

National Participation Trends, 1955-61

in the

Poliomyelitis Vaccination Program

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THE largest vaccination program in the history of the United States began with the licensing of Salk poliomyelitis vaccine for mass production in April 1955. By August 1957, about 150 million doses of Salk vaccine had been administered. Approximately one-half the population under 40 years of age had received at least one inoculation, and almost one-third had received three inoculations. There were sizable annual gains in the number of persons inoculated during the period August 1957-September 1961 (chart). The number of doses of Salk vaccine administered had more than doubled by the end of this 4-year period. By September 1961, 77 percent of the population under 40 years of age had received at least one inoculation, about 67 percent had received three or more inoculations, and 40 percent had received the booster inoculation.

Trend statistics in this report are based on five national household surveys conducted annually since August 1957. These surveys were sponsored by the Public Health Service and conducted by the Bureau of the Census (1) as supplements to its monthly Current Population Survey (CPS).

To ascertain the Salk vaccination status of the surveyed population, the following questions were added to the regular CPS schedule:

Has _____ had any polio injections or shots?
 Yes No

How many shots has _____ had already?
 1 3
 2 4

Interpretation of Data

In this paper, the statistics are expressed principally as percentages of the population that received a stated number of inoculations of Salk poliomyelitis vaccine. Since these statistics are based on a sample, they are subject to sampling errors (table 1). These errors pertain to the estimates derived from the 1957, 1960, and 1961 surveys, each of which utilized the entire monthly CPS sample of 35,000 households. The 1958 and 1959 estimates were based on information from a subsample of one-half the households in the CPS sample. The sampling errors for these estimates are roughly 40 to 50 percent larger than the errors shown in table 1.

Survey estimates are also subject to non-sampling errors due to nonresponse and to response bias. Nonresponse bias was trivial since more than 99 percent of the respondents reported the number of inoculations received. It is more difficult, however, to evaluate response bias.

According to recheck interviews of a subsample of persons interviewed in August 1957, the reporting errors were small. About 97 percent of the original and recheck interviews agreed on whether or not the person had received inoculations, and the agreement on the number of inoculations received was almost as high.

The numbers of doses of Salk vaccine released

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by pharmaceutical companies for domestic use are compared with the estimated numbers of doses administered as derived from the poliomyelitis surveys (table 2). Since an unknown amount of released vaccine is not administered because of factors such as wastage, spoilage, and outdating, it is not surprising that the ratio of the survey estimate to the report of the pharmaceutical companies is less than unity for each date shown. More difficult to interpret is the fact that the ratio has been steadily declining since 1958. The procedure for deriving estimates of the number of administered doses from the survey data is undoubtedly a factor in the decline of this ratio. For example, persons who reported having received four or more inoculations were assumed to have received exactly four inoculations, and persons 60 years of age and older were excluded from the calculations. On the other hand, the possibility of under-report-

ing of inoculations in the more recent surveys due to memory loss may be a factor also in the decline in the ratio.

Reporting of the poliomyelitis vaccination status of infants in the more recent household surveys may have been adversely affected by the introduction and growing use of quadrivalent vaccine, which includes diphtheria, pertussis, and tetanus vaccine as well as Salk vaccine. When administered in this manner, Salk vaccine loses its independent identity. In the future, consideration may well be given to developing other types of sample survey methods in order to derive national estimates of the vaccination status of infants. One such method would be a followup survey with parents and physicians on a national sample of births selected from the files of birth certificates.

The estimates presented in this report probably do not reflect the use of oral poliomyelitis

Percentage of population under 40 years of age participating in the poliomyelitis vaccination program, by number of inoculations, United States, annual surveys August 1957–September 1961

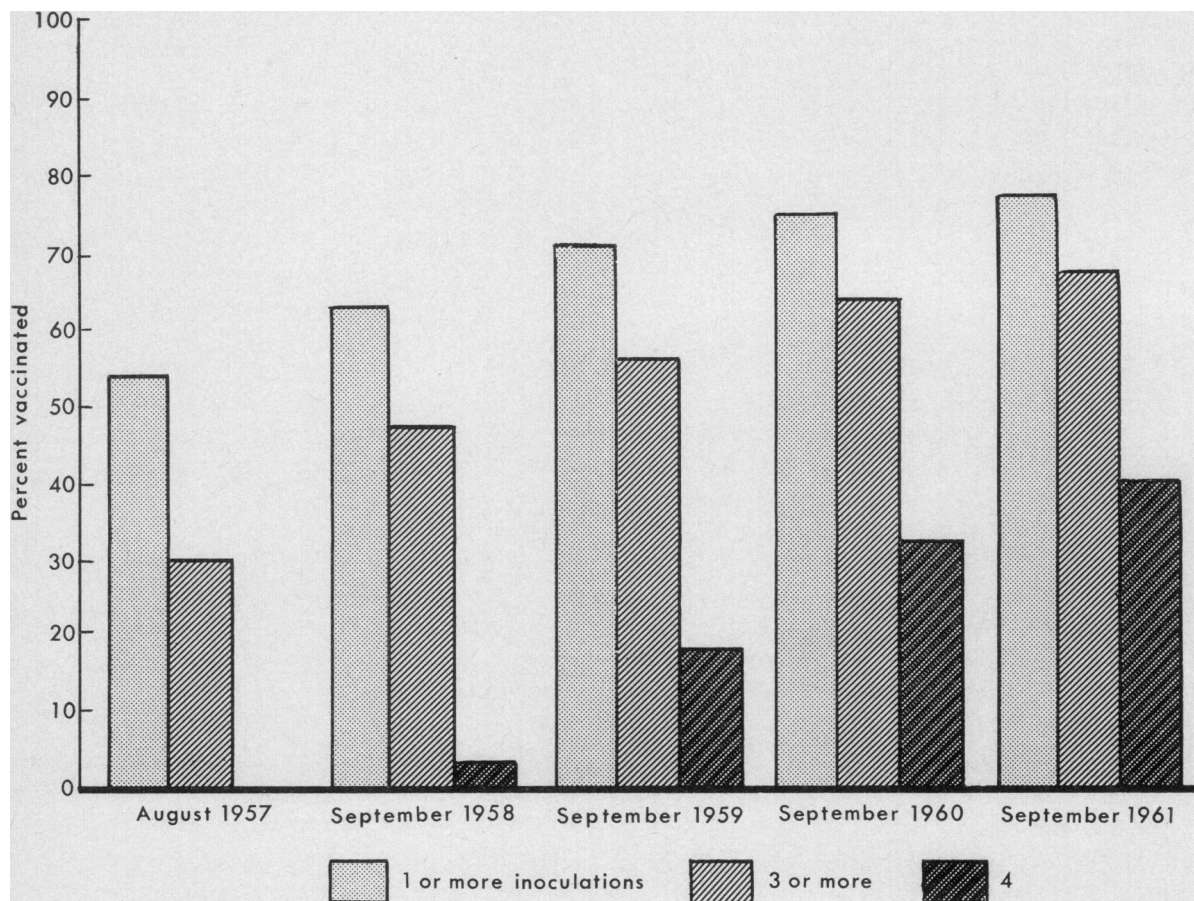


Table 1. Sampling variability of estimated percentages for broad age groups and for detailed age groups under 20 years

Population base	Standard error of estimated percentages ¹								
	2 or 98	5 or 95	10 or 90	15 or 85	20 or 80	25 or 75	30 or 70	40 or 60	50
<i>Broad age groups (years)</i>									
Under 60-----	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Under 20-----	.1	.1	.2	.2	.2	.3	.3	.3	.4
20-39-----	.1	.2	.2	.3	.3	.3	.4	.4	.4
40-59-----	.1	.2	.2	.3	.3	.4	.4	.4	.4
<i>Detailed age groups (years)</i>									
Under 1-----	.4	.6	.8	.9	1.1	1.1	1.2	1.3	1.3
1-4-----	.2	.3	.4	.5	.5	.6	.6	.7	.7
5-14-----	.1	.2	.3	.3	.4	.4	.4	.5	.5
15-19-----	.2	.4	.5	.6	.7	.7	.8	.8	.8

¹ The chances are 67 out of 100 that the percentage is within plus and minus the standard error, and 95 out of 100 that it is within plus and minus twice the standard error.

vaccines because the questions used in the household surveys ask only about poliomyelitis injections or "shots." Since oral vaccines have been administered on a limited scale in this country, excluding them from the survey does not represent a problem. For example, according to a recent estimate (2) about 6 million doses of oral vaccine have been administered. This is less than 2 percent of the number of doses of Salk vaccine that have been administered from the beginning of the poliomyelitis vaccination program to September 1961.

Classification of Data

Tabulations of inoculation status derived from the poliomyelitis surveys have varied from year to year (table 3). More variables were tabulated in the 1957, 1960, and 1961 surveys because the samples were twice as large as in the 1958 and 1959 surveys.

A report based on the 1957 survey related participation in the vaccination program to social and demographic characteristics of the populations by age (3). An analysis of participation trends by age and other variables, including sex, color, geographic division and region, and type of area, will be presented in another report.

The Current Population Survey covers the civilian noninstitutional population. Conse-

quently, the Armed Forces and persons residing in long-term institutions are excluded from the estimates. In this report, the civilian noninstitutional population is subdivided into three broad age groups: under 20 years, 20-39 years, and 40-59 years. The age group under 20 years is subdivided as follows: under 1 year, infants; 1-4 years, preschool children; 5-14 years, school children; and 15-19 years, preadults. (In the absence of information concerning poliomyelitis vaccination for the age group 50-59 years in the 1957 survey, it was assumed that none of this group had participated in the vaccination program by 1957.)

Salk poliomyelitis vaccine is administered in a series of four inoculations. The recommended spacings are: 1 month between first and second inoculations, 7 months between second and third inoculations (with the provision that the interval might be shorter to assure that the third inoculation is administered prior to the poliomyelitis season), and 1 year between the third and the booster inoculation. For infants, the following schedule of five inoculations of Salk vaccine is recommended: the first inoculation is administered when the baby is 1½ to 2 months old, the second and third inoculations follow 1 and 2 months later, respectively. The fourth inoculation is administered 7 months after the third inoculation, or when the baby is almost 1 year old. In addition, a fifth inocula-

Table 2. Number of inoculations of Salk poliomyelitis vaccine administered and number of doses released by manufacturers, April 1955 to September 1961

Period	Doses of vaccine (in thousands)		
	Admin- istered according to survey	Released by manu- facturers	Ratio (per- cent)
<i>Cumulative</i>			
April 1955 to August 1957	147, 429	168, 362	87. 6
April 1955 to September 1958	198, 142	221, 888	89. 3
April 1955 to September 1959	253, 039	283, 424	89. 3
April 1955 to September 1960	297, 469	342, 747	86. 8
April 1955 to September 1961	327, 365	390, 334	83. 9
<i>Between survey dates</i>			
August 1957 to September 1958	50, 713	53, 526	94. 7
September 1958 to September 1959	54, 897	61, 536	89. 2
September 1959 to September 1960	44, 430	59, 323	74. 9
September 1960 to September 1961	29, 896	47, 587	62. 8

tion is recommended 1 year after the fourth inoculation.

The extent of participation in the vaccination program is measured by three indexes:

- Percentage receiving at least one inoculation (minimal participation).
- Percentage completing series of three inoculations.

- Percentage receiving fourth, or booster inoculation.

The estimates of participation derived from the 1957-61 surveys are presented in table 4.

Since the 1957 survey was conducted before the booster inoculation was recommended, information for the third index was not tabulated. It may be assumed, however, that only an insignificant fraction of the population had been quadruply vaccinated by August 1957.

1961 Vaccination Status

The estimates of inoculation status derived from the 1961 survey indicate striking variations according to age (table 5). By broad age groupings, there is an inverse relationship between age and the percentage of the population that had received at least one inoculation of poliomyelitis vaccine. When participation levels are based on fractions of population triply and quadruply vaccinated, it is not surprising that this differential participation by age persists.

Among groups under 20 years of age, the inverse relationship between age and level of participation in the vaccination program does not hold. School-age children had the highest level of participation, preschool children and preadults had achieved roughly the same levels, and infants had the lowest levels.

Participation Trends

Broad age groups. Throughout the vaccination program the population under 20 years of age had the highest levels of participation and

Table 3. Guide to tabulations of inoculation status, survey years 1957-61

Survey year	Age	Sex	Color	Marital status	Income	Geo-graphic region	Geo-graphic division	Type of area ¹
1957	X	a	b	a	b, c, e	e	d	e
1958	X							
1959	X		X			X		
1960	X	a	b			d	c	b, d
1961	X	a	b				b	b

¹ Defined in terms of whether place of residence is inside or outside a standard metropolitan area.

NOTE: Variables denoted by X are cross-tabulated with each other and with lettered subjects. Lettered variables are not cross-tabulated unless the same letter is used.

those aged 40-59 years, the lowest. Since September 1958, differences between the age group under 20 years and the group 20-39 years in the proportions vaccinated at least once and those vaccinated three or more times have been decreasing, and the difference in the proportion that had received the booster shot has been increasing. Differences in levels of participation between each of these age groups and the group 40-59 years old increased steadily until September 1960; during the past year this trend continued for the quadruply vaccinated group, but the change in proportions vaccinated at least once and those vaccinated three or more times has been small and about the same for each of the broad age groups.

Nearly three-fourths of the population under 20 years of age had been vaccinated at least once by August 1957. The gains during the subsequent 4-year period raised the level to almost 90 percent by September 1961. Since August 1957 the gains have been smaller each year, and during the 1-year period ending in September 1961 the gain was minimal. About 45 percent of this age group was vaccinated three or more times by August 1957, and the level increased to 62 percent by September 1958. During the subsequent 3-year period, the annual gains have become smaller each year. Less than 5 percent had received the booster inoculation by September 1958. The level was increased to almost 25 percent by September 1959, and the

Table 4. Inoculation status of the population, by age at selected dates in the poliomyelitis vaccination program, United States, August 1957-September 1961

Age group and number of inoculations	Percent inoculated				
	August 1957	September 1958	September 1959	September 1960	September 1961
<i>Broad age groups</i>					
Under 60 years:					
1 or more.....	41.2	48.7	55.8	59.8	62.3
3 or more.....	22.1	36.6	43.8	50.2	53.6
4 or more.....	—	2.1	14.2	24.6	31.8
Under 20 years:					
1 or more.....	71.5	77.8	83.3	86.7	88.0
3 or more.....	44.9	61.6	68.5	75.3	78.2
4 or more.....	—	4.0	23.8	39.6	49.4
20-39 years:					
1 or more.....	29.4	39.8	50.9	56.1	59.0
3 or more.....	7.6	26.2	36.5	44.8	48.5
4 or more.....	—	.8	9.9	19.1	25.9
40-59 years:					
1 or more.....	4.8	9.9	14.0	16.8	20.4
3 or more.....	1.3	6.7	9.5	12.1	15.6
4 or more.....	—	.3	2.5	4.5	7.1
<i>Detailed age groups under 20 years</i>					
Under 1 year:					
1 or more.....	27.6	36.1	51.8	54.8	55.0
3 or more.....	2.4	2.4	9.2	20.5	23.1
4 or more.....	—	.2	.8	2.7	3.4
1-4 years:					
1 or more.....	71.7	76.7	83.8	86.6	87.1
3 or more.....	43.4	55.7	65.0	72.2	74.2
4 or more.....	—	3.5	22.0	34.6	41.8
5-14 years:					
1 or more.....	81.7	86.5	89.5	92.5	93.4
3 or more.....	56.6	74.1	79.5	84.5	87.0
4 or more.....	—	5.3	30.0	48.9	60.0
15-19 years:					
1 or more.....	55.7	67.6	75.8	80.6	84.3
3 or more.....	26.8	52.4	62.0	71.0	76.4
4 or more.....	—	2.1	16.4	31.5	43.9

NOTE: Minus sign (—) indicates that survey information was not available to calculate the value.

gains have been substantial but successively smaller during each of the next two periods of 1 year.

About 30 percent of the population 20-39 years of age had received the first inoculation of poliomyelitis vaccine by August 1957, and an additional 11 percent had the first inoculation by the end of each of the two subsequent 1-year periods. The gains were successively smaller in 1960 and 1961. Less than one-tenth of the population had received the third inoculation by August 1957, but this was increased to about one-quarter by September 1958. The annual gain has been smaller each year thereafter. Practically none of this group had received the booster inoculation before September 1958. Three years later about one-fourth of the group had had the booster inoculation.

Compared with the younger age groups, the population 40-59 years old has participated in the vaccination program at a much lower and more constant rate. This group did not materially participate in the program prior to August 1957. Five percent had received one inoculation by that date, and each year 3 percent more had at least one inoculation. Each year since 1957 about 3 percent more of this age group had the third inoculation, and since 1959

about 2 percent more have had the booster inoculation each year.

Age groups under 20 years. The participation rankings of the four age groups under 20 years have not changed throughout the vaccination program. Participation in the poliomyelitis vaccination program has been highest for school-age children, next highest for pre-school children and preadults, and lowest for infants.

Since August 1957, differences among the age groups in the proportion that have had at least one inoculation of poliomyelitis vaccine have been decreasing, the absolute gains in participation levels being inversely related to the attained level of participation. The gains have been smallest for school-age children and largest for preadults and infants. Differences in the proportions that have had three or more inoculations increased until September 1958 but have decreased during more recent periods. Differences between the age groups in proportions that have had the fourth inoculation are continuing to increase.

By August 1957, more than four-fifths of the school-age children, 5-14 years, had received at least one inoculation. In more recent years, the absolute gains have been small, about 3 percent-

Table 5. Poliomyelitis inoculation status of civilian noninstitutional population under 60 years, by age, United States, September 1961

Age (years)	Population (in thousands)	Number inoculated	Number inoculations received				Number not inoculated
			4 or more	3	2	1	
Total.....	157, 910	98, 325	50, 238	34, 405	9, 465	4, 217	59, 585
Under 20.....	72, 405	63, 695	35, 763	20, 880	4, 914	2, 138	8, 710
Under 1.....	4, 304	2, 367	148	848	808	563	1, 937
1-4.....	16, 767	14, 605	7, 012	5, 430	1, 543	620	2, 162
5-14.....	37, 773	35, 297	22, 646	10, 196	1, 759	696	2, 476
15-19.....	13, 561	11, 426	5, 957	4, 406	804	259	2, 135
20-39.....	44, 564	26, 277	11, 550	10, 058	3, 319	1, 350	18, 287
40-59.....	40, 941	8, 353	2, 925	3, 467	1, 232	729	32, 588
Percent							
Total.....	100. 0	62. 3	31. 8	21. 8	6. 0	2. 7	37. 7
Under 20.....	100. 0	88. 0	49. 4	28. 8	6. 8	3. 0	12. 0
Under 1.....	100. 0	55. 0	3. 4	19. 7	18. 8	13. 1	45. 0
1-4.....	100. 0	87. 1	41. 8	32. 4	9. 2	3. 7	12. 9
5-14.....	100. 0	93. 4	60. 0	27. 0	4. 6	1. 8	6. 6
15-19.....	100. 0	84. 3	43. 9	32. 5	5. 9	1. 9	15. 7
20-39.....	100. 0	59. 0	25. 9	22. 6	7. 4	3. 1	41. 0
40-59.....	100. 0	20. 4	7. 1	8. 5	3. 0	1. 8	79. 6

age points annually. About 57 percent had received the third inoculation by August 1957, and by September 1958 the level had increased to about 75 percent. The gain was less than 15 percent during the subsequent 3-year period, and it was only 2 percent during the 1-year period ending in September 1961. During the period September 1958 to September 1959, the number who had the booster inoculation increased from 5 to 30 percent. The annual gains were smaller during the 2-year period September 1959 to September 1961.

Although the level of participation in 1961 was about the same for the preschool children and the preadults, this has not always been the situation. In 1957 the level of participation was substantially greater for the preschool children, but the difference between the two age groups has decreased each year.

For infants under 1 year, the proportion with at least one inoculation increased from 28 percent in 1957 to 55 percent in 1961. The proportion with three inoculations increased from 2 percent in 1957 to 23 percent in 1961.

Factors Affecting Participation Trends

Four factors have affected participation trends in the Salk vaccination program:

- Aging of the population.
- Designation of priority groups.
- Size of the exposed population.
- Delay in followup inoculations.

Aging of population. Trends in participation levels during successive calendar periods reflect not only active participation of persons in specified age groups but also changes in composition of the groups. During a specified time period, some persons enter an age group from a younger group and others withdraw to enter an older group. Consequently, we have deliberately refrained from referring to the annual gain in the level of participation of an age group in terms of the percentage inoculated during the 1-year period.

Whether aging of the population increases or decreases the participation level of an age group during a specified period depends on whether persons who enter the group have a higher or a lower participation level than those who withdraw from it. On this basis, the move-

ment of the population from one age group to another has tended to raise the participation levels for preadults and older persons, but it has had the opposite effect on the younger groups. Since 1957, changes in the composition of age groups due to aging of the population have tended to equalize levels of participation in the vaccination program, and this trend will continue. For example, this factor tended to equalize the levels of participation for the preschool and preadult age groups. In 1957, the preadult group (15-19 years) had a substantially higher level of participation than the preschool group (1-4 years).

Priority groups. The rankings of age groups by levels of participation in the poliomyelitis vaccination program have been the same in each survey. These rankings are consistent with the order in which the priority groups were designated prior to August 1957, when the vaccine was in short supply. Groups given priority for the first inoculations of Salk vaccine were ready for and have been receiving the third and fourth inoculations earlier than other groups.

During 1955, only school children in the first and second grades were included in the priority group to get Salk vaccine. Later, children 5-9 years old were included, and by July 1956 the priority group included all ages under 20 years.

When the vaccine supply became ample, it was recommended that all persons under 40 years of age be vaccinated, but the age group 40-59 years was never included in the priority group.

Exposed population. Trends in participation levels reflect changes in the size of the population exposed to the possibility of participating in the vaccination program. Smaller gains each year since 1957 in the number of persons getting the first and the third inoculations reflect reductions in the sizes of the exposed population. The size of the population exposed to the possibility of getting the first inoculation was reduced each year by the number who had received the first inoculation during the preceding year. Similarly, the size of the population exposed to the third inoculation was reduced annually by the number who had received the third inoculation the year before.

According to the recommended spacing between inoculations—approximately 1 month

between the first and second, 7 months between the second and third, and 1 year between the third and the booster inoculations—the population exposed to the possibility of getting the booster inoculation during a 1-year period would be limited to those persons who had exactly three inoculations. The size of this population has fluctuated. It was substantially greater in September 1958 than 1 year earlier, and it has become smaller each year since 1958. More persons received the booster inoculation during the period September 1958 to September 1959 than during any other 1-year period of the vaccination program, and the number getting the booster inoculation has been declining each subsequent year.

Annual vaccination rates based on exposed populations were computed for each of the calendar periods for which survey data were available, beginning with the results of the survey conducted during August 1957 (table 6).

The annual rate of first vaccinations among the uninoculated population has declined each year since September 1958. The annual rate of the third vaccination for the population with fewer than three inoculations was highest during the year September 1957 to September 1958, stayed at a much lower level during the next 2-year period, and declined again during the

year September 1960 to September 1961. The annual rate of booster vaccinations among those with exactly three inoculations was lowest from September 1957 to September 1958, the year that the booster inoculation was first recommended. The annual booster inoculation rate among the exposed population remained at about the same level during the 2-year period beginning September 1958 and declined during the period September 1960 to September 1961. It is noteworthy that the vaccination rates during the period September 1960 to September 1961 are lower than during the preceding year, and that the rates for first and third vaccinations during that period are lower than at any time during the 4 years August 1957 to September 1961.

Throughout the vaccination program the rate at which the exposed populations received first and third inoculations has been highest for the group under 20 years of age, next highest for the group 20–39 years, and lowest for the group aged 40–59 years. The rates at which the exposed population received the booster inoculation, however, have tended not to vary between these broad age groups.

Since 1957, participation trends and differences in these trends between the three broad age groups have become increasingly determined by the size of the population that has not participated in the vaccination program. The proportions receiving the first and third inoculations have been greater for the age group 20–39 years than for the younger age group, despite the fact that vaccination rates per exposed populations were greater for the younger group. Also, a substantially larger proportion of children and preadults received the booster inoculation than did persons in the older age groups, even though vaccination rates per exposed population did not vary greatly among the age groups.

Delay in followup inoculations. The majority of the population which has participated in the vaccination program did not get the followup inoculations within the recommended time intervals. According to the results presented in table 6, the annual booster vaccination per 1,000 population having exactly three inoculations has ranged between 290 and 370 since 1958. In other words, about two-thirds of the

Table 6. Vaccination rates for persons under 60 years of age exposed to the possibility of inoculation with Salk poliomyelitis vaccine, United States, August 1957 to September 1961

Calendar period	Vaccination rate		
	First vaccination per 1,000 uninoculated persons	Third vaccination per 1,000 persons with fewer than 3 inoculations	Fourth vaccination per 1,000 persons with exactly 3 inoculations
August 1957 to September 1958.....	140	200	100
September 1958 to September 1959.....	160	130	360
September 1959 to September 1960.....	120	130	370
September 1960 to September 1961.....	90	90	290

population did not get the booster inoculation within 1 year of having a third inoculation.

Participation trends in the vaccination program indicate that substantial numbers of the population did not get the third inoculation within 12 months after the first and second inoculations. For example, the gain (22,210,000) in the size of the population with at least three inoculations between the surveys conducted in August 1957 and September 1958 represents about 80 percent of the population (27,774,000) under 60 years of age that had either one or two inoculations but had not completed the series of three inoculations by September 1957. The percentage has been declining each year. The number getting the third inoculation (6,713,000) between September 1960 and September 1961 was about 45 percent of the population (14,903,000) that had received either one or two inoculations but had not completed the series of three inoculations by September 1960.

Summary and Conclusions

Participation trends of the civilian noninstitutional population by age in the poliomyelitis vaccination program presented in this report are based on estimates of the levels of participation derived from a series of five national household sample surveys conducted annually during the period August 1957–September 1961. The survey results are summarized in table 4.

Between the inauguration of the national vaccination program in April 1955 and the first survey in August 1957, about two-fifths of the population under 60 years of age had received at least one inoculation of poliomyelitis vaccine and about one-fifth had completed the series of three inoculations. Since the vaccine was frequently in short supply during this period, priority groups were established. Initially, priority was given only to children of grammar school age, but gradually the priority group was widened to include adjacent age groups, all ages under 20 years, and finally all ages under 40 years. Differences between age groups in participation levels attained by August 1957 were entirely compatible with these priorities. By broad age groups, the participation level declines with advancing age. Under age 20, the level of participation was highest for school-age children.

There were substantial gains in the levels of participation between August 1957 and the date of the most recent survey so that by September 1961 about three-fifths of the population under 60 years of age had received at least one inoculation, about one-half had received at least three inoculations, and nearly one-third had received the booster inoculation. The rankings of the age groups had not changed since 1957.

For the age groups under 40 years, the gains during the 4-year period 1957–61 in the proportions having one to three inoculations were inversely related to the levels attained in 1957. Thus, the differences among these groups in the proportions having at least one inoculation and those having three or more inoculations were smaller in 1961 than 4 years earlier. Virtually none of the population had received a booster inoculation by August 1957, but by September 1958 there were substantial differences among the age groups. School-age children, 5–14 years, had the largest proportion quadruply vaccinated, about 60 percent. About two-fifths of the preschool children and preadults, 15–19 years, and about one-quarter of the young adults, 20–39 years, had received the booster inoculation.

During the period August 1957 to September 1961 both the size of the unvaccinated population and the rate of participation of the uninoculated population declined each year, and consequently the absolute gains in the levels of participation declined each year. The annual rate of participation of the uninoculated population was greater for the age group under 20 years than for the age group 20–39 years, but the absolute gains in the percent of the population that was vaccinated was larger for the older group because a larger proportion of them were unvaccinated. On the other hand, the annual rate at which triply vaccinated persons received the booster inoculation was roughly the same for the younger and older age groups, but the year-to-year gains in the percentage of the population who had received four inoculations was greater for the population under 20 years because more of them had completed the series of three inoculations and thus were ready to get the booster inoculation.

The annual gains in the levels of participa-

tion of the age group 40–59 years have been small during the entire vaccination program. By September 1961 about one-fifth of this group had received one or more inoculations and less than one-tenth had had three or more inoculations. It seems likely that many inoculated persons in this age group in 1961 had received the first inoculation before they attained their 40th birthday.

As the participation levels of the population under 40 years increase in the future, the effort of the poliomyelitis vaccination program will become increasingly concentrated on getting babies inoculated as soon after birth as feasible. If, however, the goal of the vaccination program is to get at least 90 percent of the population under 40 years to complete the series of four Salk inoculations, the drive to get these persons inoculated will have to be sustained for many more years.

Should the trends during the past year continue indefinitely, the proportion of the population under 20 years vaccinated with at least one dose of Salk vaccine would reach the 90th percentile by about 1963. This level of partici-

pation in the proportion vaccinated with three or more doses of Salk vaccine would not be reached until 1965–70. The proportion quadruply vaccinated would not attain this level until about 1970–75. Since the current levels of participation and the rates at which the unvaccinated population is participating in the program are lower for the older age groups, the periods required to attain the 90th percentile levels of participation would be substantially longer for this group than for the group under 20 years of age.

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Continuous Air Monitoring Station

On May 17, 1962, a new air monitoring station in Washington, D.C., began continuous sampling for air pollution. Built and equipped by the Public Health Service, the station is one of eight similar installations operating in major American cities. The stations are designed to provide automatic measurement and analysis of the continuously fluctuating levels of pollutants in urban air.

Automatic gas sampler-analyzers within the stations provide continuous sampling and analysis of sulfur dioxide, nitric oxide, nitrogen dioxide, carbon monoxide, ozone, total hydrocarbons, and total oxidants. The installations house supplementary equipment which provides information on particulate pollutant concentrations, pollutants washed out of the atmosphere by rainfall, and measurements of wind turbulence.

The Washington installation is operated by employees of the District Government who have received special training at the Public Health Service's Robert A. Taft Sanitary Engineering Center in Cincinnati, Ohio.