THE RISE AND FALL OF SHIGA DYSENTERY IN 
EL SALVADOR, 1969-1973

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A large Shiga dysentery epidemic began in El Salvador in July 
1969, peaked in July 1970, and then declined rapidly to 
near-endemic levels in 1973. Over 197,000 cases and an 
estimated 11,570 excess deaths occurred.

Introduction

In late 1968 an epidemic of bacterial dysen-
tery began in southwestern Guatemala; during 
1969 it spread rapidly to surrounding countries; 
and by 1970 cases had been reported through-
out Central America and Mexico. Investigations 
of the pandemic revealed that it had several 
unique features (1, 2).

The agent responsible was the Shiga bacillus 
(Shigella dysenteriae, type I), which spread 
rapidly and extensively through a population 
with little previous exposure to it. The disease 
was severe and carried an unusually high case-
fatality rate. The causative organism was hard 
to identify at the start of the epidemic because 
it did not grow well on routine laboratory 
media such as Shigella-Salmonella medium. 
Moreover, the Shiga bacillus strain in question 
was resistant to various antibiotics—including 
tetracycline, sulfonamides, chloramphenicol, 
and streptomycin.

Another important feature of the Central 
American dysentery epidemic is that it involved 
re-emergence of a Shigella serotype that, except 
for scattered cases, had almost vanished from 
the earth over the past 40 years. Before the 
1930's Shiga bacillus was common in many 
parts of the world and was an important cause 
of dysentery. It was, for example, the most 
frequent etiologic agent of bacterial dysentery 
in Europe during the first 25 years of this 
century (3). Since that time Shigella flexneri 
and S. sonnei have tended to replace it through-
out the world. Nevertheless, because of the 
pandemic propensity and unique virulence of 
the Shiga bacillus, the evolution of the Central 
American epidemic is of great historical and 
scientific importance.

Reller, et al., have already described the 
early development of El Salvador's epidemic in 
1969 and early 1970 (4). The present paper 
considers subsequent events in El Salvador, 
including the peaking of the epidemic in 1970 
and its subsequent decline.

Methods

Morbidity and mortality information for this 
analysis was obtained from the records of the 
Division of Epidemiology and the Department 
of Health Statistics of the Department of 
Health of El Salvador. These data originated in 
186 health centers scattered throughout the 
country; eighty per cent of the population of El 
Salvador lives within 5 kilometers of one of 
these centers. Stool culture data were obtained

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All dysentery cases, regardless of whether the reported etiology was amoebic, bacterial, or unspecified, have been lumped together in this paper. There are several reasons for this. First, the etiologic diagnosis of dysentery cannot be made on clinical grounds. Since laboratory facilities in El Salvador are limited, only a small portion of reported dysentery cases are diagnosed in the laboratory. Second, 20 per cent or more of all Salvadoreans carry amoebae (Entamoeba histolytica) asymptomatically (5), so that a finding of amoebae in stools of dysentery patients—in the absence of adequate bacteriologic culturing—does not establish a diagnosis of amebiasis. And third, the bacteriologic isolation of Shigella dysenteriae, type 1, is difficult because the organism is both fragile and fastidious.

The Course of the Epidemic

Morbidity

Beginning in August 1969, the number of reported clinical cases of dysentery in El Salvador began to far exceed that anticipated from previous years. Figure 1 shows the number of reported cases from January 1969 to June 1973 and, for comparison, the mean number of reported cases that occurred between 1964 and 1968. In the five-year period before the epidemic the average monthly incidence of dysentery was 522 cases. Usually the number of reported cases of enteric disease declines with the start of the dry season in October, but in late 1969 the dysentery count continued to rise. In February it reached an initial peak of over 9,000 reported cases, a level 15 times greater than that preceding the epidemic. Then, after a brief respite in the early months of 1970, a very high peak of 33,822 reported cases occurred in July. However, this was followed by a period of sharp decline, resulting in a monthly case count for December 1970 of only 2,778. Overall, the national dysentery morbidity rate for 1970 was 319.4 per 10,000 inhabitants, as compared to a mean rate of 20.5 for the five-year period preceding the epidemic.

During 1971 there was a relatively low mean monthly case count of 2,800. Then in 1972 and the first 6 months of 1973 the mean number of cases reported per month fell even further, to 1,828 and 1,591, respectively. A total of 197,020 dysentery cases were reported in the four-year period beginning in July 1969 and ending in June 1973.

Reller, et al. have shown that the Shiga bacillus was the etiologic agent of the epidemic in El Salvador, and that the disease spread into El Salvador from Honduras and Guatemala (4). In 1968 Rosales Hospital made only nine isolations of Shiga bacillus. This figure rose with the spread of the epidemic to 250 isolations in 1969 and 839 in 1970, later falling back to 126 isolations in 1971, 70 in 1972, and 61 in the first six months of 1973.
The seasonal distribution of dysentery cases from 1970 to 1973 was similar to that of general enteric disease before the epidemic; i.e., peak counts occurred in the rainy months of June, July, and August and were followed by declining counts during the dry season. This pattern contrasts with the initial rise in the dysentery rate that accompanied the outbreak during the relatively dry months of October, November, and December of 1969.

Mortality

Dysentery deaths in El Salvador are recorded as being due to amoebic, bacterial, or unspecified etiologies. Data for deaths of unspecified etiology were tabulated together with those due to enteritis and other diarrheas and could not be separated for purposes of this report. However, deaths reported as being due to amoebic and bacterial dysentery increased greatly in 1969 and 1970 (Figure 2) and then declined in 1971 and 1972. In 1969 a total of 608 amoebic and bacterial dysentery deaths (18.3 per 100,000) were reported to the Department of Health Statistics, as contrasted with a mean of 123 deaths per year (4.1 per 100,000) for the preceding five-year period. This total rose further—to 990 deaths in 1970—before falling back in succeeding years. In 1971 and 1972, respectively, only 164 and 149 dysentery deaths were reported.

Reported deaths from enteritis and other diarrhea diseases (including unspecified dysentery) likewise rose with the epidemic, reaching a rate of 175.7 deaths per 100,000 in 1970 as compared to 56.5 for the pre-epidemic years 1964-1968. Since the incidence of non-dysentery diarrhea cases in 1969-72 was relatively similar to the incidence in previous years (6), most of the reported increase in enteritis and other diarrhea deaths was probably caused by the Shiga bacillus. Because less than 35 per cent of the death certificates filed in El Salvador are completed by physicians, many deaths due to Shiga bacillus may have been recorded as due to dysentery of unspecified etiology or enteritis (7). Combining diarrheal and dysenteric deaths, subtracting the 1964-1968 mean, and allowing for 3.6 per cent annual population growth, there were 1,779 “excess” diarrheal and dysenteric deaths in 1969, 5,191 in 1970, 2,220 in 1971, and 2,382 in 1972.

Of the 1,721 amoebic and bacterial dysentery deaths reported nationally from 1969 to 1971, 45.9 per cent occurred in children under 5 years of age and 23.3 per cent occurred in persons 50 years of age or more. The mortality rates for these groups were 125.0 and 120.9 per 100,000 population, respectively. Although dysentery mortality rates for the epidemic years greatly exceeded those for the years 1964-1968, the distribution of deaths by age

FIGURE 2—Reported amoebic and bacterial dysentery deaths in El Salvador, showing the monthly figures for 1969-1973 (solid line) and the mean monthly figures for 1964-68 (broken line).

Source: Division of Health Statistics, Department of Health of El Salvador.
were quite similar. Males accounted for 57 per cent of all dysentery deaths, both in the pre-epidemic period 1964-1968 and during the epidemic years 1969-1971.

Case-fatality ratios for Shiga dysentery declined markedly in late 1969 with the increasing utilization of appropriate antibiotics. The Rosales Hospital case-fatality ratio, for example, dropped from 21.8 per hundred in 1969 to 6.6 per hundred in 1970.

Discussion

What will be the future course of this disease in El Salvador? The Shiga bacillus has persisted at low levels in Central America since the early part of the century, a fact already documented by a few scattered studies. In 1914 and 1915 a large Shiga bacillus epidemic in El Salvador resulted in 2,779 recorded deaths (8); small localized outbreaks occurred in Honduras in 1928 (9) and in Guatemala in 1960 (10); and serologic surveys in different areas of Guatemala in 1966 showed Shiga bacillus positivity rates of between 0 and 4.4 per cent (11), attesting to the endemicity of the disease.

Several previously noted interrelated factors have probably contributed to the re-emergence of epidemic dysentery in Central America (1, 2, 4). First, the organism itself has changed, as reflected by the fact that pre-epidemic strains were sensitive to tetracycline and chloramphenicol while those causing the epidemic were resistant to these antibiotics. Second, a susceptible, previously unexposed human population had grown tremendously. And third, the mobility of this population over recently constructed roads contributed to rapid spread of the disease. These factors, taken together, probably explain why the epidemic occurred and why it was so severe.

Conclusions

Since the height of the epidemic in 1969-1970, dysentery mortality and morbidity, as well as isolations of the Shiga bacillus, have steadily decreased. It thus appears likely that the Shiga bacillus may again revert to low endemic levels, even though morbidity, mortality, and Shiga bacillus isolations are still far above pre-epidemic rates.

One can only speculate about the reasons for this sudden decline of the Shiga bacillus in El Salvador. Dr. Shiga himself admitted in 1936 that the reasons for the previous disappearance of the Shiga bacillus were obscure (12). Perhaps the organism has become attenuated and has lost its startling epidemic potential. Considering the very high attack rates which occurred, it is also possible that the number of susceptible persons has dropped below the critical level necessary to maintain the disease at epidemic strength. In other words, a combination of parasite and host factors could be responsible for causing the disease to revert to an endemic state.

SUMMARY

A large epidemic, part of a Central American pandemic of dysentery, began in El Salvador in July 1969, peaked in July 1970, and then declined to near-endemic levels in 1973. The epidemic was caused by the previously rare Shiga bacillus (Shigella dysenteriae, type 1); this organism was highly virulent and proved to have multiple resistance to antibiotics. During the peak month of July 1970, 33,822 cases of dysentery were reported. This contrasts with a pre-epidemic dysentery case count of about 500 per month. In the four-year period from June 1969 to June 1973 there were 197,020 dysentery cases reported. Levels of mortality were also unusually high. Discounting the average number of dysentery deaths before the epidemic, there were 11,572, "excess" deaths from dysentery in this period. Since then, however, rapid declines in numbers of dysentery cases and bacterial isolations indicate that Shiga bacillus dysentery may again be reverting to an endemic status.
REFERENCES


