SUMMARY 1974–1976
Issued October 1977

CENTER FOR DISEASE CONTROL

NEUROTROPIC DISEASES SURVEILLANCE

POLIOMYELITIS

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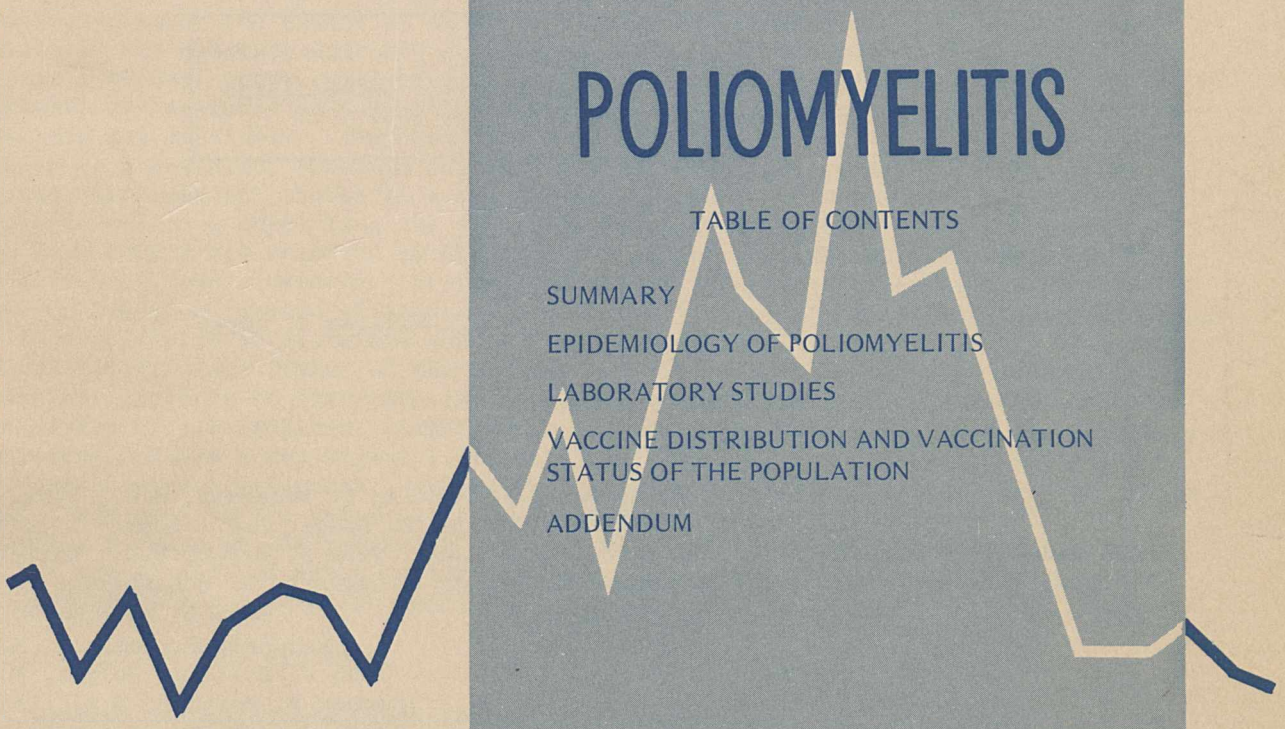

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

PREFACE

Summarized in this report is information received from state health departments, university investigators, virology laboratories, and other pertinent sources, domestic and foreign. This summary is intended primarily for the use of those with responsibility for disease control activities. Anyone desiring to quote this report should contact the original investigator for confirmation and interpretation.

Contributions to the Surveillance Report are most welcome. Send them to

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SUGGESTED CITATION
Center for Disease Control: Poliomyelitis Surveillance Summary 1974-1976, Issued October 1977

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SUMMARY

Twenty-five cases of paralytic poliomyelitis, including 2 fatal cases, were reported to have occurred in United States residents over the 3-year period 1974-1976. Five cases were reported in 1974--the lowest annual total reported to the Center for Disease Control (CDC) since poliomyelitis surveillance began in 1955; 12 cases were reported in 1975, and 8 in 1976. The 25 cases were distributed among 16 states: Arizona (1), Arkansas (1), California (4), Connecticut (2), Indiana (2), Iowa (1), Kansas (1), Maryland (1), Michigan (3), New Hampshire (1), New York (1), Ohio (1), Pennsylvania (1), Tennessee (1), Texas (3), and Washington (1). Ten of the cases were in children 2 years of age or under. With the exceptions of an 11-year-old, a 16-year-old, and a 54-year-old, the other persons affected were between 20 and 35 years of age. Epidemiologic classification showed 4 "endemic, not vaccine-associated" cases, 10 "contact vaccine-associated" cases, 5 "imported" cases, and 6 "immune deficient" cases. No "recipient vaccine-associated" or "epidemic" cases were reported for the 3-year period. Not included in the above totals are 3 cases of paralytic poliomyelitis imported into the United States in 1976 by nonresidents--2 from Mexico and 1 from Brazil. The 25 cases represent the "best available paralytic poliomyelitis case count." This designation, used since 1958 to represent the number of cases of illness of poliovirus etiology, includes clinically and epidemiologically compatible cases in persons known to have residual paralysis 60 days after onset of initial symptoms, plus those cases reported initially as paralytic poliomyelitis for which no 60-day report on residual paralysis was available. The designation permits exclusion of illnesses that involve more transient weakness possibly due to echovirus, coxsackievirus, or other viruses, although not proven as such. In all 25 cases there was pathologic and/or virologic evidence supporting the diagnosis of poliomyelitis.

Case counts are received by CDC from the states and published in Morbidity and Mortality Weekly Reports. States also report individual cases to the Viral Diseases Division, Bureau of Epidemiology, CDC. Virologic and serologic data are provided initially by state and academic laboratories. When specimens are available, the Enteric Virology Branch of the CDC Bureau of Laboratories makes studies of the poliovirus isolates to determine the antigenic characteristics and temperature sensitivity of all isolates. Confirmation of serologic results is also done by this laboratory. Table 1 and Figure 1 are based on case counts published in Morbidity and Mortality Weekly Reports. Subsequent tables and figures are based on case counts submitted to the Viral Diseases Division, Bureau of Epidemiology, CDC. Primarily because of the review of reported cases by the Viral Diseases Division and the use of date of onset rather than date of report, the annual incidence from each system will not coincide exactly.

EPIDEMIOLOGY OF POLIOMYELITIS

General Epidemiologic Characteristics - In April 1975 CDC requested a group of consultants to review all reported cases of paralytic poliomyelitis from 1969 (the year the last committee review of vaccine-associated cases had been conducted) through 1974. The 1974, 1975, and 1976 cases are hereafter presented as part of a summary of all paralytic poliomyelitis cases reported from 1969-1976. Epidemiologic classifications recommended by the 1975 CDC Poliomyelitis Review Group and used in this report are as follows:

I. EPIDEMIC

A. Oral Poliovirus Vaccine (OPV) not received from 4-30 days before onset of illness.

B. OPV received from 4-30 days before onset of illness.

II. ENDEMIC

A. No history of receiving OPV or of contact with an OPV recipient as defined in B and C below:
B. OPV received from 4-30 days before onset of illness.
C. Onset of illness 4-60 days after OPV was fed to a recipient in contact with the patient and contact occurred within 30 days before onset of illness.

1. Household contact - vaccinee and patient regularly share the same home for sleeping.
2. Community contact or nonhousehold contact

III. IMPORTED - Disease develops in United States resident who has traveled outside the United States in areas with known endemic or epidemic poliomyelitis.

IV. IMMUNE DEFICIENT

Table 1 shows the incidence and rates of reported cases of paralytic poliomyelitis from 1951 through 1976. After the introduction of inactivated poliovirus vaccine (IPV) in 1955 and continuing with the introduction of oral poliovirus vaccine (OPV) in 1962, there was a precipitous decline in the rate of poliomyelitis in the United States (Figure 1). From 1969 through 1976 rates have ranged from 0.004 to 0.02 cases per 100,000 population, with case totals ranging from 5 to 32 cases per year (Figures 1 and 2). The case total for this 8-year period was the lowest one reported for any such period to date.

Epidemiologic groupings of the cases by year are shown in Figure 3. Only 2 epidemics were reported, accounting for 30 (22.7%) of the reported cases. The first, consisting of 22 cases, occurred in 1970 near the Texas-Mexico border. The second, consisting of 8 cases, occurred in 1972 in a Connecticut private boarding school. Thirty-two (24.2%) cases were endemic without vaccine association. Forty-four (33.3%) cases were vaccine-associated: 10 (7.6%) cases occurred in recipients and 34 (25.7%) in contacts of vaccine recipients. Fifteen (11.4%) cases were imported, and 11 (8.3%) reflected an immune deficiency. An increased poliomyelitis activity in summer and fall is observed when all reported cases are considered together (Figure 4).

As in previous years slightly over half of the patients were < 1-4 years of age (Table 2); however, there has been a statistically significant change in the age distribution.* The 5- to 9-year-old group from 1962-1968 accounted for 17.5% of all cases but from 1969-1976 accounted for only 4.5%. Contrasting increases from 7.1% and 5.7% to 9.8% and 11.4% are found in the age groups 20-29 and 30-39, respectively. Males outnumbered females 1.3:1.

Eighty-four (63.6%) persons were unvaccinated, 5 (3.8%) had received 3 or more doses of IPV, and 6 (4.5%) had received 3 or more doses of OPV (Table 3).

The outcome of each episode of paralytic poliomyelitis is shown in Table 4. There were 12 deaths, giving a reported death-to-case ratio of 9.1%. A disproportionate number of deaths came from the immune deficient group. The majority of cases in all of the other epidemiologic groups were in the severe or significant categories.

The geographic distribution of cases is shown in Figure 5. Sixteen states reported no cases. Although the small numbers and variable reporting systems preclude statistical analysis of attack rates, 38 (28.8%) of the cases occurred in Texas, where only 6% of the total United States population resides.

Epidemic Cases--Only 2 epidemics of paralytic poliomyelitis were reported in the years 1969 through 1976, one in Texas and the other in Connecticut.

* Chi-square 20.26, p between 0.001 and 0.005 (10- to 19-year-olds considered as 1 group)

Table 1
Reported Cases of Poliomyelitis, by Paralytic Status
United States, 1951-1976

Year	Paralytic	Nonparalytic	Unspecified	Total	Total Case Rate*
1951	10,037	5,470	12,879	28,386	18.5
1952	21,269	12,802	23,808	57,879	37.2
1953	15,648	12,144	7,800	35,592	22.5
1954	18,308	13,221	6,947	38,475	23.9
1955	13,850	12,453	2,682	28,985	17.6
1956	7,911	6,555	674	15,140	9.1
1957	2,499	2,826	160	5,484	3.2
1958	3,697	1,941	149	5,787	3.3
1959	6,289	2,045	91	8,425	4.8
1960	2,525	626	39	3,190	1.8
1961	988	305	19	1,312	0.7
1962	762	139	9	910	0.4
1963	396	52	1	449	0.2
1964	106	12	4	122	0.1
1965	61	10	1	72	0.04
1966	106	7	13	113	0.06
1967	40	0	1	41	0.02
1968	53	0	0	53	0.03
1969	18	2	0	20	0.01
1970	31	4	0	33	0.02
1971	17	4	0	21	0.01
1972	29	2	0	31	0.01
1973	7	1	0	8	<0.01
1974	7	0	0	7	<0.01
1975	8	0	0	8	<0.01
1976	8	1	0	9	<0.01

* Case rate per 100,000 population (Bureau of Census midyear population estimates)

Table 2
Paralytic Poliomyelitis Cases, by Age Group,
United States, 1962-1968, 1969-1975*

	1962-1968		1969-1976	
Age Group	No.	(%)	No.	(%)
<1-4	707	(51.5)	73	(55.3)
5-9	240	(17.5)	6	(4.5)
10-14	129	(9.4)	2	(1.5)
15-19	54	(3.9)	17	(12.9)
20-29	98	(7.1)	13	(9.8)
30-39	78	(5.7)	15	(11.4)
40+	51	(3.7)	6	(4.5)
Unknown	16	(1.2)	0	
	1,373		132	

*Chi-square 20.26, p between 0.001 and 0.005 (10- to 19-year-olds considered as 1 group)

Fig. 1 REPORTED PARALYTIC POLIOMYELITIS ATTACK RATES, BY YEAR, UNITED STATES, 1951-1976

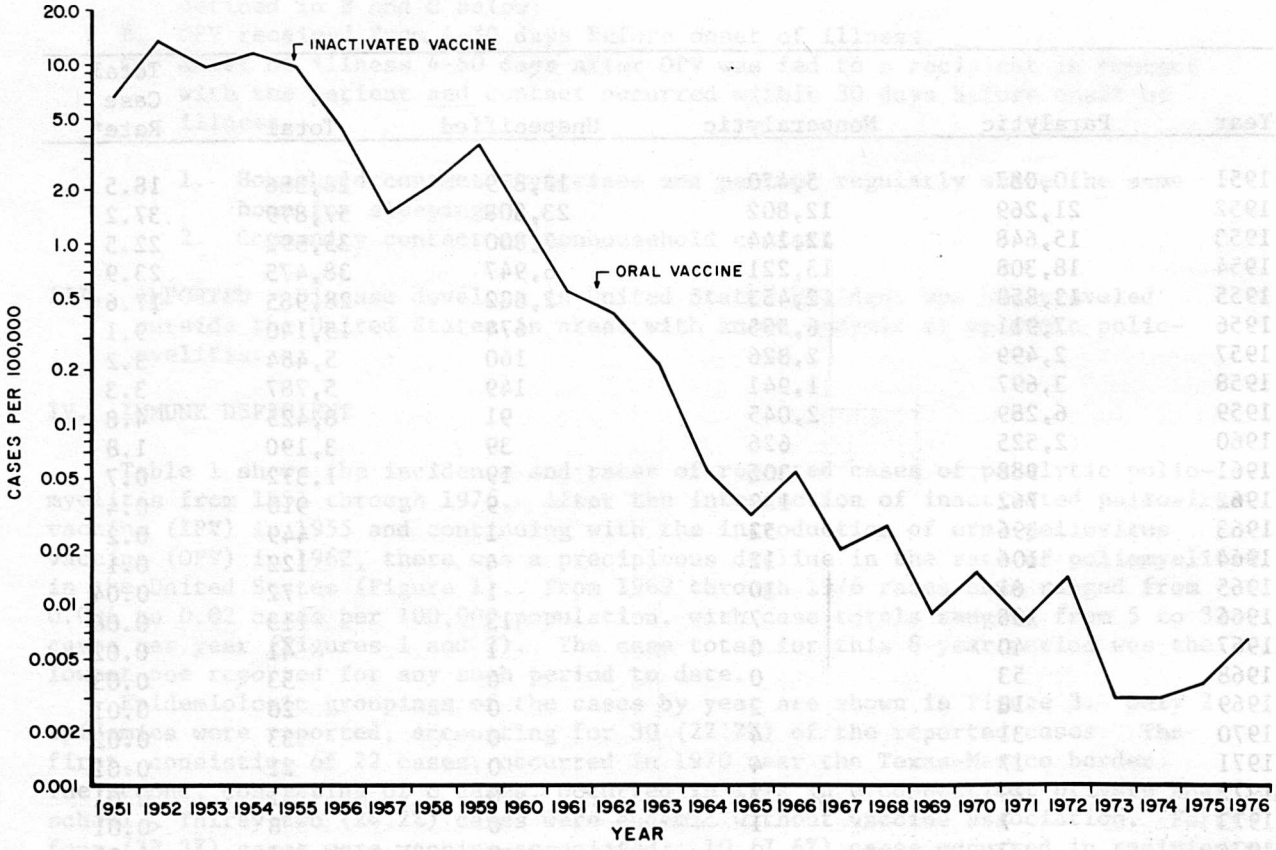


Table 3
Type of Endemic Poliomyelitis Vaccination History, United States, 1969-1976

Vaccination History	No History of Vaccine Association	Vaccine-associated Recipient	Vaccine-associated Household Contact	Vaccine-associated Community Contact	Epidemic	Imported	Immune Deficient	Total
None	20	6	20	4	24	10	0	84
IPV: Partial	1	1	3	0	0	1	1	7
3 or more doses	3	0	0	1	0	1	0	5
OPV: Partial	7	2	3	0	6	3	7	28
3 or more doses	0	0	3	0	0	0	3	6
Mixed: Partial IPV + 3 or more doses OPV	0	0	0	0	0	0	0	0
Partial IPV + Partial OPV	1	0	0	0	0	0	0	1
3 or more IPV + Partial OPV	0	1	0	0	0	0	0	1
3 or more IPV and OPV	0	0	0	0	0	0	0	0
TOTAL	32	10	29	5	30	15	11	132

Fig. 2 PARALYTIC POLIOMYELITIS CASES, UNITED STATES, 1969-1976

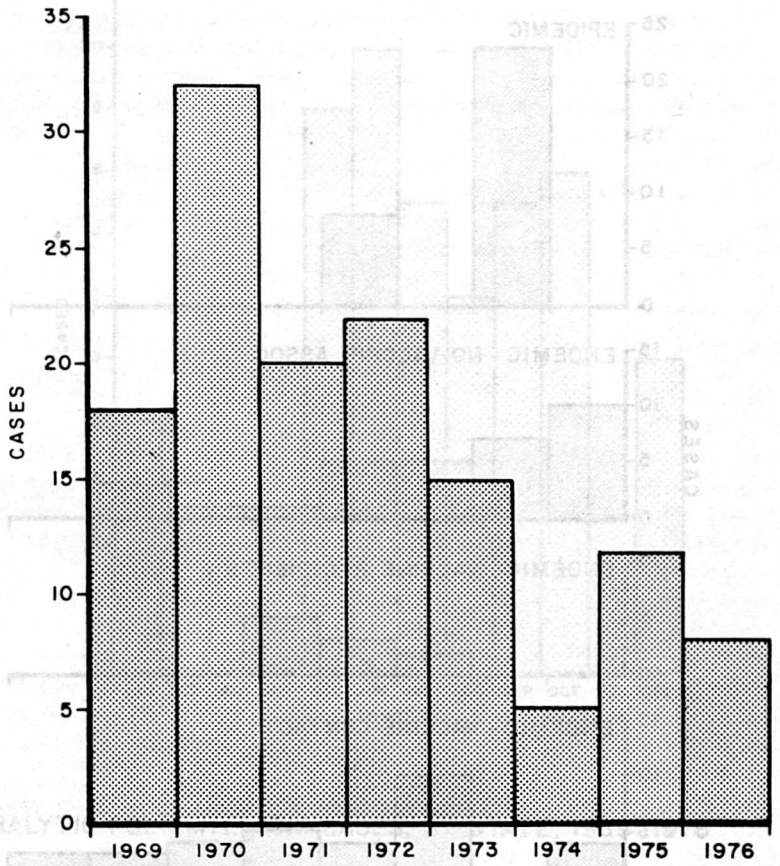


Table 4
Severity of Paralytic Poliomyelitis Cases,
By Epidemiologic Classification, United States, 1969-1976

	Death	Severe	Significant	Minor	Unknown	Total
Epidemic	3	10	10	1	6	30
Endemic						
No OPV	2	9	8	6	7	32
OPV receipt		3	6	1	0	10
OPV contact	1	7	17	3	6	34
Imported	1	7	1	2	4*	15
Immune deficient	5	2	2	—	2**	11
TOTAL	12	38	44	13	25	132

*One patient died several months after discharge, unknown role of residual
**One patient died at an unstated time after discharge, unknown role of residual

Fig. 3 PARALYTIC POLIOMYELITIS, BY EPIDEMIOLOGIC GROUPING, UNITED STATES, 1969-1976

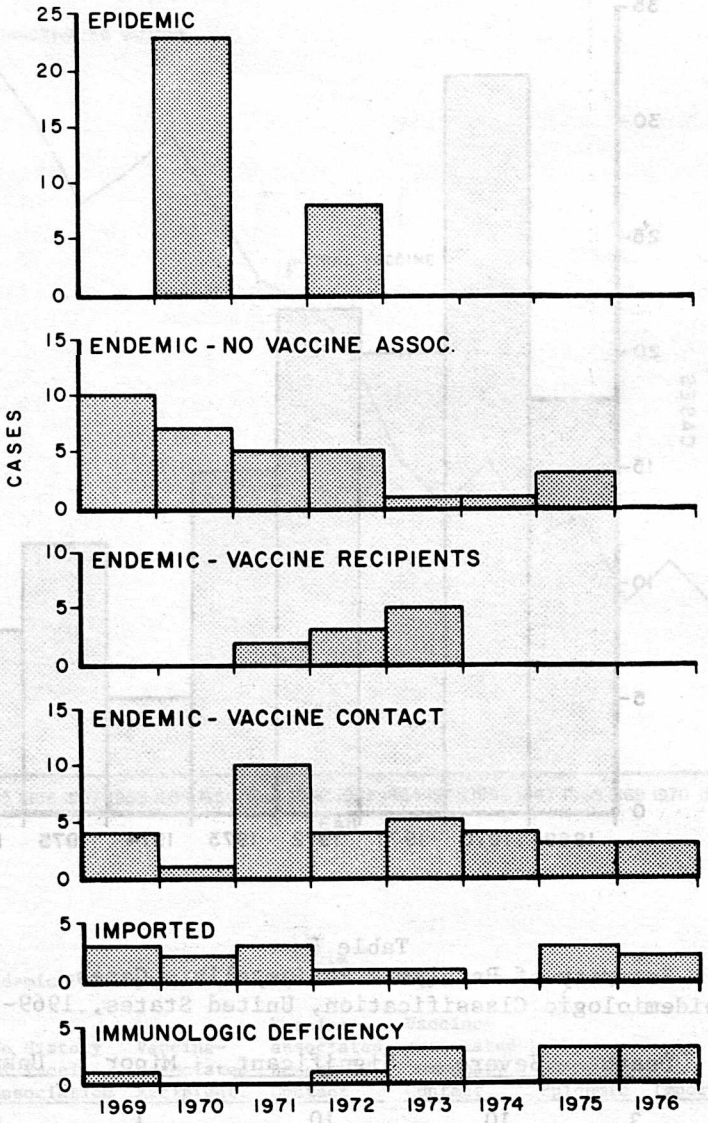


Table 5
Paralytic Poliomyelitis Cases, By Age Group and Epidemiologic Classification, United States, 1969-1976

Age	Epidemic	No Vaccine Associatfon	Vaccine-associated Recipient	Contact Vaccine-associated	Imported	Immune Deficient
<1-4	22	17	8	6	8	10
5-9	1	3	1	1	0	0
10-14	1	1	0	0	1	0
15-19	6	4	1	4	1	0
20--29	0	1	0	10	2	1
30-39	0	3	0	12	1	0
40+	0	3	0	1	2	0
TOTAL	30	32	10	34	15	11

Fig. 4 PARALYTIC POLIOMYELITIS CASES, BY MONTH OF ONSET, UNITED STATES, 1969-1976

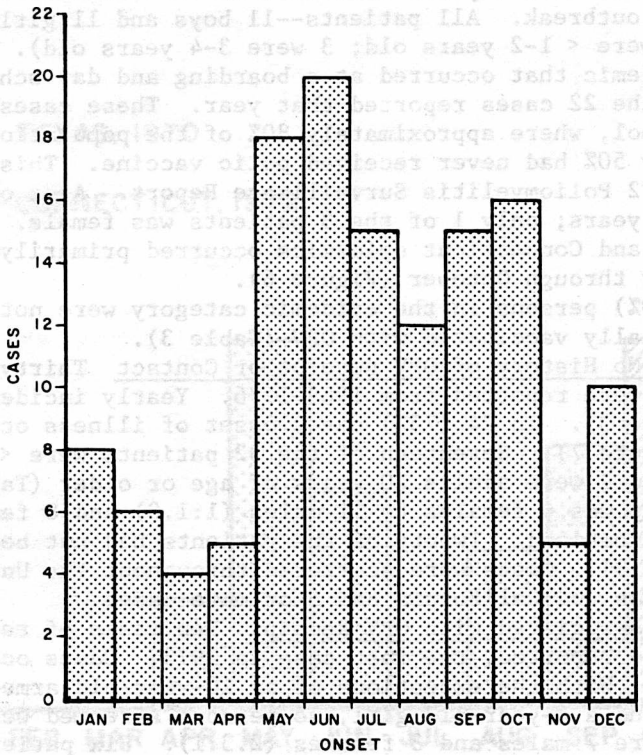
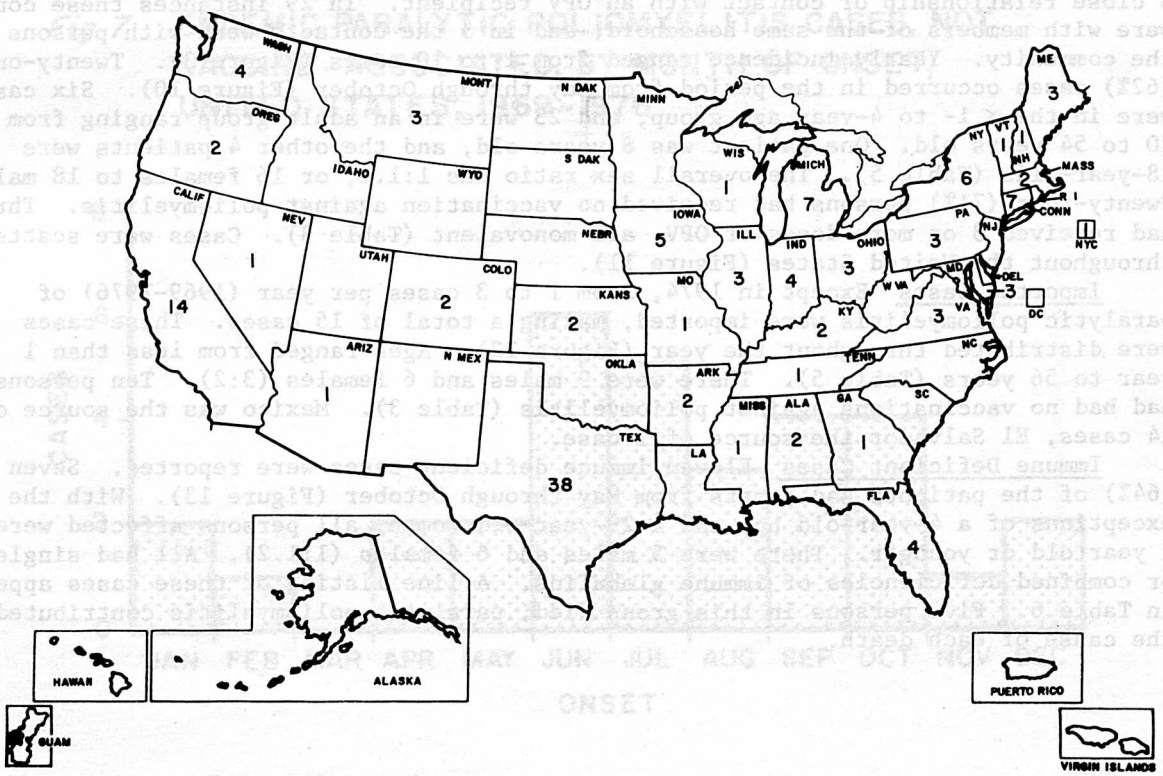


Fig. 5 PARALYTIC POLIOMYELITIS CASES, BY STATE, 1969-1976



In 1970 an epidemic occurred in 2 Texas counties near the Mexican border. Retrospective review of case reports submitted to CDC revealed that 22 cases were associated with the outbreak. All patients--11 boys and 11 girls--were 4 years of age or younger (19 were < 1-2 years old; 3 were 3-4 years old).

In 1972 an epidemic that occurred at a boarding and day school in Connecticut accounted for 8 of the 22 cases reported that year. These cases occurred in students of the school, where approximately 80% of the population were inadequately vaccinated, and over 50% had never received polio vaccine. This outbreak was discussed in the 1972 Poliomyelitis Surveillance Report. Ages of the patients ranged from 7 to 18 years; only 1 of the 8 patients was female.

Both the Texas and Connecticut epidemics occurred primarily in the warmer half of the year from May through October (Figure 6).

Twenty-four (80%) persons in the epidemic category were not vaccinated. The remainder were partially vaccinated with OPV (Table 3).

Endemic Cases--No History of OPV Receipt or Contact Thirty-two cases not associated with OPV were reported from 1969-1976. Yearly incidence ranged from 0 to 10 cases (Figure 3). In 24 (75%) cases onset of illness occurred from May through October (Figure 7). Seventeen of the 32 patients were < 4 years old, 8 were aged 5-19, and 7 were adults 20 years of age or older (Table 5). Sex ratio in the youngest group was 6 females to 11 males (1:1.8) and 8 females to 7 males in the other groups combined. Twenty of the patients had not been vaccinated against poliomyelitis (Table 3). Cases were scattered throughout the United States (Figure 8); only Texas and California had 5 or more cases.

Endemic Cases--Associated with OPV Receipt Ten cases of recipient vaccine-associated polio were reported, the last case in 1973. Cases occurred throughout the year (Figure 9). With the exceptions of an 18-year-old armed services recruit, a 3-year-old girl, and a 6-year-old girl, no persons affected were over 1 year old (Table 5). There were 7 males and 3 females (2.3:1). Six patients became ill after their first exposure to OPV, 2 after their second. One person had a history of partial vaccination with IPV (Table 3).

Endemic Cases--Associated with Contact of an OPV Recipient From 1969 through 1976, 34 cases of paralytic poliomyelitis occurred in persons who had a history of a close relationship or contact with an OPV recipient. In 29 instances these contacts were with members of the same household, and in 5 the contacts were with persons in the community. Yearly incidence ranged from 1 to 10 cases (Figure 3). Twenty-one (62%) cases occurred in the period from May through October (Figure 10). Six cases were in the < 1- to 4-year age group, and 23 were in an adult group ranging from 20 to 54 years old. One patient was 8 years old, and the other 4 patients were 18-year-olds (Table 5). The overall sex ratio was 1:1.1, or 16 females to 18 males. Twenty-four (71%) persons had received no vaccination against poliomyelitis. Three had received 3 or more doses of OPV, all monovalent (Table 3). Cases were scattered throughout the United States (Figure 11).

Imported Cases Except in 1974, from 1 to 3 cases per year (1969-1976) of paralytic poliomyelitis were imported, making a total of 15 cases. These cases were distributed throughout the year (Figure 12). Ages ranged from less than 1 year to 56 years (Table 5). There were 9 males and 6 females (3:2). Ten persons had had no vaccinations against poliomyelitis (Table 3). Mexico was the source of 14 cases, El Salvador the source of 1 case.

Immune Deficient Cases Eleven immune deficient cases were reported. Seven (64%) of the patients had onsets from May through October (Figure 13). With the exceptions of a 4-year-old boy and a 29-year-old woman, all persons affected were 1 year old or younger. There were 5 males and 6 females (1:1.2). All had single or combined deficiencies of immune globulins. A line listing of these cases appears in Table 6. Five persons in this group died; paralytic poliomyelitis contributed to the cause of each death.

Fig. 6 EPIDEMIC PARALYTIC POLIOMYELITIS CASES, BY MONTH OF ONSET, TEXAS 1970 AND CONNECTICUT 1972

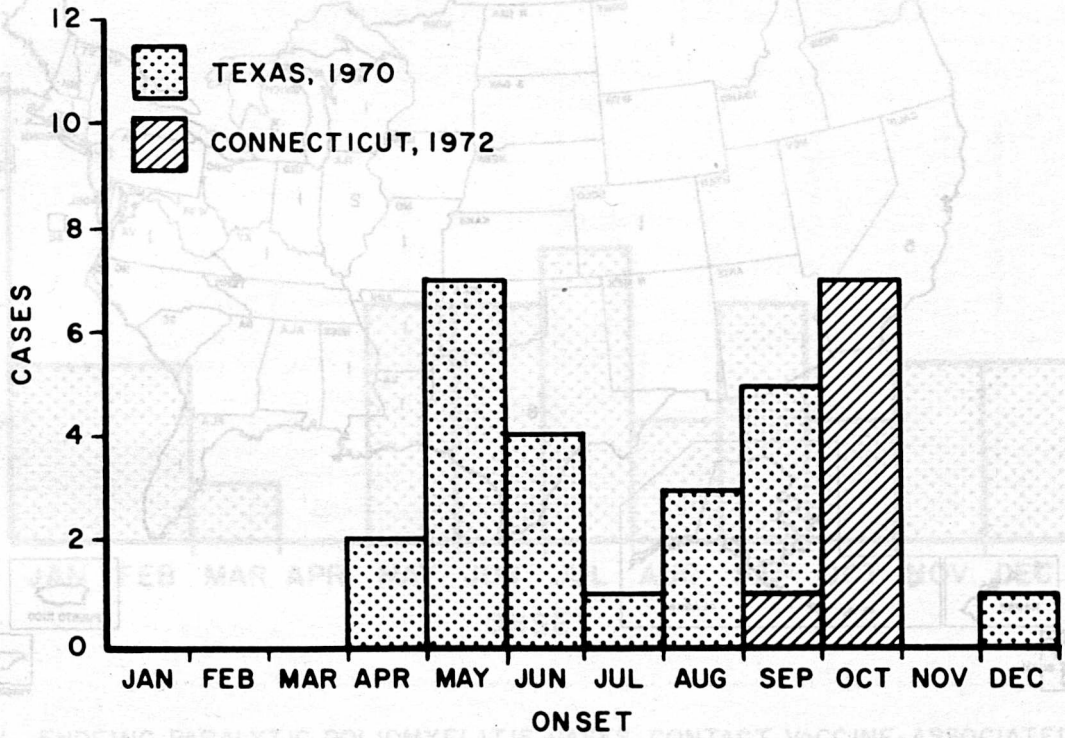


Fig. 7 ENDEMIC PARALYTIC POLIOMYELITIS CASES, NOT VACCINE-ASSOCIATED, BY MONTH OF ONSET, UNITED STATES, 1969-1976

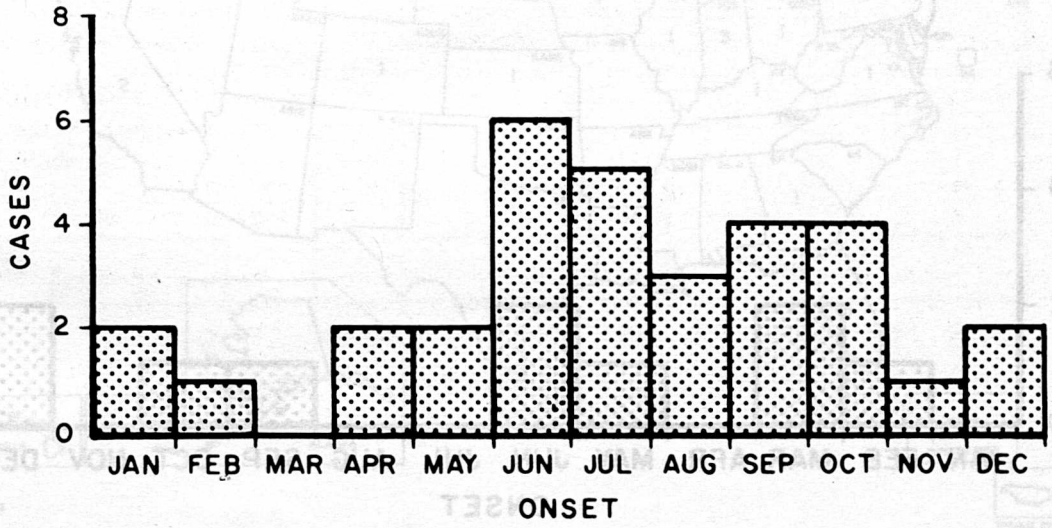


Fig. 8 ENDEMIC PARALYTIC POLIOMYELITIS CASES, NOT VACCINE-ASSOCIATED, BY STATE, 1969-1976

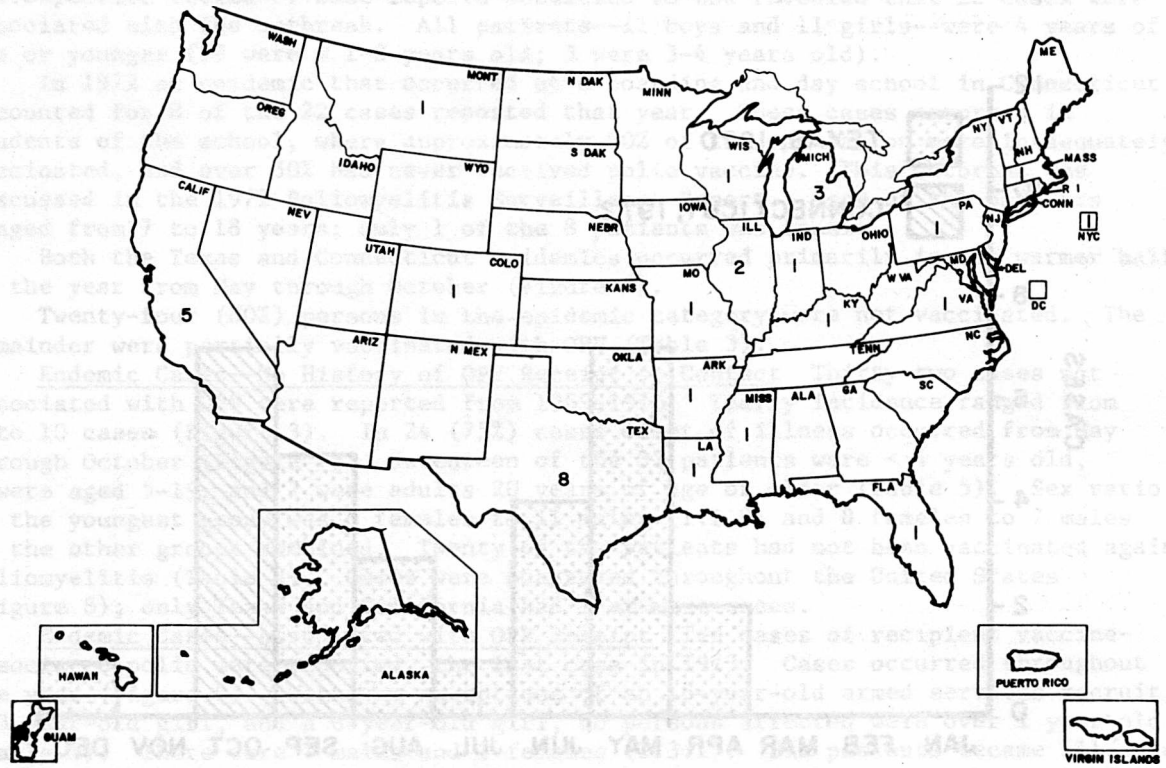


Fig. 9 ENDEMIC PARALYTIC POLIOMYELITIS CASES, RECIPIENT VACCINE-ASSOCIATED, BY MONTH OF ONSET, UNITED STATES, 1969-1976

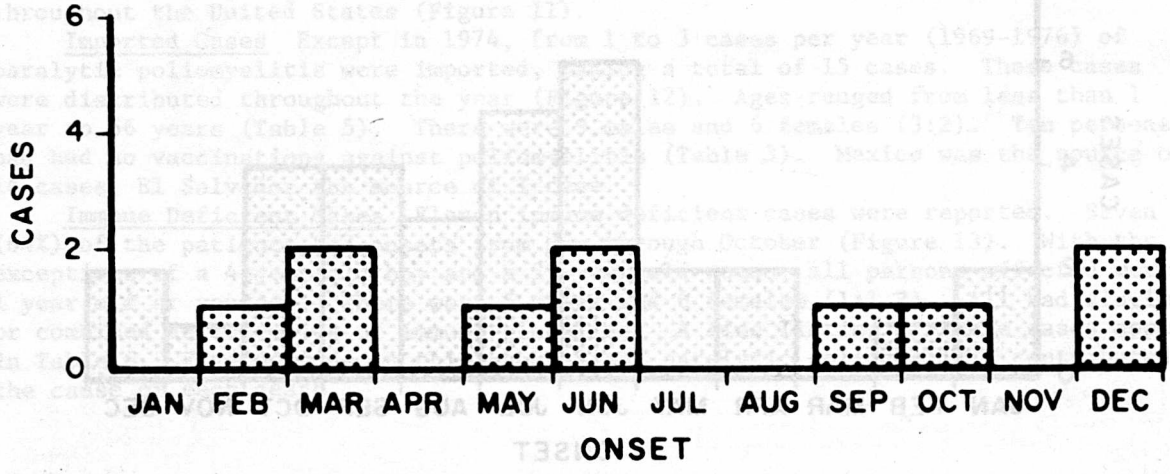


Fig. 10 ENDEMIC PARALYTIC POLIOMYELITIS CASES, CONTACT VACCINE-ASSOCIATED, BY MONTH OF ONSET, UNITED STATES, 1969-1976

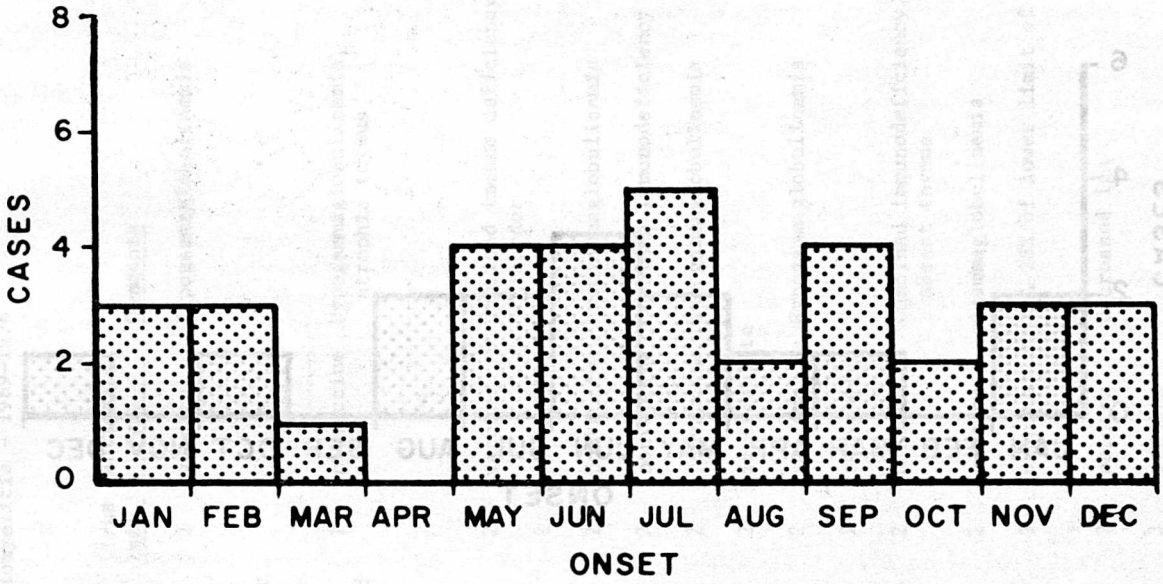


Fig. 11 ENDEMIC PARALYTIC POLIOMYELITIS CASES, CONTACT VACCINE-ASSOCIATED, BY STATE, 1969-1976

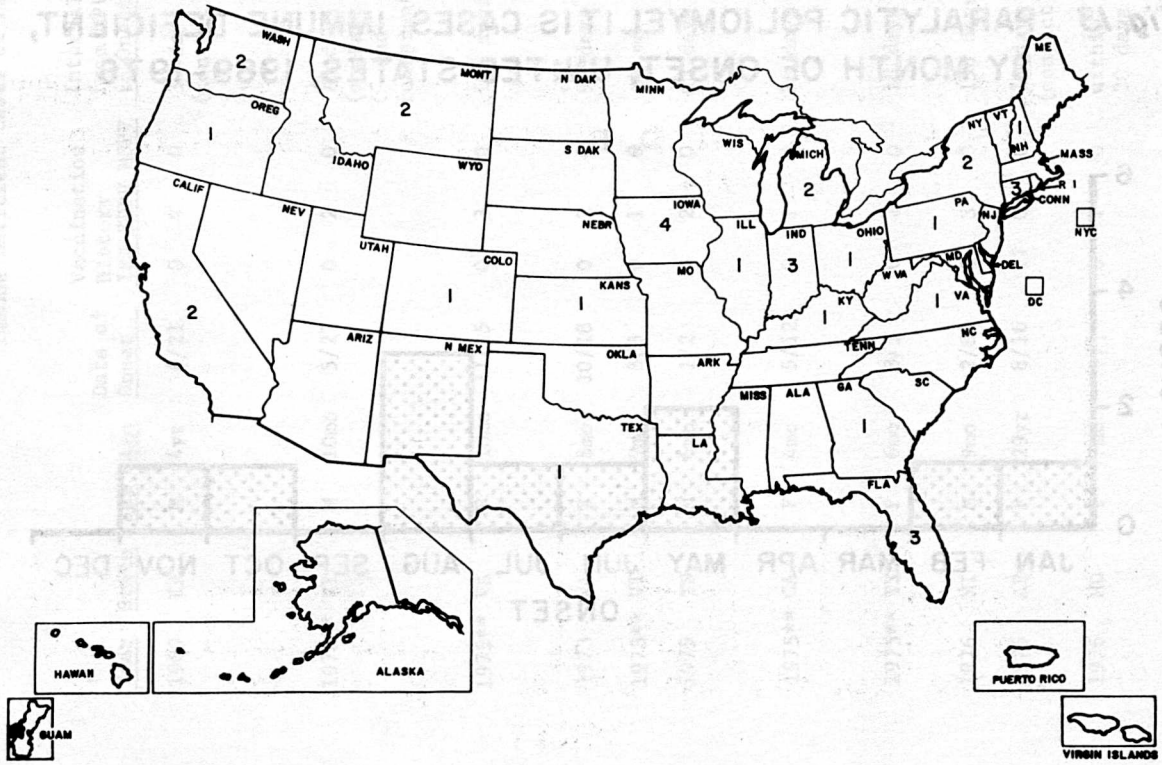


Fig. 12 IMPORTED PARALYTIC POLIOMYELITIS CASES, UNITED STATES, 1969-1976

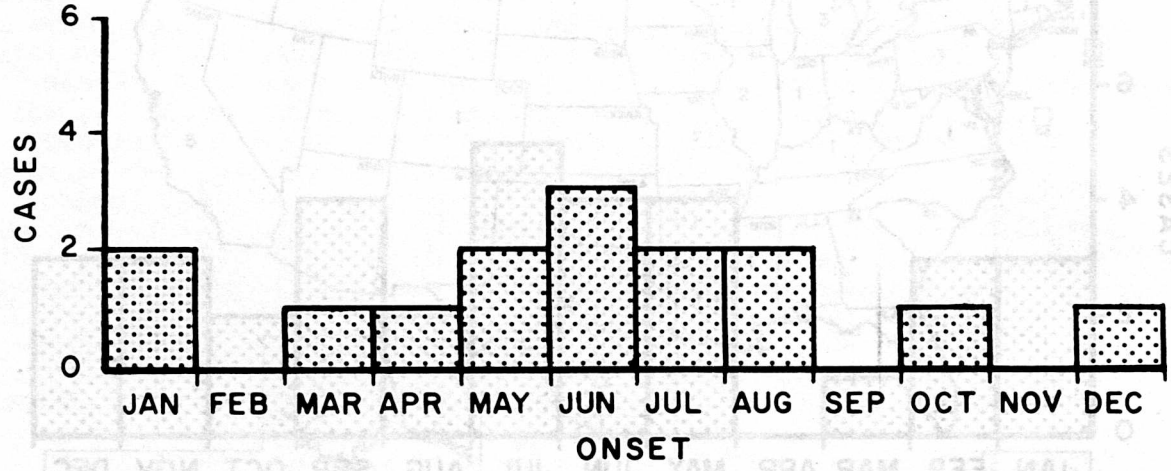


Fig. 13 PARALYTIC POLIOMYELITIS CASES, IMMUNE DEFICIENT, BY MONTH OF ONSET, UNITED STATES, 1969-1976

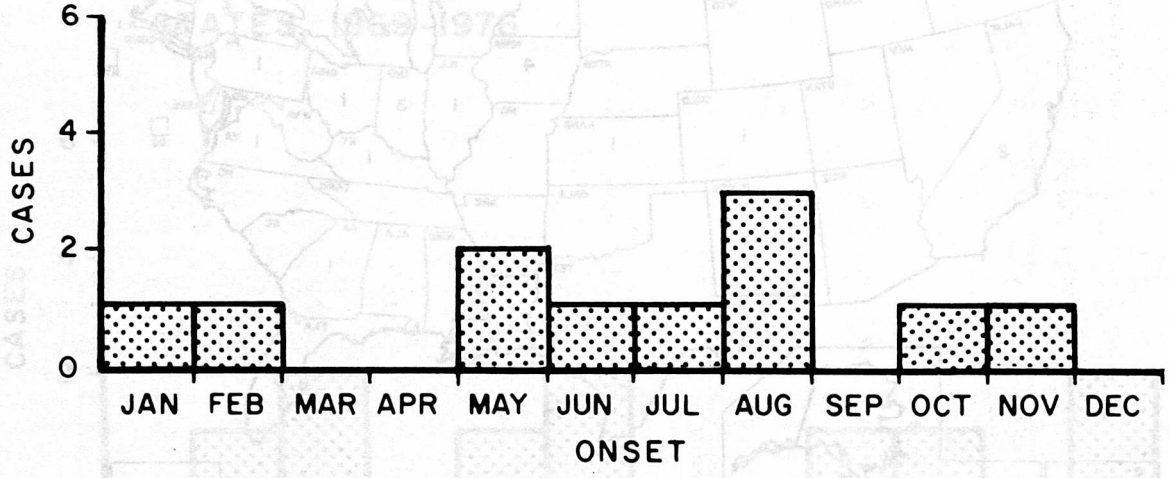


Table 6
Immune Deficient Cases of Paralytic Poliomyelitis - 1969-1976

Year	State	Sex	Age	Date of Onset	Vaccination History IPV	TOPV	MOPV	Interval from OPV to Onset*	Nature of Contact & Type of Vaccine	Virus Isol.	Antigenic Type	Comments
1969	KA	M	4yr	6/21	0	4	0	30 days (contact)	sister received TOPV 30 days prior to onset	2	vaccine	Hypogammaglobulinemia
1972**	NY	M	10mo	5/27	0	2	0	75 days (contact and recipient)	brother vaccinated approx. same time with TOPV	1	nonvaccine	Hypogammaglobulinemia, atrophic thymus
1973**	VA	F	10mo	11/15	0	3	0	107 days		2	vaccine	Combined immune deficiency disorder
										2	nonvaccine	
1973	WA	F	8mo	10/18	0	2	0	90 days		2	nonvaccine	Hypogammaglobulinemia
1973**	VT	M	9mo	8/3	0	1	0	6½ mo		2	nonvaccine	Combined immunodeficiency
1975	TN	M	6mo	1/2	0	2	0	63 days		2	nonvaccine	Hypogammaglobulinemia
										2	intermediate	
1975**	CA	F	4mo	5/12	0	1	0	36 days		2	vaccine	Hypogammaglobulinemia
										2	nonvaccine	
1975**	TX	F	6mo	8/5	0	2	0	18 days		2	nonvaccine	Combined immunodeficiency, absent thymus
1976	MI	M	9mo	2/8	0	3	0	158 days		2	vaccine	Agammaglobulinemia
1976	AR	F	29yr	8/16	1?	0	0	21 days (contact)	2-yr-old son, TOPV	2	vaccine	IgA 28% of lower limit of normal
1976	MD	F	7mo	7/?	0	1	0	within 30 days		2	pending	decreased IgA
										3	pending	

*based on most recent OPV exposure (recipient exposure) unless otherwise noted
**death attributable to polio

LABORATORY STUDIES

Laboratory techniques have been employed to differentiate "vaccine-like" from "not vaccine-like" strains of virus isolates. One of these tests, the modified Wecker intratypic serodifferentiation test, is based on certain antigenic characteristics of the virus strain. Another test, the "temperature marker" ("T" marker), is based on comparison of viral replication at different temperatures. In general, strains of poliovirus types 1 and 2 that are antigenically "vaccine-like" are usually associated with negative "T" markers, but this association is seen less frequently with poliovirus type 3. These tests usually establish with high probability the origin of the virus isolated. However, because certain wild type 3 viruses are antigenically "vaccine-like," and because of the known antigenic and "T" marker changes which can occur, especially with vaccine type 1 virus, these tests do not definitely establish the origin of the virus isolated. Furthermore, these tests do not in any way indicate the neurovirulence of the isolated virus. A comparison of all isolates from paralytic cases by type for the years 1961-1968 and 1969-1976 reveals a 93.4% reduction in type 1 isolates, a 51.6% reduction in type 2 isolates, and a 90.8% reduction in type 3 isolates. Because of the greater reductions of poliovirus types 1 and 3, poliovirus type 2 accounted for a 5-fold higher percentage of the total isolates from 1969 through 1976 than in the previous 8-year period (Tables 7 and 8). Tables 9 and 10 show laboratory results by epidemiologic classification. Type 1 was isolated from 25 of the 30 epidemic cases; no virus was isolated from specimens of 5 persons.

All types were isolated from specimens of persons with endemic cases who had no history of OPV receipt or contact. Formal analyses of vaccine-like and nonvaccine-like isolates for seasonal, geographic, and age-specific relationships were not possible because of the small numbers involved. Vaccine-like and nonvaccine-like viruses were isolated from persons of all ages and from all regions.

All types were isolated from persons who had received OPV; however, types 2 and 3 predominated. Multiple types were isolated from 6 OPV recipients. Isolations from contact cases also yielded all types. Types 2 and 3 were predominant in this category also. There were 6 type 2 and 14 type 3 isolates in 23 determinations. Twelve (52%) of the isolates were type 3, vaccine-like. Imported cases were all type 1. Type 2 virus was isolated in 13 (87%) of 15 determinations in the immune deficient category of cases. Multiple types were isolated from 4 persons in this group (Tables 9 and 10).

Table 7
Paralytic Poliomyelitis Cases by Type of Poliovirus Isolated and Percentage of Total Cases by Year

Year	Number of Isolates Poliovirus Type				Percentage Poliovirus Type		
	1	2	3	Unknown	1	2	3
1961	231	6	145	0	61	2	38
1962	300	8	100	0	74	2	25
1963	160	6	31	0	81	3	16
1964	21	6	24	0	41	12	47
1965	19[a]	8	11[a]	1	50	21	29
1966	55	13	6	1	74	18	8
1967	16	6	7	0	55	21	24
1968	25	7	3	0	71	20	9
1969	5	5	4	0	35	35	31
1970	26[b]	4[c]	1	0	84	13	3
1971	5	4	5	0	36	29	39
1972	11[a,d]	1[d]	6[a,d]	0	61	6	33
1973	4[e]	8[f]	3[g]	0	33	60	27
1974	2	2[h]	1[h]	0	40	40	20
1975	1	2	5	0	12	25	63
1976	0	3[h]	5[h]	0	0	38	62

a Includes 1 case with isolates of types 1 and 3
b Includes 1 case with isolate of type 2
c Includes 1 case with isolate of type 1
d Includes 1 case with isolates of all 3 types
e Includes 3 cases with type 2 isolate
f Includes 3 cases with type 1 isolate and 1 case with type 3 isolate
g Includes 1 case with type 2 isolate
h Includes 1 case with isolates of types 2 and 3

Table 8
Distribution of Paralytic Poliomyelitis Cases, by Type of Poliovirus Isolated, United States, 1961-1968 and 1969-1976

		Virus Type		
		1	2	3
		No. (%)	No. (%)	No. (%)
1961-1968				
	Observed distribution	827 (68)	60 (5)	327 (27)
	Expected distribution*	806 (66)	81 (7)	327 (27)
1969-1976				
	Observed distribution	54 (48)	29 (26)	30 (26)
	Expected distribution*	75 (66)	8 (7)	30 (27)

$p<0.0005$ by chi-square

*Based on overall distribution, 1961-1976

Table 9
Epidemiologic Classification of Paralytic Poliomyelitis Cases by Antigenic Laboratory Characterization of Virus Isolates (1 Isolate Only), 1969-1976

Epidemiologic Classification	Vaccine-like			Intermediate			Nonvaccine-like			Undetermined			Total
	1	2	3	1	2	3	1	2	3	1	2	3	
Epidemic	2	0	0	1	0	0	12	0	0	10	0	0	25
Endemic													
No OPV	1	2	5	0	2	0	7	2	0	1	0	1	21
OPV recipient	0	0	3	0	0	0	0	1	0	0	0	0	4
Household contact	2	4	9	0	1	1	0	0	1	0	1	0	19
Community contact	0	0	3	0	0	0	1	0	0	0	0	0	4
Imported	0	0	0	0	0	0	6	0	0	1	0	0	7
Immune deficient	0	3	0	0	0	0	1	3	0	0	0	0	7
TOTAL	5	9	20	1	3	1	27	6	1	12	1	1	87

Table 10
Epidemiologic Classification of Paralytic Poliomyelitis Cases by Antigenic Laboratory Characterization of Virus Isolates, Multiple Isolates, 1969-1976

Classification	Cases	Type(s) and Antigenic Marker
Epidemic	1	1 - nonvaccine-like and 2 - vaccine-like
	2	1 - nonvaccine-like and 3 - intermediate
Endemic		
No OPV	1	2 - intermediate 2 - vaccine-like
OPV recipient	1	1 - undetermined and 3 - intermediate
	2	2 - vaccine-like and 3 - vaccine-like
	3	1 - vaccine-like and 2 - nonvaccine-like and 3 - vaccine-like
	4	1 - intermediate and 2 - intermediate
	5	2 - nonvaccine-like and 3 - vaccine-like
	6	1 - vaccine-like and 2 - nonvaccine-like
Household contact	0	
Community contact	1	1 - undetermined and 2 - nonvaccine-like
Imported	0	
Immune deficient	1	2 - undetermined 3 - undetermined
	2	2 - nonvaccine-like and 2 - intermediate
	3	2 - nonvaccine-like and 2 - vaccine-like
	4	2 - nonvaccine-like and 2 - vaccine-like

VACCINE DISTRIBUTION AND VACCINATION STATUS OF THE POPULATION

Two sources of information are available which are indicative of the vaccination status of the population: 1) the number of doses of polio vaccine distributed in the United States, and 2) the results of a questionnaire survey on the types and number of vaccine doses received.

Vaccine Distribution Table 11 shows the number of doses distributed (not administered) from 1962 through 1976. These data reflect certain trends in immunization practices. After 1963 the distribution of IPV steadily declined to the 1968 level of 2.7 million doses. Little IPV has been available for use in the United States since 1968. With the introduction of trivalent oral poliovirus vaccine (TOPV) in 1963, use of monovalent oral poliovirus vaccine (MOPV) diminished to the 1971 level of less than 1/3 million doses of each of the 3 types. In effect, TOPV is essentially the only poliovirus vaccine now used in the United States. The number of doses distributed each year from 1969 through 1975 was approximately the same.

The 1975 Immunization Survey The second source of information for estimating immunization levels of the population is the 1975 United States Immunization Survey made by CDC. Although the sample survey based on a questionnaire is less accurate than a serologic study, it has proven to be useful in assessing the minimum proportion of the population that can be expected to be immune to poliovirus infection. Tables 12 and 13 are based on findings of the 1975 Immunization Survey.

Table 12 reflects the immunization status by age group, 1965-1975. Since 1973 the survey questionnaire has not included questions on IPV history; therefore, data for the years 1965-1972 include both OPV and IPV doses, but for the years 1973-1975 reflect OPV doses only. Table 13 shows immunization status by race, socioeconomic category, and geographic division. The percentage of the population under 20 years of age with a history of 3 or more doses of OPV is 66.3%. A total of 11.0% of this population and 18.8% of the comparable population in the category "all other races" report never having received OPV. These facts suggest that substantial clusters of unvaccinated individuals still exist in the United States and underscore the importance of increased vaccination efforts.

Table 11

Net Doses (Millions) of Poliomyelitis Vaccines Distributed, By Year, United States, 1962-1976

Poliomyelitis Vaccine	1962[a]	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976[b]
Inactivated (IPV)	15.3	19.0	8.8	7.5	5.5	4.0	2.7	--	--	--	--	--	--	--	--
Live, Oral (OPV)															
Monovalent (MOPV)															
Type 1	33.1	38.7	24.9	4.7	1.4	1.3	0.5	0.4	0.3	0.2	--	--	--	--	--
Type 2	37.0	34.2	29.8	3.4	1.3	0.9	0.5	0.4	0.2	0.1	--	--	--	--	--
Type 3	13.7	54.2	28.4	3.7	1.4	1.0	0.6	0.4	0.3	0.2	--	--	--	--	--
Trivalent (TOPV)	--	4.2[c]	24.0	17.4	24.0	18.0	23.9	22.5	25.8	25.5	24.7	24.9	25.2	24.2	20.0
TOTAL	99.1	105.3	115.9	36.7	33.6	25.2	28.2	23.7	26.6	25.9	24.7	24.9	25.2	24.2	20.0

a July-December (surveillance program began in July 1962)
b Estimated 1976 distribution
c Production began in mid-1962
-- Not shown since fewer than 3 distributors reported

Table 12
Poliomyelitis Vaccination Status by Age Group (Under 15 Years)
United States, 1965-1975*

Year	Percentage with 3 Doses of OPV			Percentage with No OPV Immunization		
	Age Group			Age Group		
	<1-4	5-9	10-14	<1-4	5-9	10-14
1965	73.9	89.9	92.1	9.9	3.0	2.1
1966	70.2	88.2	90.0	11.3	2.9	2.3
1967	70.9	88.3	89.7	11.7	3.1	2.2
1968	68.3	84.9	87.8	10.5	3.3	2.2
1969	67.7	83.6	85.7	10.2	3.2	2.5
1970	65.9	82.3	85.3	10.8	3.6	2.3
1971	67.3	81.2	83.9	8.6	3.3	2.6
1972	62.9	78.9	81.8	10.7	3.9	3.2
1973	60.4	71.4	69.3	14.0	9.5	10.9
1974	63.1	73.5	69.8	11.7	8.3	10.0
1975	64.8	76.7	71.5	10.3	6.3	9.2

* Data for 1965-1972 based on percentage of both OPV and IPV doses; 1973-1975 based on OPV doses only.

Table 13

Percentage of Population <1-19 Years of Age with Specified Doses of Oral Polio Vaccine By Race, SMSA Components, and Geographic Divisions United States, 1975

AREA		POPULATION (Thousands)	≥3 DOSES	2 DOSES	1 DOSE	0 DOSES
UNITED STATES TOTAL		73,917	66.3	11.0	7.0	11.0
Race:	White	62,007	68.8	10.6	6.6	9.5
	All other races	11,910	53.0	12.9	9.2	18.8
Poverty Status:	Poverty	15,977	61.1	10.7	8.9	14.8
	Nonpoverty	57,940	67.7	11.1	6.5	9.9
NON SMSA		24,756	66.1	10.2	7.9	11.9
	Poverty	9,040	64.2	9.1	9.7	13.0
	Nonpoverty	15,716	67.3	10.7	6.9	11.2
TOTAL SMSA COMPONENTS		49,161	66.3	11.4	6.6	10.5
Total SMSAs Central Cities		20,354	61.6	12.1	6.9	13.4
Race:	White	13,705	65.9	10.8	6.4	10.8
	All other races	6,649	52.6	14.8	8.0	18.6
Poverty Status:	Poverty	5,321	55.5	13.7	7.6	18.1
	Nonpoverty	15,033	63.7	11.5	6.7	11.7
Remaining Areas in SMSA		28,808	69.7	10.9	6.3	8.5
	Poverty	1,616	62.7	9.9	8.4	13.7
	Nonpoverty	27,191	70.2	11.0	6.2	8.2
SELECTED SMSA COMPONENTS						
SMSAs with Population ≥250,000		42,751	66.5	11.1	6.7	10.8
Central Cities		17,056	61.0	11.9	7.2	14.1
	Poverty	4,694	55.1	13.2	8.0	18.6
	Nonpoverty	12,362	63.3	11.3	6.9	12.3
Remaining Areas in SMSA		25,695	70.1	10.6	6.3	8.6
	Poverty	1,103	60.0	9.9	8.1	16.1
	Nonpoverty	24,592	70.6	10.7	6.2	8.2
SMSAs with Population <250,000		6,410	65.4	13.3	6.0	8.9
Central Cities		3,298	64.3	13.3	5.6	9.9
	Poverty	627	58.5	17.1	5.0	14.7
	Nonpoverty	2,671	65.6	12.5	5.7	8.8
Remaining Areas in SMSA		3,113	66.7	13.2	6.5	7.8
	Poverty	514	68.4	9.9	9.1	8.4
	Nonpoverty	2,599	66.3	13.9	6.0	7.7
GEOGRAPHIC DIVISIONS						
New England		4,116	70.7	11.5	4.0	7.6
Middle Atlantic		12,149	66.7	11.4	6.1	11.0
East North Central		15,014	60.3	12.9	9.1	12.9
West North Central		5,791	65.6	13.0	6.4	10.0
South Atlantic		11,360	66.7	9.3	7.8	11.9
East South Central		4,784	67.4	8.8	7.4	12.2
West South Central		7,674	70.4	10.5	6.6	9.3
Mountain		3,595	69.3	11.6	7.0	7.5
Pacific		9,434	68.1	9.2	5.8	10.9

ADDENDUM TO POLIOMYELITIS SURVEILLANCE REPORT 1974-1976, ISSUED OCTOBER 1977

Reported Paralytic Poliomyelitis in Nonresidents of the United States:

Three cases of paralytic poliomyelitis were imported into the United States in 1976 by nonresidents--2 from Mexico and 1 from Brazil.

Delayed Reports of Paralytic Poliomyelitis:

Since the writing of this summary, 2 additional cases of paralytic poliomyelitis have been reported in residents of the United States (although 1 person was living temporarily outside the United States at the time of onset). One of the 2 cases occurred in 1976 and the other in 1975. The 1976 case, in a 6-month-old girl from California, probably was vaccine-associated. The patient received her first dose of TOPV on September 30, 1976. After a transient episode of fever on October 1, she was well until fever again developed on October 8, along with flaccid paralysis of the left shoulder. A type II poliovirus antigenically vaccine-like was isolated from the patient's stool specimen.

The 1975 case was imported. A 45-year-old man, a United States citizen living temporarily in Liberia, had onset of paralytic illness consistent with poliomyelitis in April. The patient was transferred to a hospital in the state of Washington. Examination at 60 days after onset revealed a significant neurologic residual.

STATE EPIDEMIOLOGISTS

Key to all disease surveillance activities are those in each state who serve as State Epidemiologists. Responsible for the collection, interpretation, and transmission of data and epidemiologic information from their individual states, the State Epidemiologists perform a most vital role. Their contributions to this report are gratefully acknowledged.

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