas, epidemiological criteria were expressed in the form of statistical indices. Through these indices, places with a sufficiently large number of summer deaths could be cited for further investigation to determine whether effort to reduce the mortality level might be expended advantageously.

Since only mortality data are available on diarrheal diseases, the study was necessarily limited to deaths. Previous study of dysentery-diarrhea data for the years 1941-1946 had shown that the highest mortality from these diseases occurred among children 2 years of age or younger; that there was a pronounced seasonal variation; and that for the United States as a whole the incidence reached a peak in the summer months. Examination of the data for the years 1946-1947 showed marked changes in the previous pattern of seasonal incidence. The change in the curve of seasonal incidence for the United States as a whole was the resultant of marked change in the seasonal pattern of many northern States, some western States, and several southern States. In some States the prevalence continued to show a high summer incidence; in others, excess of deaths during summer months not only decreased but reverted to an excess of deaths during the winter months. The change in the seasonal incidence was repeated in 1947 and, from available 1948 data, there are indications that the prevalence will follow the 1946-1947 pattern rather than that of earlier years.

The mortality data to be studied in localizing areas of high incidence were limited therefore to dysentery-diarrhea deaths of children under 2 years old for the years 1946-1947, and consisted of mortality tabulations prepared especially for the Communicable Disease Center by the National Office of Vital Statistics.*

The first step was to eliminate those areas with no apparent summer dysentery-diarrhea problem. To accomplish this, the following two criteria were established for State-wide data:

1. Evidence of a summer excess of deaths coded to diarrhea and dysentery among children under 2 years of age, based on the ratio of deaths occurring during the summer months (June, July, August, and September) and those occurring in the winter months (December, January, February, and March). The extent to which the ratio of S/W (summer/winter) exceeds 1.0 provides a rough index of the degree of summer excess mortality.
2. An age-specific diarrhea and dysentery death rate among children under 2 years of age (based on live birth data and deaths during the summer months of 1946-1947) above the median rate for the 48 States and the District of Columbia.

Application of these two criteria resulted in the elimination of all but 16 States; but since the United States data by population-size groups showed that almost half the deaths occurred in "rural areas" (farm areas and communities less than 2,500 population), the data for the 16 States were examined by urban-rural classification, and it was found that in four of these States, the dysentery-diarrhea problem was essentially one of rural areas.

* International List of Causes of Death, Codes 27 and 119 (Fifth Revision, 1938) under 2 years of age, by State, county, population-size group, race and sex, place of death by residence of decedent.

TABLE I.- NUMBER OF DYSENTERY-DIARRHEA DEATHS, ALL AGES, BY STATES
1948

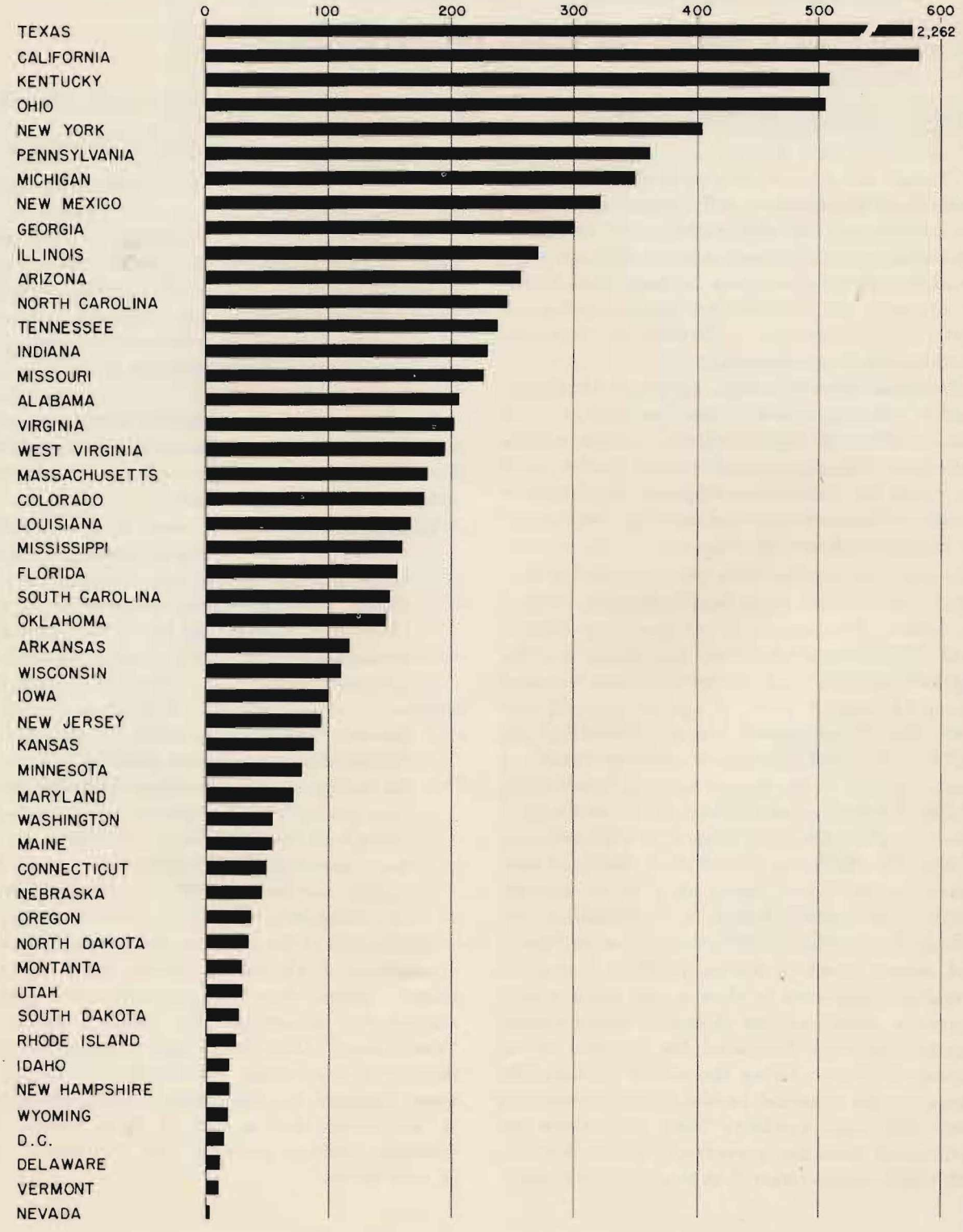
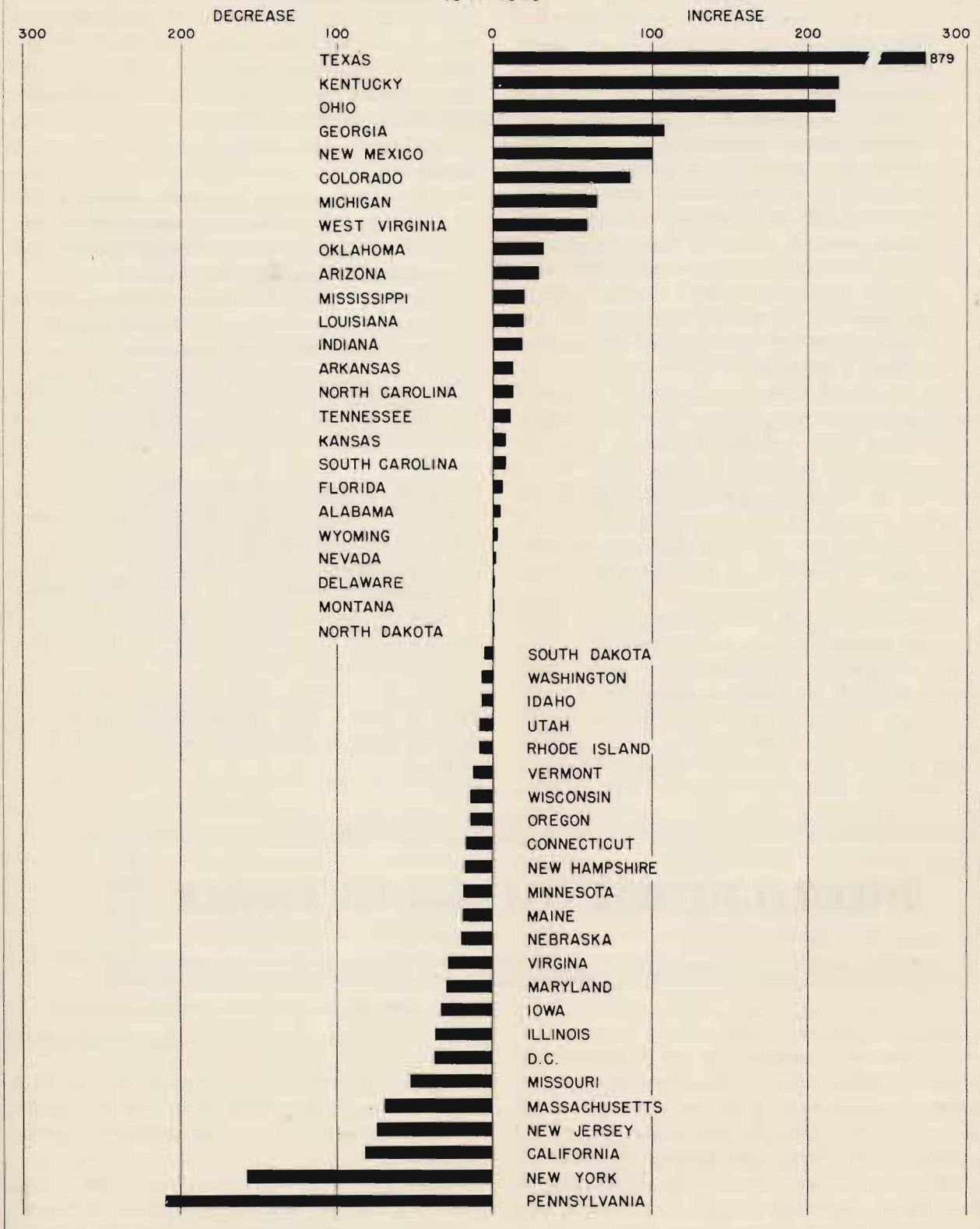


TABLE II.- CHANGE IN DYSENTERY-DIARRHEA MORTALITY BY STATES
1947-1948



In carrying the analysis to a county level, statistical criteria appropriate for small areas were established as follows:

1. **Number of Deaths:** Unless a county showed a total of four or more deaths during the "summer months" of 1946 and 1947 combined, it was eliminated for further study.
2. **Season:** A S/W ratio of 2 to 1 or greater.
3. **Mortality Rates:** Age-specific summer dysentery-diarrhea rate of 200 or more per 100,000 estimated population under 2 years of age, based on 1946-1947 "summer" deaths.
4. **Age at Death:** If a total of 25 percent or more of the 1946-1947 deaths among children under 2 years of age were under 1 month of age, it was considered presumptive evidence that the dysentery-diarrhea mortality figures reflected epidemics among the newborn.

The data for all States were examined by county and by population-size groups within each county. In 12 States there were 68 counties in which the problem appeared to be one of urban areas, and 28 counties in which the dysentery-diarrhea deaths occurred primarily in the rural areas. Of these 96 counties, there was evidence in 4 that the mortality figures might be a reflection of nursery epidemics.

In the remaining 36 States, there were 24 counties with indications of a dysentery-diarrhea problem in urban areas; but among these counties, there were 9 in which the deaths among infants 1 month or younger accounted for 29 – 59 percent of the total number of dysentery-diarrhea deaths under 2 years of age. The 36 States showed only three counties in which the problem was one of the rural areas.

The list of States and counties, with all pertinent information, was transmitted to Engineering Services for their use in field study and investigation. The following suggestions with respect to the consideration of environmental factors were made by the epidemiologist:

That field studies should not be undertaken unless

1. The community, or substantial areas within it, has privies or other accessible and widely disseminated sources of human excreta with which flies might become contaminated.
2. The population lives in an urban-type environment where effective fly control operations can be instituted and maintained.

Since mortality data as a measure of incidence have their obvious limitations, field investigations must supplement the conclusions of the statistical analysis.

Figures available for 1948 (for all ages) show an increase in mortality from the diarrheal diseases as compared with the figures for 1947. The total number of deaths for all ages in 1947 was 8,938, of which 6,527 or 73 percent were among children 2 years of age or younger. The total figure for 1948 is 9,909 or an increase of 971 deaths from these diseases over 1947.

Two accompanying tables show the total number of deaths from dysentery-diarrhea for all ages for 1948 by State; and the change from 1947 by State.

DYSENTERY-DIARRHEA (FLY) CONTROL PROGRAM

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April 1, 1950, marked the official opening of a new operational program for the Communicable Disease Center, namely, the Dysentery-Diarrhea Control Program in which fly control measures will play an important part. The new program is the outgrowth of the well-known studies of Watt and Lindsay in Hidalgo County, Tex., [Pub. Health Rep. 63(41): 1319-1334 (1948)] from which it may be concluded with reasonable certainty that in areas of high dysentery-diarrhea morbidity and high fly density, a significant reduction in disease transmission may be effected by control of domestic flies.

The new program is organized in the same manner which has worked so successfully in the malaria and typhus control programs; that is, the projects