Analysis of the Diphtheria Outbreak in Austin, Texas, 1967-69

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IN RECENT YEARS outbreaks of communicable diseases in the United States have followed a clearly discernible pattern. Numerous reports (*1–34*) indicate that these outbreaks occur primarily among low socioeconomic groups. The recent outbreaks of diphtheria in Florida (*35*), Illinois (*36*), Washington (*37*), Oregon (*38*), and Texas (*39*, *40*), also seemed to follow this pattern. A traditional explanation for the occurrence of communicable diseases among low socioeconomic groups is that people affected by such diseases are uninformed or apathetic toward existing preventive measures. Zalma's report on the diphtheria outbreak in Austin (*41*) stated ". . . there inevitably remains a pool of susceptibles—the 'hard core' families who never turn out for immunizations or who refuse to take them."

My analysis of a local outbreak of diphtheria has possible implications for the occurrences of communicable diseases in other low socioeconomic areas of the nation. The solutions to the local problem which I describe also have possible national significance.

Diphtheria in Austin, 1967–69

Beginning in October 1967 and continuing through December 1969, Austin, in Travis County, had one of the largest diphtheria outbreaks in any U.S. metropolitan area during that time (table 1). Although outbreaks occurred in other Texas counties, the outbreak in Austin and other areas of Travis County lasted longer and affected more people (table 2).

As is typical in diphtheria outbreaks, the Austin victims were predominantly 15 years of age and under. Of the 101 cases reported during October 1967 to October 1969, 42 were in Negroes and 57 in whites (52 of whom were Mexican-American). The ethnic classifications for two patients were undetermined because of a lack of standard procedures for the collection and publication of such data. Although Mexican-Americans constitute only 14.4 percent of the population, according to estimates by Austin's department of planning, they had 52 percent of the cases of diphtheria during this time. Negroes constitute 11.4 percent of the population, but had 42 percent of the diphtheria cases. Anglo-Americans, 74.2 percent of the population, had only 5 percent of the diphtheria cases.

The cases occurred predominantly in the low socioeconomic areas of the city and county. From October 1967 to October 1968, 49 cases occurred in a cluster of five census tracts. Only six cases occurred outside these areas. From October 1968 to October 1969, 34 cases occurred in the same cluster of five census tracts. Again, only six cases occurred outside these areas.

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Attempts have been made to alleviate the problem of diphtheria in Austin. In June 1968 the city-county health department began special diphtheria immunization clinics in addition to the five clinics routinely conducted in the lower socioeconomic areas. Clinic times were extended into the early evening. Saturday and Sunday clinics were added. During October 1968 immunizations for diphtheria and tetanus were given at 36 public and parochial schools and community recreational centers.

Members of the Travis County Medical Society met with the Austin School Board early in 1969, and regulations were written requiring immunizations against five communicable diseases, measles (rubeola), diphtheria, tetanus, smallpox, and poliomyelitis, before admission to school in September 1969. In November and December 1969, the city-county health department personnel gave first and second diphtheria and tetanus immunizations in the 16 elementary public and three parochial schools in the east Austin area.

During September through December 1969, the Comprehensive Health Planning Commission sponsored several meetings with officials from the Travis County Medical Society, school officials, Human Opportunities Corporation (Office of Economic Opportunity), city-county health department personnel, and persons from the east Austin neighborhood to discuss the diphtheria problem and possible solutions to it. Special clinics; house-to-house neighborhood canvasses; and radio, television, and newspaper coverage of the clinic hours and the importance of getting immunized were suggested. Neighborhood groups offered to follow up those who had not completed the series, if the names could be made available. It was also suggested that an annual immunization program and monitoring system be set up in the elementary public and parochial schools in east Austin. Despite all this activity, Travis County had 37 cases of diphtheria in 1969 (*42*).

Austin's problem with underimmunized low-income people is not unique, as recent reports have revealed (*35–40*). However, the time has come to raise questions as to some possible reasons for the occurrence of communicable disease outbreaks. As I interpret existing data on communicable diseases, the following are primary parameters.

Communicable disease outbreaks are primarily a result of consumers who are uninformed or apathetic with respect to preventive measures. This alternative has been discussed in previous reports (*8, 34, 43*). They cite extensive bibliographies that question the validity of the traditional explanation of apathy for the general underimmunized status of low socioeconomic people. Based on these studies, it seems plausible to search elsewhere for other causes of communicable diseases among low socioeconomic people.

Some vaccines are not effective in preventing certain diseases. This alternative certainly merits research. Older's study (*44*) and reports from the Center for Disease Control (*39, 40*) indicate that this parameter should be considered with regard to the fully immunized people who contract diphtheria. Future research should include investigation of the occurrence of diphtheria in young adults who had the complete series as children but are no longer protected and in those persons who had recently received their second immunization but contracted the disease before immunization protection had been established.

Table 1. Diphtheria incidence in Travis County, the State of Texas, and the United States, 1967–69

Area	Population [1]	1967		1968		1969	
		Cases	Rates	Cases	Rates	Cases	Rates
Travis County	263, 981	12	4. 55	64	24. 24	37	14. 02
Texas including Travis County	10, 924, 009	72	. 66	131	1. 20	75	. 69
Texas excluding Travis County	10, 660, 028	60	. 56	67	. 63	38	. 36
United States	197, 859, 000	214	. 11	243	. 12	232	. 12

[1] 1967 estimates.

Table 2. Diphtheria incidence in Texas counties which reported five or more cases to the Texas State Department of Health, 1967–69

County	Population[1]	1967		1968		1969	
		Cases	Rates	Cases	Rates	Cases	Rates
Bexar	839, 330	(2)	--------	6	0. 71	9	1. 07
Dallas	1, 201, 617	5	. 42	(2)	--------	(2)	--------
Jefferson	254, 017	(2)	--------	(2)	--------	11	4. 33
Kleberg	29, 137	17	58. 35	18	61. 78	(2)	--------
Nueces	234, 081	8	3. 42	14	5. 98	(2)	--------
Travis	263, 981	12	4. 55	64	24. 24	37	14. 02

[1] 1967 estimates.
[2] Less than 5 cases reported.

Communicable disease outbreaks are primarily a result of uninformed or apathetic providers of preventive measures. This alternative also merits future research. The present study represents an empirical analysis of one communicable disease outbreak that, based on experience and the literature, suggests that this alternative is a likely candidate as a primary parameter.

The causes of communicable disease outbreaks are overcrowding, poverty, and malnutrition. These conditions prevail in every metropolitan area in the United States to a degree equal to or greater than in Austin.

A combination of the foregoing. Many communicable disease outbreaks are the result of a combination of the four parameters discussed. Further analysis of the Austin data may provide a clearer insight into the complexities of the problem.

The following explanations are offered as to why Austin continues to have diphtheria. According to health department estimates in February 1970, 90,000 immunizations were given during the outbreak. The disease, however, has continued to occur in the same socioeconomic areas and among the same ethnic groups. In 1968, even with a "captive" school population, more than 10,000 immunizations produced only a 64 percent completion rate for the elementary schools in the low socioeconomic areas. After immunizations were given in these schools for 2 consecutive years, only three of the 16 elementary public schools had a completed immunization rate of 80 percent or higher. Others were as low as 36 percent. The city-county health department and the elementary schools keep separate records. They have been unable to establish procedures to record promptly the immunizations as they are received. The public health department officials seem reluctant to lend their records to the schools for the transcription of immunization data to school records because the department's policy is not to allow records to be loaned out for any reason. The health department has not been able to establish a time when this information can be made available to the schools. This problem should be resolved and greater cooperation should be encouraged between agencies to share records.

The Texas State Department of Health operates a birth certificate followup program that provides the local health department with the names and addresses of newborn babies whose parents have not completed a form indicating that the immunization series has been started. Of the 1,330 referrals received in 1969, the health department processed 288 by telephone and home visits. There is no system to determine how many of those processed actually completed an immunization series.

Perhaps the most striking deficiency of the local health department immunization program was the lack of outreach capability in the low socioeconomic areas. Previous reports (*8*, *18*, *34*, *43*) indicate the importance of such a component in any effort to motivate low socioeconomic people to participate in public health programs. However, public health nurse supervisors generally have been resistant to the idea of using neighborhood people in outreach efforts, and this resistance has been evident in Austin. The public health nurses justified the refusal to re-

lease names of people who fail to complete their diphtheria series to neighborhood volunteers for followup purposes in the name of confidentiality, although the city's legal department ruled it legally permissible.

Because of newspaper, radio, and television publicity, action by neighborhood center personnel, and use of a sound truck to announce that school immunization requirements would be enforced, the special immunization clinics were predictably inundated. During one October Sunday clinic in 1969, 466 people were immunized between 1 and 5 p.m. This clinic was better staffed than the other special clinics, and it had two jet-injector guns. The staff consisted of one State health department employee, one student nurse, three nurses, and two clerks. (The clinics are usually staffed with two or three nurses and two clerks and have no jet-injector guns.) Comparison of the data from the special clinics in October 1969 with the same clinics in November 1969 revealed that 179 people came into the Pan American clinic for their first DTP or DT injection on October 12, but only 3½ percent returned on November 9 for their second injection. Of the 139 people who came into the Sabine clinic on October 5 for their first DTP or DT injection, only 19 percent returned on November 2 for their second injection. Of the 108 people who came into the Meadowbrook clinic on October 12 for their first DTP injection, only 15 percent returned on November 9 for their second injection. Of the 71 persons who came to the Montopolis clinic on October 5 for their first DTP or DT injection, only 29½ percent returned for their second injection on November 2.

One interpretation of these data could be the traditional one that the people are apathetic or uninformed. This interpretation raises a question—if the people are apathetic or uninformed, why did they come out the first time? Observation of several special clinics suggested other possible explanations for the low percentage of people who returned for their second DTP or DT immunization. In the Pan American clinic on Sunday, October 12, 1969, from 1 to 5 p.m., the waiting time for immunizations was 1 to 2 hours. Although the Pan American Center is a large building, parents and children were standing in the rain because there was no one to organize the lines. The clinic in general was poorly organized. Nurses used one narrow passageway for both entrance and exit. There were too few clerks for the paperwork—two to support four professionals. In order to operate a mass clinic efficiently, the staff ratio should be at least two clerks for every professional person. There was no one who could explain the procedures in Spanish to the people standing in line. Few were told when to return or the importance of returning for the second immunization.

During rush periods some special clinics gave only DTP or DT injections and referred the people to regularly scheduled clinics for their other immunizations. Reports by the Comprehensive Health Planning Commission staff on other special clinics confirmed this pattern. The city-county health department continued to hold most of its special clinics at the central office, although its data for February and March 1969 indicated that less than 30 percent of the people who came to the central clinic were from east Austin where the diphtheria was occurring. The single evening clinic, at the same location, was open only until 6 p.m. The health department's general policy was to close the clinics promptly at the stated times regardless of how many people might be waiting. The health department began to use a small mobile unit in November 1969, with some clinics operating from 5–7 p.m., but it could only serve a small number of people. It is evident that mass immunization clinics as operated in Austin cannot be looked upon as an effective method of solving communicable disease problems. This is particularly true of communicable diseases that require (*a*) more than one immunization, (*b*) periodic boosters, and (*c*) immunization of preschool children of low socioeconomic levels.

Conclusions

The deficiencies described suggest why diphtheria continued to occur in Austin. It would be a simple matter to make the local city-county health department the scapegoat. This would be neither fair nor accurate. Most health departments for years have been inadequately funded for the task they have been expected to perform. Most schools also have been inadequately

funded and structured in health and health-related matters.

I believe the situation that I described is not solely local but one that exists generally across the nation. There are few or no health auxiliaries to do outreach work, few clinics near the low socioeconomic population, few clinics operating in the evening hours, and often a "means" test is a barrier to persons most in need of immunization. Careful analysis of communicable disease data where the diseases are occurring seems to support this position.

Based on reported experiences throughout the country, immunization programs established in the elementary schools, comprehensive in scope and operated without regard to any "means" test, have proved effective in preventing or halting communicable disease epidemics. Such a program is not subject to the weaknesses I described earlier because parents are receptive to school-sponsored activities, which reach virtually all socioeconomic groups. Since the population to be immunized will be known in advance, public or school health officials can efficiently schedule and establish locations for the immunizations. Such a program coupled with an intensive concentration on reaching preschool children should virtually eliminate many communicable diseases which continue to occur in this country.

If these conclusions are accurate, it is essential to build into curriculums and programs the importance of teaching physicians, health officers, health administrators, and nurses the following: (*a*) the need for, and utility of, health auxiliary personnel and how they may be selected, trained, and supervised, (*b*) the use of data in program activities and program planning, (*c*) the need for understanding the people to be served, and (*d*) the recognition that communicable diseases are public health problems, and, as such, obstructive "means" tests should be eliminated. People charged with delivering services to the poor often have a distorted concept of such persons' values, attitudes, and motivations.

Much of this could also be taught through inservice programs. If the medical schools, the public schools, the schools of public health, local medical societies, and local health departments cannot or will not address themselves to the problems I have outlined, unnecessary diphtheria, poliomyelitis, measles, and rubella will continue to result in debilitation and loss of human and economic resources.

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Tearsheet Requests

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