

CONTROL OF NEONATAL TETANUS IN RURAL HAITI THROUGH THE UTILIZATION OF MEDICAL AUXILIARIES¹

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Auxiliary health workers, if their duties are strictly defined and appropriately supervised, can efficiently extend the services of professionals to large and isolated populations. Their use is not limited to rural populations, but it is the rural context that most dramatically highlights the auxiliaries' possibilities for service. This article reports the control of tetanus in one rural area, an example which serves to illustrate the value of medical auxiliaries.

Introduction

Tetanus preventive measures are effective, economical, simple, and acceptable in most cultures. In spite of meeting these selective criteria that show tetanus vulnerable to attack, the disease continues to cause enormous mortality. This paradox is related to the fact that tetanus toxoid immunization is not accessible to the population of the rural areas in which the disease exists. The cost of tetanus toxoid is so low and its use so uncomplicated that its utilization is primarily a function of the availability of personnel to inject it.

Emergence of a Hospital Program to Control Neonatal Tetanus

The Albert Schweitzer Hospital in Deschappelles, Haiti, is a 150-bed institution supported by a United States foundation. It opened in

1956 to serve a rural district containing an estimated population of 94,000 (Figure 1). Figure 2 shows that the number of patients admitted to the Schweitzer Hospital because of tetanus increased from 128 in 1958 to 461 in 1967. Analysis of admissions by origin of the patient (Figure 3) shows that increasing numbers of patients were coming from outside the hospital district through 1967.

Neonatal tetanus is frequent in rural Haiti, as mothers customarily have their babies in their homes, attended by a member of their family or by a traditional midwife. Most rural homes are small structures with floors of packed earth and walls of earth and rock. Water must generally be carried from springs or streams, so it is in very limited supply. There is ordinarily very little furniture, and both beds and linen are very scarce. In these circumstances an aseptic obstetrical delivery is not possible. It is furthermore the custom to "treat" the infant's umbilical stump with a variety of unsterile materials which may contain the spores of *Clostridium tetani*.

Some time ago the Schweitzer Hospital developed programs to control neonatal tetanus (2). Traditional midwives were given sterile supplies and instructed in their use. Nurses gave inoculations with tetanus toxoid in prenatal and other outpatient clinics and in the local

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FIGURE 1—Map of Haiti showing the approximate location of the Albert Schweitzer Hospital, its census tract, and its district.

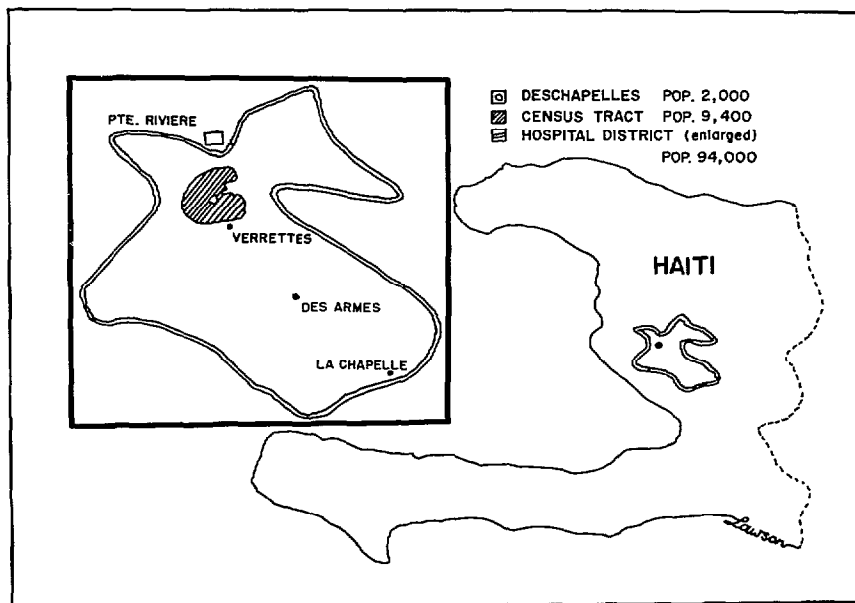


FIGURE 2—Annual number of cases with final diagnosis of tetanus of the newborn treated at the Albert Schweitzer Hospital from 1958 through 1972.

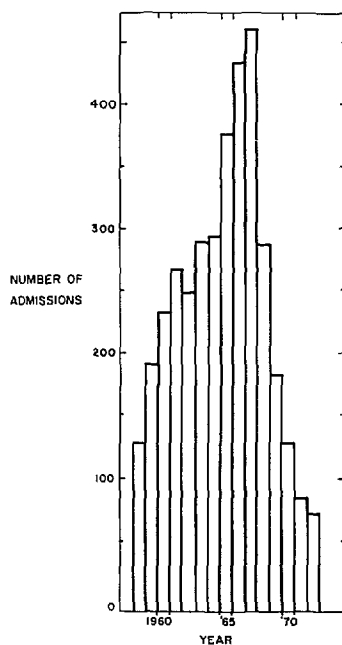
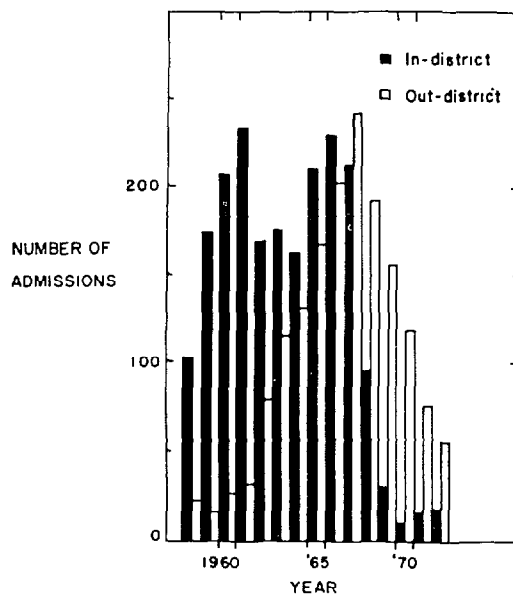
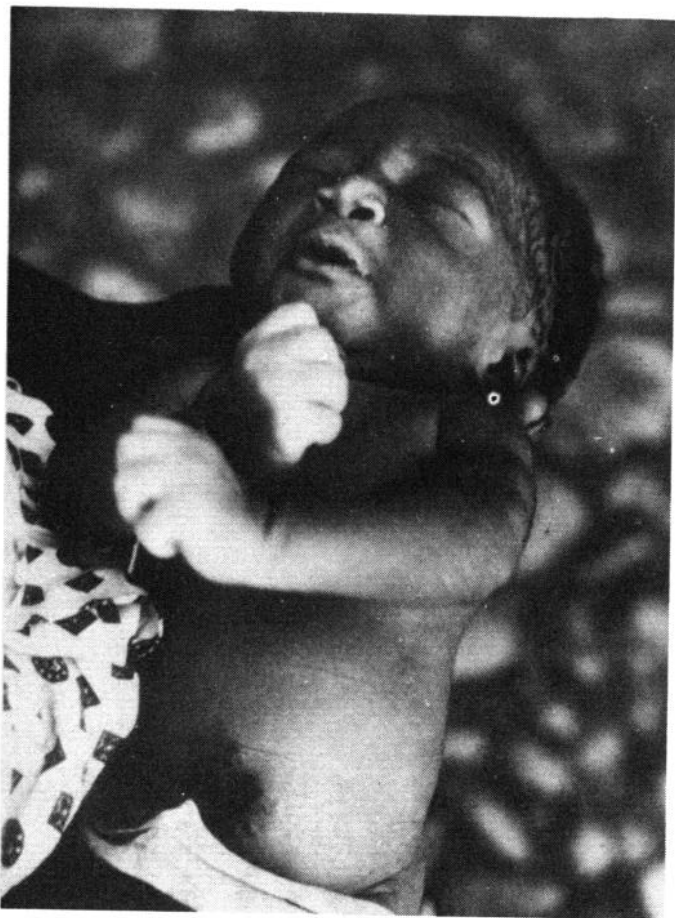


FIGURE 3—Geographic distribution of cases of tetanus of the newborn treated at the Albert Schweitzer Hospital. Cases admitted from within the hospital district are indicated by the black bars. Cases from outside the hospital district are indicated by the white bars.





Infant exhibiting the "stiff upper lip" grimace and general tonic spasm characteristic of neonatal tetanus. The baby's grandmother had packed the umbilical stump with charcoal and covered it with a bandage.

schools. Newborn babies were received in the hospital outpatient department soon after birth, and nurses, supervised by physicians, administered antiseptic care, dressed the umbilical stump, and injected antitetanus serum.

The hospital's interest in tetanus may perhaps explain the increasing numbers of admissions for this disease through 1967, in spite of a decline in the incidence of neonatal tetanus in the community immediately surrounding the hospital (1).

Creation of a Community Health Program

In 1967 the hospital, with consultation from the Harvard School of Public Health, organized a community health department. This unit consisted at first of two public health physicians, a nurse, a rural health officer trained by the Haitian Department of Public Health, and a

few locally recruited persons without previous health training.

A review of the hospital records revealed that more than half of the 461 admissions for newborn tetanus in 1967 came from outside the hospital district with its 94,000 population. Thus the population requiring immunization services was at least 200,000. As neonatal tetanus was the problem, we first concentrated on women who might bear a child during the next five years. There were at least 40,000 women in this category.

Contact with the population needing immunization could be achieved by bringing the immunization services to the marketplaces that every Haitian woman visits one or more times per week. There were, however, no organized facilities at the marketplaces in which immunization could be carried out in an orderly fashion.

The community health department made plans for outdoor immunization clinics to be held in the major markets. The plans included diagrams of the flow of the crowds and the physical location of stations for gathering, seating, educating, registering, and inoculating people who wished to be immunized. The component tasks of the immunization program were simplified and were kept stereotyped (Table 1).

Literate lay persons were recruited on a day-labor basis from the immediate area of each marketplace. These recruits were each taught their specific component task by the few full-time employees of the community health department. Training was done on the job. Full-time employees supervised the recruits and performed the more difficult aspects of clinic procedure. As the recruits learned their tasks, those who demonstrated alertness and responsibility learned more complex techniques such as the care, maintenance, and operation of the jet injectors, the preparation and care of the materials and supplies used by the clinic, and education of the people coming for immunization. The team's dependence upon the more costly doctors and nurses was thereby reduced until all tasks could be performed by auxiliary

TABLE 1—Personnel included in the immunization team.

Category	Number	Title	Component task
Professional	1	Doctor or nurse	Emergency medical care; public relations; official relations with local and regional authorities.
Auxiliary, recruit	10	Guide	Direct crowds to the different stations; assist record-keepers; assist auxiliary in charge of injections.
Auxiliary, full-time	1	Educator	Explain purpose of immunization and immunization records to crowds.
Auxiliary, recruit	12	Recorder	Interview all persons coming for immunization and prepare an immunization record for each of them.
Auxiliary, full-time	1	Health Officer	Supervise the preparation of equipment and supplies; supervise the guides and recorders; pay part-time auxiliaries.
Auxiliary, full-time	1	Special Recorder	Interview people who have lost their personal record or have other problems which the recruits cannot handle. Make provisional records and complete them with information found in searching hospital and other records.
Auxiliary, full-time	1	Guard	Check records of people about to be immunized; refer any irregularities back to the recorder who made out the record.
Auxiliary, full-time	2	Record-Keeper	Check records of people returning for second or third injection; stamp date of injection and date of return appointment on record.
Auxiliary, full-time	2	Injector	Prepare the equipment and supplies for the clinic; give injections; repair the injector.
Total manpower	31		

personnel. A single professional was retained on the immunization team solely to provide medical aid in case of emergency. From a modest beginning the program expanded to the point where one team of 40 auxiliaries sometimes gave more than 8,000 injections in a single day.

Any patient admitted from the hospital district for tetanus after the beginning of the immunization effort was taken to represent a failure of the program. Tetanus patients' homes were visited to determine in each case why the mother had failed to receive proper immuniza-

tion, and to encourage the patient's family and neighbors to present themselves for immunization. This visiting was carried out by auxiliary recruits who had demonstrated ability in explaining the purpose of the immunization program.

The community health department also developed plans for the control of tuberculosis, malnutrition, and other childhood diseases. These plans provided for complete community coverage and evaluation of results through registration of every household in defined



Auxiliary administers tetanus toxoid by means of a jet injector which he has learned to maintain and repair as well as to operate.

geographic areas, maintenance of a growth record on every preschool child, and recording of births and deaths. They were executed in the same manner as the plans for tetanus control: component tasks were kept simple and training was carried out on the job.

Many recruits originally employed to help with the immunization thus learned other tasks and eventually became highly valued full-time

members of the community health department. Their effectiveness is demonstrated in the vital statistics for the registered area, where infant mortality declined in 5 years from 144 per 1,000 live births to 34 per 1,000 live births, and where the 1-to 4-year-old mortality declined from 16 per 1,000 to 8 per 1,000.

In four years the tetanus control program succeeded in giving more than 675,000 inoculations to more than 266,000 men and women of all ages. Figure 2 shows the effect of this program on hospital admission for neonatal tetanus.

If we assume that the hospital admission rates for neonatal tetanus would have remained at their 1967 peak of 461 had there been no immunization program, we can show that the program averted the necessity of treating approximately 1,160 cases of neonatal tetanus in 1968-1971.

Inasmuch as young girls were immunized, and since the effect of the vaccine lasts at least five years, admissions for tetanus were unlikely to rise to the 1967 peak until 1976, even if all immunization efforts had ceased at the end of 1971. The total neonatal tetanus caseload averted by the program was, therefore, approximately 2,320.



Auxiliaries prepare personal records for women waiting to be immunized.

A case of neonatal tetanus consumes an average of 17 days of hospital care. Thus the program avoided the necessity of expending 41,140 days of care on neonatal tetanus, and these days of care could be redistributed to the care of other diseases. The Albert Schweitzer Hospital calculates the cost of a hospital day at US\$12.00. Thus, averting 41,140 days of care for neonatal tetanus effectively redistributed US\$494,000 to the care of other diseases.

The total expenditures of the community health department for the immunization pro-

gram—including salaries, transportation, equipment, vaccines, supplies, and administration—were approximately US\$67,000 in four years. The ratio of control cost to the cost of no control was therefore approximately 1:7. The added benefit of reducing tetanus at other ages improved this ratio to 1:9. Of course, the benefits to the families receiving the service cannot be quantified in dollars. And the value of the program in recruiting and training highly motivated persons for an effective health team is likewise incalculable.

ACKNOWLEDGMENTS

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SUMMARY

Neonatal tetanus is a disease of major public health importance in Haiti. However, 12 years of hospital-based health services performed by professional personnel of the Albert Schweitzer Hospital had failed to control the disease in rural areas served by the facility. Therefore, in 1968 immunization services were extended to these rural areas through the use of medical auxiliaries.

In four years the services covered the hospital's entire catchment area and the number of hospital admissions for neonatal tetanus de-

clined sharply. The use of locally recruited and trained medical auxiliaries permitted the accomplishment despite the limitations of having few available health professionals and a small budget. The dollar value of the treatment services averted by the program was more than seven times the cost of the program.

In addition, the program served to recruit and to start training a group of auxiliaries who learned to function effectively in delivering other health services to the population.

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