CDC POLIOMYELITIS SURVEILLANCE REPORT

FOR ADMINISTRATIVE USE

REPORT NO. 198 June 2, 1960

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SPECIAL NOTE

This report is intended for the information and administrative use of those involved in the investigation and control of poliomyelitis and polio-like diseases. It presents a summary of provisional information reported to CDC from State Health Departments, the National Office of Vital Statistics, Virology Laboratories, Epidemic Intelligence Service Officers, and other pertinent sources. Since much of the information is preliminary in nature, confirmation and final interpretation should be determined in consultation with the original investigators prior to any further use of the material.

SUMMARY

The national incidence of poliomyelitis remains at very low levels, both for paralytic and total cases. There have been no epidemics and no new concentrations of cases in the United States.

A major epidemic continues to spread in Puerto Rico. Winter epidemics have been reported from Stites, Idaho, and from the Burn's Lake region in British Columbia.

Included is the complete text of the report of a series of Soviet-American discussions of poliomyelitis problems, held in Moscow, May 12-16, 1960.

Section 5 gives a preliminary listing of the virus isolations reported to the PSU by 60-day follow-up classification.

1. CURRENT POLIOMYELITIS MORBIDITY TRENDS

Through the first 21 weeks of 1960 the incidence of poliomyelitis has remained at remarkably low levels (Figure I). During the past week only 10 cases, including 7 paralytic, were reported to the NOVS, a decline from the 17 cases, 13 paralytic, of the previous week.

The cumulative total for 1960 is now only 313 cases, of which 223 are paralytic. Furthermore, the six week totals, both paralytic and total cases, are below those for a comparable period during the preceding four years:

Total for 16-21 weeks for five years

	1960	1959	1958	1957	1956
Paralytic	48	133	59	135	270
Total	59	196	129	312	533

This low incidence is generalized throughout the United States with 6-week totals below those for 1959 in all national regions except New England (table I). During the last week cases were reported from only 7 States in 4 regions. In the past 6 weeks only three States, California, Texas, and Louisiana, have reported a total of 5 or more cases.

2. REPORTS

A. Summary on Stites, Idaho Polio Outbreak

The following report was submitted by Dr. Theodore Doege, EIS officer, CDC, based on information from Dr. John Mather, Idaho Health Department.

In late January (PSU #194) an outbreak of 4 poliomyelitis cases, 3 paralytic and 1 non-paralytic, occurred in Stites, Idaho. The epidemiological details of this outbreak may now be filled in.

Of the 4 cases, 3 (2 paralytic) were in brothers of a single family, ages 13, 15 and 19. The fourth case (paralytic) was in a 23 year old farmer from nearby Kooskia. The 4 patients had similar prodromata of acute febrile illnesses with symptoms of myalgia, stiff neck and back, and headache . . . Type I poliovirus was isolated from stools of 3. There were varying degrees of weakness and residual paralysis . . .

The suspected source of the outbreak is thought to be a 5 year old girl from Burlington, Washington, who had the sudden onset of fever, malaise, headache, and stiff neck and back on December 30 . . . Neurological examination at the time of hospitalization showed right eye muscle weakness but an attempted spinal puncture was unsuccessful. The child made a rapid recovery within 7 days. Her illness, in retrospect, is thought to be compatible with bulbar poliomyelitis.

While this 5 year old was sick, she was visited by the 17 year old sister of the 3 Stites brothers, and her one year old nephew. Type I poliovirus was isolated from this 17 year old, as well as from 2 of her 3 brothers. Type I was also isolated from 5 of 6 children who were contacts of the girl. The 23 year old farmer, also proven to have Type I infection, cared for the 1 year old following the latter's return from Burlington.

It is postulated that the 17 year old sister and her 1 year old nephew were infected during their visit to the 5 year old Burlington child, and became the exogenous sources of infection for the Stites families.

The follow-up data on this outbreak were furnished by Mrs. Dorothy Smylie and the North Central District Health Department, Idaho; Dr. W. Giedt, Washington State Health Department, and Dr. R. Powers, Burlington physician. Virus isolations were performed by the Idaho State Laboratory, Boise.

B. Puerto Rico

The previously reported epidemic in Puerto Rico, which originated in January, has continued at a steady pace and shows no sign of waning. Through June 1, 1960, Dr. Manuel Feliberti, Epidemiologist, Bureau of Communicable Disease Control, Puerto Rico Department of Health, reports the occurrence of 141 paralytic cases of poliomyelitis with onset in 1960.

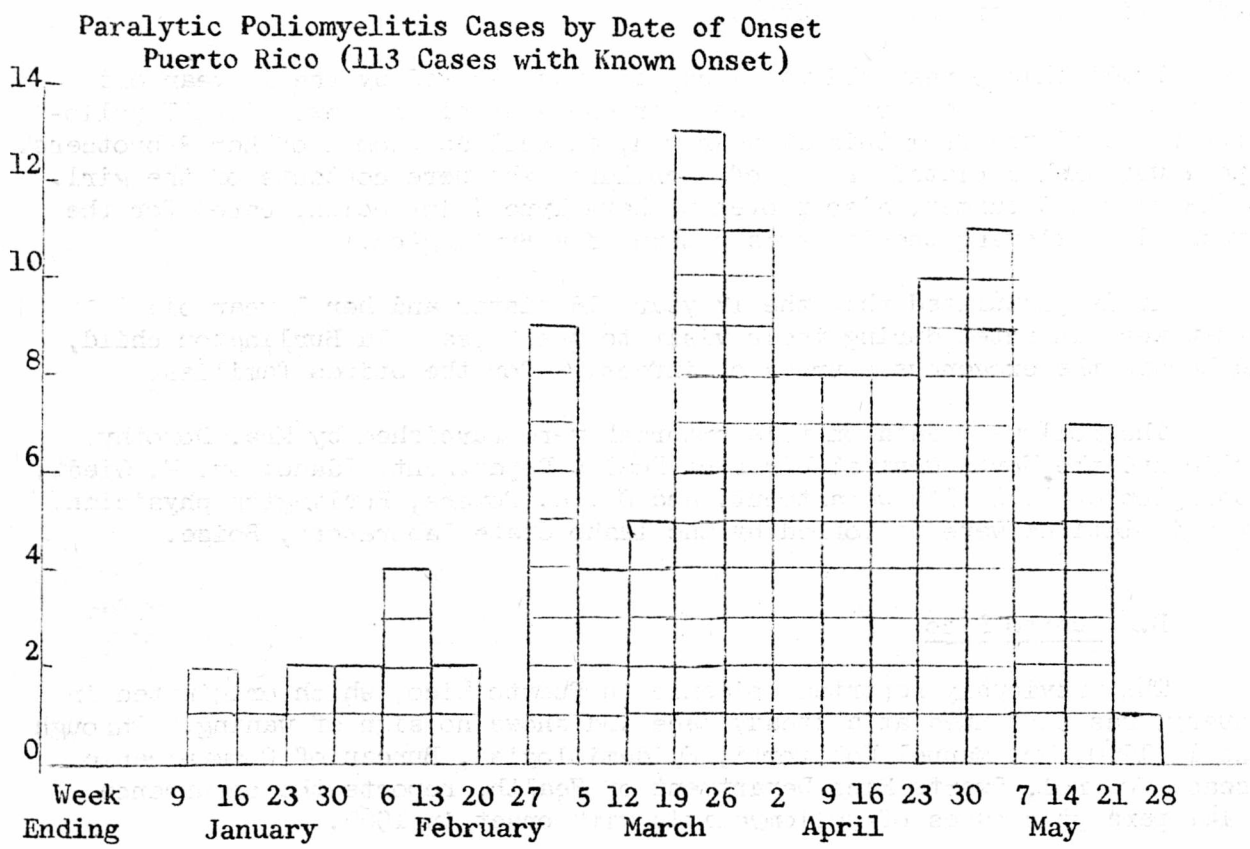
During the last three weeks there have been 42 newly reported paralytic cases and two previously reported (PSU #197) cases have been

dropped as not polio. The date of onset is now known for 113 cases and is presented in Figure 2A. The peak week continues to be the week ending March 26 although there has been an increase in cases during the last week in April and first week in May. Since the onset of symptoms is not known for 28 of the more recently reported cases, it appears that there may be a higher incidence during the early part of May than in March. Dr. Feliberti has indicated that many of these recent cases appear to be milder than those previously reported.

New cases are still concentrated in the area in and around the capital city of San Juan. In addition, cases are now being reported in several municipalities on the western coast of Puerto Rico for the first time.

The age distribution and vaccination status has not changed. There continues to be a predominance of cases among pre-school, unvaccinated children. Of the 138 cases with age known, 87 per cent have been in the group under 5 years and 62 per cent in the group under 3 years of age. Only 4.3 per cent of those with known vaccination status have received three or more doses of vaccine and 87.1 per cent have received none.

Figure 2A



C. Canada

According to the Surveillance Report of the Epidemiology Division of the Canadian Department of National Health and Welfare there had been telegraphic notification of 101 paralytic cases in Canada through May 21, the 20th week of 1960. This total is far in excess of the 34 cases in 1959 and the 15 cases in 1958 during a comparable period. Thus far, the 1960 cumulative total is the highest ever reported by this date. Included in this total are 45 cases from British Columbia, 20 cases from Quebec, and 18 from Alberta. The 45 cases in British Columbia have been far in excess of previous experience in that province.

Dr. Kubryk of the Epidemiology Division and Dr. A. A. Larsen of the British Columbia Department of Health and Welfare, Vancouver, report that a winter epidemic has occurred in the Burn's Lake region in the mountainous northwestern part of the province. Approximately 20 to 25 cases of paralytic poliomyelitis occurred in a sparsely populated area of about 100 square miles. The outbreak started with 3 cases in January, reached a peak in March, and no new cases have been reported since early May. Among the first 17 cases, 12 were in white persons and 5 were in Indians. Seven of these cases were in pre-school children, 5 were in adults. Six cases had been fully vaccinated while 7 were unvaccinated. There were two fatalities including one infant and one adult.

3. CONFERENCE REPORT

THE FIRST SOVIET-AMERICAN DISCUSSIONS OF PROBLEMS RELATING TO THE CONTROL OF POLIOMYELITIS

MOSCOW, MAY 12-16, 1960.

SUMMARY OF THE PROCEEDINGS

In partial fulfilment of an agreement between the Ministry of Health of the USSR and U.S.P.H.S. for the exchange of views and information regarding matters of health, a meeting was convened in Moscow, May 12-16, 1960 to discuss problems relating to the control of poliomyelitis. In attendance were 28 participants: 15 Soviets and 13 Americans (see the appendix for listing of participants).

SESSION I

The first session, May 12, was devoted to Russian experience with the live attenuated vaccine strains of Sabin. A preliminary published report of their mass administration in the USSR had been made available to the participants, and Dr. Chumakov opened with comments on their experience. He emphasized that the decision to offer vaccine to all persons aged 2 months to 20 years in the USSR was made only after thorough discussion of sequentially larger trials, first with Sabin's original lots and later with Soviet produced progeny lots, which had confirmed prior claims as to safety and capacity to induce antibody development. Observations related to the vaccination of 15,000,000 children during 1959 permitted Dr. Chumakov to draw certain definite or tentative conclusions and to delineate problems requiring further study. Since an estimated 700,000 triple negatives had received vaccine without detected ill effect and since study of 1,000 paired sera had indicated a high rate of sero-conversions, safety and serologic effectiveness are felt to have been fully demonstrated. Also, convenient and effective methods for administration have been developed. Although observation for another 2 or 3 years is necessary to provide final confirmation, observations in the latter half of 1959 in Estonia and Lithuania as to epidemiologic effectiveness encourage Dr. Chumakov to hope for a radical solution of the problem of poliomyelitis in the USSR within 1 or 2 years. Important remaining problems include interference by other enteroviruses, duration of immunity and final proof of epidemiologic effectiveness. For the future, annual trivalent revaccination is planned until the duration of immunity is established. Also, recently born children will be vaccinated systematically.

In a second presentation Prof. Baroyan described a placebo controlled trial of the Sabin vaccine. Available data confirm the negligible occurrence of reactions or poliomyelitis related to vaccination but another year of observation is required to provide evidence regarding epidemiologic effectiveness. If vaccine did in fact provoke disease, the cases did not exceed 7 per 1,000,000.

The related discussion revolved about a number of principal points. Regarding safety, the major concerns were the problem of distinguishing polio cases possibly provoked by vaccine from those due to wild viruses and the significance of virus reversion to neurovirulence during human passage. In relation to effectiveness, including duration of immunity, several necessary aspects were stressed including continuing intensive surveillance for clinical disease, periodic sampling for persisting seroimmunity and continuing virologic surveillance to determine the prevalence of polioviruses. Significant frequency of poliovirus isolates would seem to indicate inadequate intestinal resistance, regardless of antibody persistence, or too many unvaccinated persons; in either case, in Dr. Sabin's view, further vaccination would be indicated in an effort to break the chain of wild poliovirus transmission. Sero-response to live vaccine is said to be more rapid and more consistent than to Salk vaccine. The special difficulty of evaluating effectiveness when vaccine is given during an epidemic was pointed out. The United States participants were particularly interested in the methods developed for vaccine administration and in how the high general level of popular acceptance was achieved in the USSR. Finally, it was indicated that contra-indications had been specified initially on a priori grounds but that many have been removed as the result of observations during the emergency use of vaccine in the Tashkent epidemic.

Unfortunately, the experience of Prof. Smorodintsev was not discussed because of his inability to be present.

SESSION II

At the session on May 13, in a series of reports, some of the American participants described some of the current research in poliomyelitis in the United States.

Dr. Murray opened by presenting the preliminary recommendations, developed by the Committee on Live Poliovirus Vaccine appointed by the Surgeon-General of the U.S.P.H.S., concerning the basis of selection of attenuated poliovirus strains for human vaccination and the licensing of live poliovirus vaccines so as to assure safety, immunogenicity and purity. The important criteria for strain selection are: 1) full documentation of the origin of the strain; 2) neurovirulence in monkeys inoculated by the intrathalamic and intraspinal routed to be no greater than that of a reference strain which is subject to selection; 3) sufficient genetic stability that strains undergo no significant (word significant yet to be defined in terms of the total experience) change during human passage; 4) uneventful use in field trials including at least 100,000 triple negative persons; and 5) evidence that, in the recommended dosage, the strain will infect and induce antibody formation in at least 90 per cent of susceptible persons. For licensing, the manufacturer must show consistent ability to meet established standards by producing at least five successive satisfactory lots. Prescribed control measures, to be described later, are intended to insure potency and exclusion of harmful adventitious agents. Information still needed by the Committee relates to: 1) significance of observed reversions to neurovirulence; 2) evidence of epidemiologic effectiveness, and 3) firm dosage recommendations, especially for very young children; 4) more definitive evidence regarding the safety for all candidate strains.

Dr. Sabin described several recent studies. Rapid mass vaccinations with trivalent vaccine in Toluca, Mexico, seem to have revealed a way to vaccinate successfully in the massive presence of other enteroviruses. In New York, Cleveland, New Orleans and Nashville, immunization of newborn and older infants is under study. Although the data are as yet incomplete, it is already clear that trivalent feeding of newborn infants is unsatisfactory because the type II virus multiplies predominantly. However, when only type I vaccine was fed, multiplication was demonstrated in 90% of newborn children. Nonetheless, a decision regarding its use in newborns is being postponed until further evidence is obtained of antibody and intestinal resistance to re-infection at 6 months of age. Several stains, representing all 3 virus types, have been completely freed of monkey neurovirulence by selective propagation at 25°C. Unfortunately, the type I and type II "cold mutant" strains have little or no ability to multiply in the human intestine. However, the type III strain does multiply but requires further study. At present in progress is a large scale vaccination program intended to reach all school and pre-school children in Cincinnati. A similar program is about to begin in Rochester, N.Y.

Dr. Langmuir described the recent increase in polio in the U.S. and, in some detail, the 1959 epidemic in Des Moines, Iowa. This outbreak, similar to many other recent outbreaks, was characterized by a change in the epidemiological pattern from that which existed prior to 1955, socio-economic, and poorly vaccinated groups were more severely affected and attack rates were even higher than previously seen in upper economic groups. He expressed his belief that lack of vaccination in the lower economic groups determined the shift but that the very high rates probably reflect a change in character of the virus, possibly resulting from restriction, due to vaccination, of the spread of less virulent strains. Several members disagreed with this interpretation.

Dr. Cabasso described laboratory studies with the Lederle-Cox strains and other strains which confirmed reports of others, including Sabin, that the common genetic markers, d, T and MS, do not invariably correlate with neurovirulence and, hence, should not be referred to as virulence markers. Dr. Melnick followed by reporting studies of both wild strains and isolates from persons receiving vaccine strains which show that, while no single marker is correlated with neurovirulence, changes in one and especially in two markers are associated with a trend towards increased neurovirulence. He pointed out that testing for such <u>in vitro</u> changes is useful in selecting isolates from vaccinees for neurovirulence tests in monkeys.

Field trials with the Lederle-Cox strains in Minnesota and Florida were described by Drs. Kleinman and Flipse. These will have involved about 500,000 persons and include such interesting features as placebo-controls and tests for viremia in Minnesota and search for spread and for influence on wild viruses in Florida. Single administration of trivalent vaccine was reported by both speakers as inducing high rates of seroconversion.

Finally, Dr. Fox reported studies of the spread of the Sabin vaccine strains in households and communities in Louisiana. While low economic status (associated with poor household hygiene), young age of the vaccinee, use of the type III strain, possibly pharyngeal excretion of virus and, in the community, heavy seeding of the child population all favor vaccine virus spread, the dominant fact is that the vaccine strains spread much less extensively than the more infective wild strains and tend to die out well before

the supply of suceptibles is exhausted. Further, contact infections often are abortive and fail to induce antibody formation. He suggested that, in view of the short life expectancy of vaccine strains in the population, great concern about reversion may not be justified.

SESSION III

The third session was devoted to a discussion of questions of manufacture and quality control as these affected the safety and potency of live poliovirus vaccine.

Dr. Chumakov introduced the discussion by presenting a general account of the system of control which had been the basis for issuing live poliovirus vaccine for general use in the USSR. He noted that these were based on "Instructions" prepared largely by Dr. Smorodintsev which were approved by the Ministry of Public Health on Nov. 10, 1958. These instructions were later amended following conferences with USSR health officials, following a conference held by Dr. Sabin in June 1959 in Cincinnati and later taking into account some of the recommendations made by the US Public Health Service Committee on Live Poliovirus Vaccine.

Dr. Chumakov pointed out that in the USSR only three Sabin strains were used and the following principles were included in the production and control of the product in order to assure safety and effectiveness:

a) Identification of the strains used.

b) Usually first and rarely second passage from the seed is used in preparing vaccines.

c) Careful selection and examination of monkeys for disease.

d) Holding of monkeys for six weeks. Keeping up to 7 monkeys per cage has not been found to be a disadvantage.

e) Separate processing of individual kidney pairs.

f) Use of dense tissue culture preparations with heavy inocula of the cultures during production of vaccine.

g) Incubation at 34°C. during the virus propagation phase.

h) Use of 25 per cent of the tissue culture vessels as control vessels and examination of all culture bottles after 3 days' cell growth prior to inoculation as matters which minimize the simian agent problem.

i) Each lot is tested for neurovirulence in monkeys by intracerebral inoculation and every tenth lot by intraspinal inoculation.

j) Tissue culture and animal tests designed to pick up various contaminating bacteria and viruses are performed.

k) Final virus titers are carefully determined by two methods.

l) In the case of vaccine incorporated into candy, up to 110 pieces of candy, randomly selected, are tested for virus content.

Dr. Chumakov indicated that a total of about 4,000 liters of vaccine had been issued, that this represented the production of 61 lots, of which only 4 had been rejected during processing. These rejections were because of positive findings in the intracerebral monkey neurovirulence test. Simian viruses had not been a problem and B virus had not been encountered.

Dr. Murray briefly summarized the recommendations issued in the USA on Nov. 16, 1959. These followed along parallel lines with some differences. Individual isolation of monkeys was a requirement. Greater emphasis was put on the possible presence of simian and other adventitious agents and in this connection the test volumes were high; 500 ml where possible or 500 recommended doses in the case where neutralizing serums were required in the test. It was emphasized that the extensive experience with tissue culture testing of killed poliovirus vaccine indicated that simian agents were rather commonly encountered but that the occurrence tended to be irregular. In addition the need for the control of personnel, prevention of entry of extraneous viruses into production areas and need for separate facilities for vaccine manufacture were emphasized.

In the ensuing discussion a number of speakers stressed the need for some simple evaluation of safety such as might be presented by an array of markers. There was also emphasis on the important role of continuous epidemiological evaluation in order to support laboratory control measures and the possibility that it might be several years before it becomes possible to make a full evaluation of the epidemiological effectiveness of live poliovirus vaccine. By effectiveness is meant prevention of both paralytic disease and circulation of wild polioviruses.

SUMMARY

REACTIVITY AND SAFETY

The occurrence of reactions following the use of these vaccines has been followed in a number of studies, some of which were controlled studies, in the USA and the USSR. The rate is so low that the product may be considered virtually areactive. Multiplication of virus has not been accompanied so far by any certainly detected evidence of illness. The status of the few cases of poliomyelitis which have occurred shortly after vaccination has not been clarified.

On the basis of the experience with large scale feeding of the Sabin vaccines involving some 60,000,000 in the USSR alone, no cases of poliomyelitis which could be attributed to the use of these vaccines have been reported from the various areas of the world where they have been used.

On the question of increase in virulence, while there was little direct evidence that this did not occur, the epidemiological information available indicated that this had not been encountered.

IMMUNOGENICITY

Much of the data indicated that live virus vaccines induced antibody formation in a high proportion of susceptible children. Single use of trivalent vaccines, especially in young infants, was often reported to result in lesser frequency of response than that following sequential monovalent feeding, although various workers in both countries have reported satisfactory results.

Vaccination during summer months on occasion has been followed by a significant proportion of failures, possibly because of the interfering effect of prevalent other enteroviruses. Evidence exists that rapid initial mass application of trivalent vaccine followed by reapplication may overcome this difficulty.

A hoped for advantage of live virus vaccination voiced by many participants is intestinal resistance to infection. It has been suggested that, guided by virologic surveillance, periodic revaccination may be practiced annually until this desired level of resistance is achieved.

Information regarding duration of immunity is as yet inadequate. To supply this, periodic serologic sampling of the vaccinated population and continued epidemiologic and virologic surveillance are essential.

EPIDEMIOLOGIC EFFECTIVENESS

Several observations compatible with significant epidemiologic effectiveness have been reported. These include: 1) the unusually low overall incidence of poliomyelitis in the second half of 1959 in the several areas in the USSR in which 50-60% of the population was vaccinated prior to June; and 2) the fact that, in the several regions where vaccine was administered during the summer and fall, attack rates in those vaccinated were consistently much lower than in those not yet receiving vaccine. All agreed, nonetheless, that careful surveillance for several more years is necessary to provide full proof of effectiveness.

RECOMMENDATIONS FOR PRODUCTION AND TESTING

The production and testing standards in effect in the USSR and USA are parallel in most respects but there are certain differences. The existence of these differences suggests the desireability that a comparative study of the different requirements be undertaken by the U.S. and the USSR so that international recommendations may be formulated by the WHO.

CONCLUSION

The participants all agree that the work of the conference has been mutually profitable and has laid a firm foundation for the continuing exchange of information and cooperation in the future.

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Zhdanov, V.M.
Academic-Secretary of
Academy of Medical
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Appendix

Participants from U. S. A.

1. Dr. M. Benyesh-Melnick, Baylor University School of Medicine, Houston, Texas

2. Dr. Theodore Boyd, National Foundation, New York

3. Dr. Victor Cabasso, Lederle Laboratories, Pearl River, New York

4. Dr. Eugene Flipse, School of Medicine, University of Miami, Miami

5. Dr. John P. Fox, Institute for Public Health Research, New York City, New York

6. Dr. Thomas Francis, Prof. of Epidemiology, University of Michigan, Ann Arbor, Michigan

7. Dr. Hilary Koprowski, Wistar Institute, Philadelphia, Pennsylvania

8. Dr. Herman Kleinman, Minnesota Health Department, Minneapolis, Minn.

9. Dr. Alexander Langmuir, Communicable Disease Center, U.S.P.H.S., Atlanta, Georgia

10. Dr. Joseph E. Melnick, Prof. Virology and Epidemiology, Baylor University School of Medicine, Houston, Texas

11. Dr. Roderick Murray, Division of Biologics Standards, National Institutes of Health, Bethesda, Maryland

12. Dr. David E. Price, Assistant Surgeon General, U.S.P.H.S., Washington

13. Dr. Albert B. Sabin, Director, Children's Hospital Research Foundation, Cincinnati

Participants from U.S.S.R.

1.	Dr. Anjaparidze O.G.	Institute of Virus Preparations, Director, Moscow
2.	Dr. Barogan O.V.	Ivanovsky Institute of Virology, AMS USSR, Department of Epidemiology, Chief, Moscow
3.	Dr. Voroshilova M. K.	Institute for Poliomyelitis Research, USSR, Laboratory of Immunology, Chief, Moscow
4.	Dr. Ginsburg N.N.	State Control Institute for Medical Biologics, Vice Director on Scientific Part, Moscow
5.	Dr. Dzagurov S.G.	Institute for Poliomyelitis Research, AMS USSR, Vice Director on Production Part, Moscow
6.	Dr. Zhdanov V.M.	Academy of Medical Sciences of USSR, Academic Secretary
7.	Dr. Zeitlyonok N.A.	Institute for Poliomyelitis Research, Vice Director on Scientific Part, Moscow
8.	Dr. Kosyakov P.N.	Ivanovsky Institute of Virology, AMS USSR, Director, Moscow
9.	Dr. Lashkevich V. A.	Institute for Poliomyelitis Research, AMS USSR, Vaccine Laboratory, Chief, Moscow
10.	Dr. Lebedev Y. D.	Ministry of Health of USSR, Assistant State General Inspector, Moscow
11.	Dr. Sakvarelidze L.A.	Ministry of Health of USSR, Department of Epidemiology, Chief, Moscow
12.	Dr. Smorodintsev A.A.	Institute of Experimental Medicine, Department of Virology, Chief, Leningrad
13.	Dr. Soloviev V.D.	Central Institute of Advanced Courses for Physicians, Chair of Virology, Chief, Moscow
14.	Dr. Tyufanov A. V.	Institute for Poliomyelitis Research, AMS USSR, Laboratory of Pathomorphological, Control of Vaccine, Chief, Moscow
15.	Dr. Chumakov M.P.	Institute for Poliomyelitis Research, AMS, USSR, Director, Moscow

4. LIVE POLIOVIRUS VACCINE PROGRAMS

1. Sabin Strains

   a. New Haven, Connecticut (Dr. John R. Paul, Section of Epidemiology and Preventive Medicine, Yale University School of Medicine). --
   A field trial using Types I, II, and III in pre-school children.

   b. Houston, Texas (Dr. Joseph L. Melnick, Department of Virology and Epidemiology, Baylor University College of Medicine). -- A study of attenuated virus in young children and family contacts.

   c. Cleveland, Ohio (Dr. Frederick C. Robbins, Department of Pediatrics and Contagious Diseases, Cleveland Metropolitan Hospital). --
   A study of Type I attenuated virus in newborn infants.

   d. New Orleans, Louisiana (Dr. John P. Fox, Division of Epidemiology, The Public Health Research Institute of the City of New York and Dr. Henry M. Gelfand, Enterovirus Unit Laboratory Branch, CDC, Chamblee, Georgia). --
   All three types of attenuated virus being studied in infants under 30 days of age.

   e. New York City, New York (Dr. Saul Krugman, Department of Pediatrics, New York University College of Medicine). --
   A study of both monovalent and trivalent vaccines in newborn infants.

   f. Nashville, Tennessee (Dr. Amos Christie, Department of Pediatrics, Vanderbilt University School of Medicine). --
   Monovalent and trivalent vaccines administered to infants of several ages in varying schedules.

   g. Cincinnati, Ohio (Dr. Albert B. Sabin, Department of Pediatrics, University of Cincinnati, College of Medicine). --
   A large-scale field trial of monovalent strains in children.

   h. Rochester, New York (Dr. Wendell Ames, Monroe County Health Department). -- Monovalent vaccines being fed to pre-school and school age children.

   i. Foreign Programs (Submitted by Dr. Albert B. Sabin, The Children's Hospital Research Foundation, Cincinnati, Ohio)

1) Toluca, Mexico (Dr. M. Ramos - Alvarez) --
Mass feeding of children with a polyvalent vaccine in a tropical, poorly-sanitated population.

2) British Medical Research Council (Professor C. H. Stuart - Harris, University Department of Medicine, The Royal Hospital, Sheffield 1, England) --
A series of studies using the 3 types of vaccine virus.

3) Holland (Professor J. D. Verlinde - Netherlands Institute of Preventive Medicine, Wassenaarseweg 56, Leiden, Holland) --
A study of immunization effectiveness in infants.

4) Italy (Professor G. D'Alessandro, Instituto D'Igiene E Microbiologia, Universita Di Palermo, Via Divisi 83, Palermo, Italy, and Dr. A. Giovanardi, Instituto Di Igiene, Universita Di Milano, Via Francesco Sforza 35, Milano, Italy) --
details not available.

5) Yugoslavia (Dr. M. Milanoric - Institute of Hygiene, Bulerar J.N.A. 12, Belgrade, Yugoslavia) --
A community study using three monovalent vaccines in children.

6) U.S.S.R. (Professor M.P. Chumakov, Institute for Poliomyelitis Research, Moscow) --
Oral vaccination of the total population 20 years of age and under.

7) Hungary --
Feeding of all 3 monovalent vaccines to all children 2 months to 14 years old.

8) Czechoslovakia (Dr. V. Skovranek, Ministry of Health, Prague) --
Mass vaccination of all children up to about 15 years of age.

2. Cox Strains

a. Miami, Florida (Dr. George Erickson, Dade County Health Department, 1350 N.W. 14th Street, Miami, Florida, and Dr. M. Eugene Flipse, University of Miami School of Medicine, Jackson Memorial Hospital, Miami, Florida) --
A large-scale community-wide field trial of oral trivalent vaccine among all residents less than 40 years of age.

b. Minnesota (Dr. R. N. Barr, State of Minnesota, Department of Health, Minneapolis, Minnesota) --
Community-wide field trials of trivalent attenuated oral vaccine in three cities plus several specialized studies.

c. Ithaca, New York (Dr. R. Broad, Tompkins County Health Department) -- Trivalent vaccine offered to entire county population.

5. VIRUS ISOLATIONS REPORTED TO PSU - 1959 (Preliminary Report)

Reports of attempted virus isolation on 3,910 poliomyelitis cases with onset during the year 1959 had been received by the Poliomyelitis Surveillance Unit through March 1. This represents virologic study on 45 per cent of the cases reported to PSU. A number of additional reports have since been received and will be included in the final analysis.

Poliovirus was isolated from 2,624 cases or 67.1 per cent of the specimens submitted. Of those with virus type specified, 2,308 (89.5%) were Type I and 259 (10.0%) were Type III poliovirus. Type II was isolated in only eleven cases. These data are presented in Table 5 in accordance with the 60-day follow-up classification of cases. Only 5 per cent of the specimens studied had no final classification.

As would be expected, there was a greater percentage of poliovirus isolations from the cases with residual paralysis. In these cases, poliovirus was isolated in 78.4 per cent. There were 13 isolations of Coxsackie and 2 isolations of ECHO virus among these cases with residual paralysis. In those paralytic cases with no residual paralysis at 60 days, poliovirus was isolated in 58.7 per cent of the cases. The non-paralytic poliomyelitis-aseptic meningitis syndrome showed a poliovirus isolation in only 41.3 per cent of specimens studied.

Poliomyelitis in 1959 was predominantly due to Type I virus throughout the country, with the exception of Massachusetts where a Type III outbreak was experienced. Other concentrations of Type III were noted in Nebraska and Pennsylvania with scattered isolations in New York, New Jersey, North Carolina, Florida, Ohio and Kentucky.

Table 5

VIRUS ISOLATIONS BY
FINAL CLASSIFICATION

	POLIOVIRUS ISOLATION							Total	%
	Type I	Type II	Type III	Type Unspec.	ECHO	Cox-sackie	Neg	Spec.	Polio
Paralytic Polio, Residual Para	1681	9	188	35	2	13	513	2441	78.4
Paralytic Polio,No Residual Para	206	0	35	3	0	3	169	416	58.7
Non Paralytic Polio-Aseptic Meningitis Syndrome	311	0	24	7	33	77	377	829	41.3
Not Polio	0	0	0	0	0	0	35	35	0.0
No Final Classification	110	2	12	1	0	3	61	189	66.1
TOTAL	2308	11	259	46	35	96	1155	3910	67.1

6. ROUTINE POLIOMYELITIS SURVEILLANCE - 1960

A. Cases With Onset Within 30 Days of Vaccination

There have been no new under 30-day cases reported to the Poliomyelitis Surveillance Unit during May. Thus, the total number reported in 1960 remains at two, both of which are paralytic, and neither correlated.

B. Vaccine Distribution

A summary of current and cumulative data concerning vaccine released, shipped and inventoried is presented in Table II. Also included are releases and shipments of quadruple antigen.

(This report was prepared by the Poliomyelitis and Polio-like Diseases Surveillance Unit, Joseph Oren, M. D. and Leo Morris, Statistician, with the assistance of the Statistics Section, CDC.)

Figure 1. CURRENT U.S. POLIO INCIDENCE

compared with years 1956 through 1959

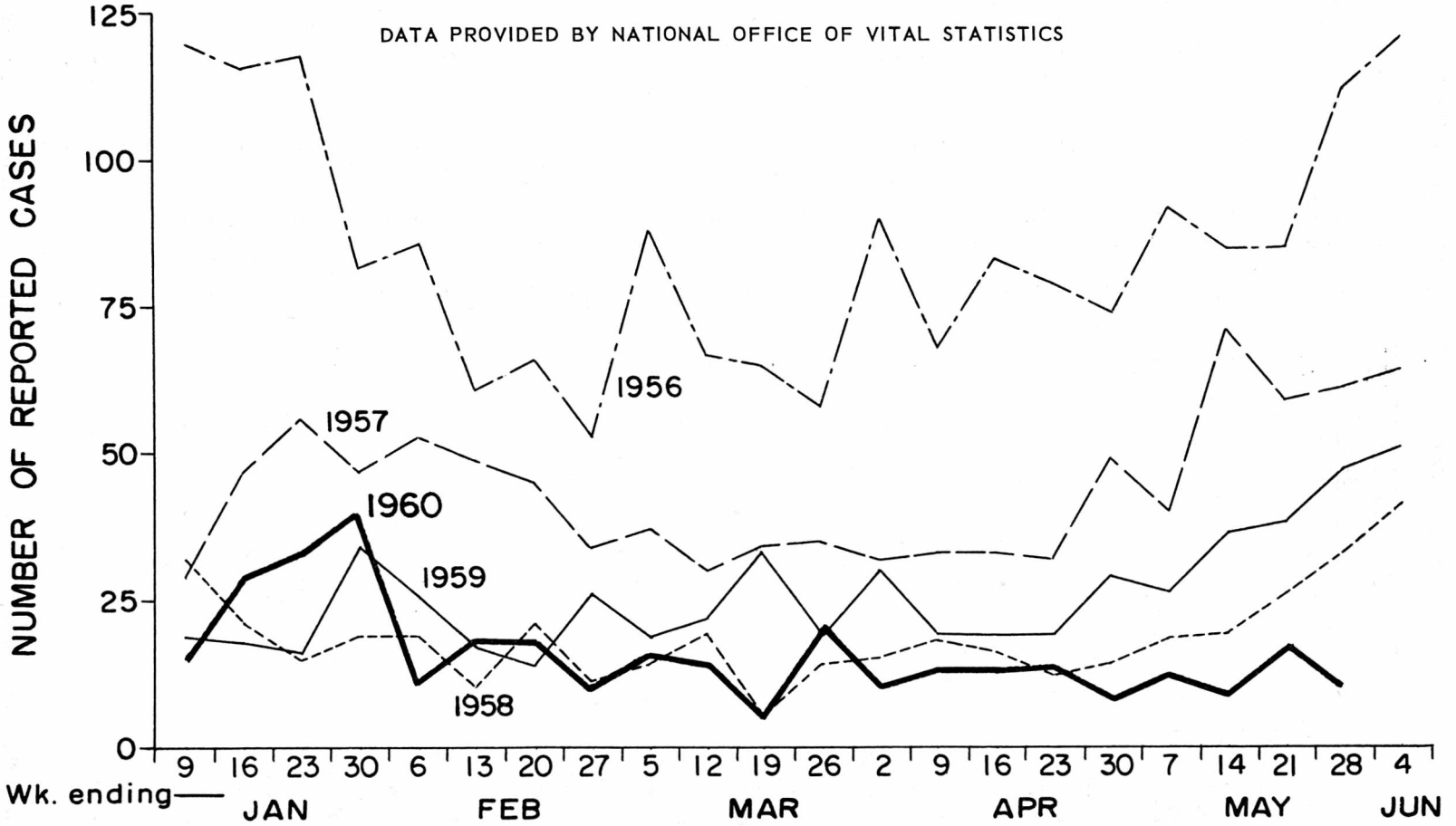

Table I

TREND OF 1960 POLIOMYELITIS INCIDENCE

State and Region	Cumulative 1960	Cases Reported to NOVS* For Week Ending 4-23	4-30	5-7	5-14	5-21	5-28	Six Week Total	Comparable Six Weeks Totals in: 1959	1958	1957
UNITED STATES											
Paralytic	223	9	6	8	5	13	7	48	133	59	135
Nonparalytic	56	4	2	2	3	2	2	15	43	41	140
Unspecified	34	-	-	2	1	2	1	6	20	29	37
Total	313	13	8	12	9	17	10	69	196	129	312
NEW ENGLAND											
Paralytic	10	-	1	-	1	1	-	3	2	-	2
Total	10	-	1	-	1	1	-	3	2	-	4
Maine	5	-	1	-	1	-	-	2	-	-	-
New Hampshire	-	-	-	-	-	-	NR	-	-	-	-
Vermont	-	-	-	-	-	-	-	-	-	-	2
Massachusetts	5	-	-	-	-	1	-	1	-	-	1
Rhode Island	-	-	-	-	-	-	-	-	2	-	-
Connecticut	-	-	-	-	-	-	-	-	-	-	1
MIDDLE ATLANTIC											
Paralytic	29	1	1	1	-	1	-	4	7	1	1
Total	41	1	1	1	1	1	-	5	12	6	7
New York	33	1	1	-	1	1	-	4	8	3	3
New Jersey	6	-	-	1	-	-	-	1	4	3	-
Pennsylvania	2	-	-	-	-	-	-	-	-	-	4
EAST NORTH CENTRAL											
Paralytic	13	-	-	1	3	-	-	4	9	3	7
Total	39	1	1	3	5	-	-	10	22	9	24
Ohio	18	-	-	1	2	-	-	3	10	2	4
Indiana	-	-	-	-	-	-	-	-	3	2	4
Illinois	6	-	-	2	-	-	-	2	2	1	5
Michigan	12	1	1	-	2	-	-	4	6	3	7
Wisconsin	3	-	-	-	1	-	-	1	1	1	4
WEST NORTH CENTRAL											
Paralytic	10	1	-	-	-	1	-	2	11	1	6
Total	16	1	-	-	-	1	-	2	17	9	17
Minnesota	8	-	-	-	-	-	-	-	2	-	1
Iowa	4	-	-	-	-	-	-	-	1	3	1
Missouri	3	1	-	-	-	1	-	2	5	-	5
North Dakota	-	-	-	-	-	-	-	-	-	1	1
South Dakota	1	-	-	-	-	-	-	-	-	-	-
Nebraska	-	-	-	-	-	-	-	-	4	4	6
Kansas	-	-	-	-	-	-	-	-	5	1	3

*National Office of Vital Statistics: weekly figures reported by the states as of Wednesday of the specified week; cumulative figures include revisions and corrections.

Table 1 (Continued)

State and Region	Cumulative 1960	Cases Reported to NOVS For Week Ending 4-23	4-30	5-7	5-14	5-21	5-28	Six Week Total	Comparable Six Weeks Totals in: 1959	1958	1957
SOUTH ATLANTIC											
Paralytic	38	-	1	-	-	1	1	3	31	6	9
Total	49	1	1	-	1	1	2	6	42	17	31
Delaware	1	-	-	-	-	-	-	-	-	-	-
Maryland	1	-	-	-	-	-	-	-	-	-	-
D. C.	-	-	-	-	-	-	-	-	-	1	-
Virginia	-	-	-	-	-	-	-	-	6	1	5
West Virginia	4	-	-	-	-	-	1	1	4	2	-
North Carolina	14	-	1	-	-	-	-	1	1	3	6
South Carolina	3	-	-	-	-	-	1	1	2	-	3
Georgia	3	1	-	-	-	-	-	1	1	-	3
Florida	23	-	-	-	1	1	NR	2	28	10	14
EAST SOUTH CENTRAL											
Paralytic	11	-	-	1	-	3	-	4	7	7	6
Total	13	-	-	1	-	3	1	5	13	18	13
Kentucky	7	-	-	-	-	-	1	1	2	7	3
Tennessee	1	-	-	-	-	1	-	1	6	5	3
Alabama	1	-	-	-	-	-	-	-	1	1	3
Mississippi	4	-	-	1	-	2	-	3	4	5	4
WEST SOUTH CENTRAL											
Paralytic	26	1	2	2	-	3	2	10	30	23	64
Total	37	3	3	3	-	4	3	16	46	33	106
Arkansas	3	-	-	-	-	-	-	-	5	2	8
Louisiana	10	-	1	-	-	2	2	5	5	-	16
Oklahoma	3	-	1	1	-	-	-	2	3	1	-
Texas	21	3	1	2	-	2	1	9	33	30	82
MOUNTAIN											
Paralytic	8	-	-	-	-	-	-	-	8	4	11
Total	16	-	-	-	-	2	-	2	10	13	30
Montana	6	-	-	-	-	2	-	2	1	2	1
Idaho	4	-	-	-	-	-	-	-	-	-	2
Wyoming	1	-	-	-	-	-	NR	-	-	-	3
Colorado	1	-	-	-	-	-	-	-	-	2	4
New Mexico	1	-	-	-	-	-	-	-	2	-	6
Arizona	2	-	-	-	-	-	-	-	7	6	8
Utah	1	-	-	-	-	-	-	-	-	2	6
Nevada	-	-	-	-	-	-	-	-	-	1	-
PACIFIC											
Paralytic	78	6	1	3	1	3	4	18	28	14	29
Total	92	6	1	4	1	4	4	20	32	24	80
Alaska	1	-	-	-	-	-	1	1	-	1	-
Washington	6	-	-	-	-	-	-	-	1	2	-
Oregon	12	-	-	-	-	-	-	-	6	-	5
California	70	5	1	4	1	4	2	17	24	15	75
Hawaii	3	1	-	-	-	-	1	2	1	6	-
Puerto Rico	116	17	12	14	14	9	NR	66	-	14	-

Table II

POLIOMYELITIS AND QUADRUPLE ANTIGEN VACCINE REPORTS*
(Data provided by the Polio Vaccine Activity, BSS, USPHS through May 20, 1960)

POLIOMYELITIS VACCINE SHIPPED (1000's cc's)

Period	National Foundation	Public Agencies	Commercial Channels	Export	Total
1955	13,541	7,893	6,223	--	27,667
1956	194	45,588	24,784	6,477	77,043
1957	154	50,026	38,062	12,784	101,026
1958	203	18,533	28,319	33,571	80,626
1959	160	26,160	37,553	21,161	85,034
1960					
Jan-March	-	4,298	5,371	2,782	12,451
Week Ending					
4-8	-	489	691	249	1,429
4-15	-	673	674	465	1,812
4-22	-	151	873	37	1,061
4-29	-	472	754	542	1,768
5-6	-	400	994	154	1,548
5-13	-	522	1,120	32	1,674
Total to Date	-	7,005	10,477	4,261	21,743
Cumulative Total	14,252	155,205	145,418	78,254	393,129

* Excludes amounts of outdated unshipped vaccine.

QUADRUPLE ANTIGEN VACCINE SHIPPED (in cc's)

Period	Public Agencies	Commercial Channels	Export	Total
1959	157,251	4,019,577	59,143	4,235,971
1960				
Jan-March	117,915	1,307,923	64,700	1,490,538
Week Ending				
4-8	8,221	119,448	-	127,669
4-15	5,994	110,628	-	116,622
4-22	21,096	153,315	1,710	176,121
4-29	8,006	129,897	279	138,182
5-6	2,344	137,142	9,621	149,107
5-13	11,390	173,700	1,566	186,656
Total to Date	174,966	2,132,053	77,876	2,384,895
Cummulative Total	332,217	6,151,630	137,019	6,620,866