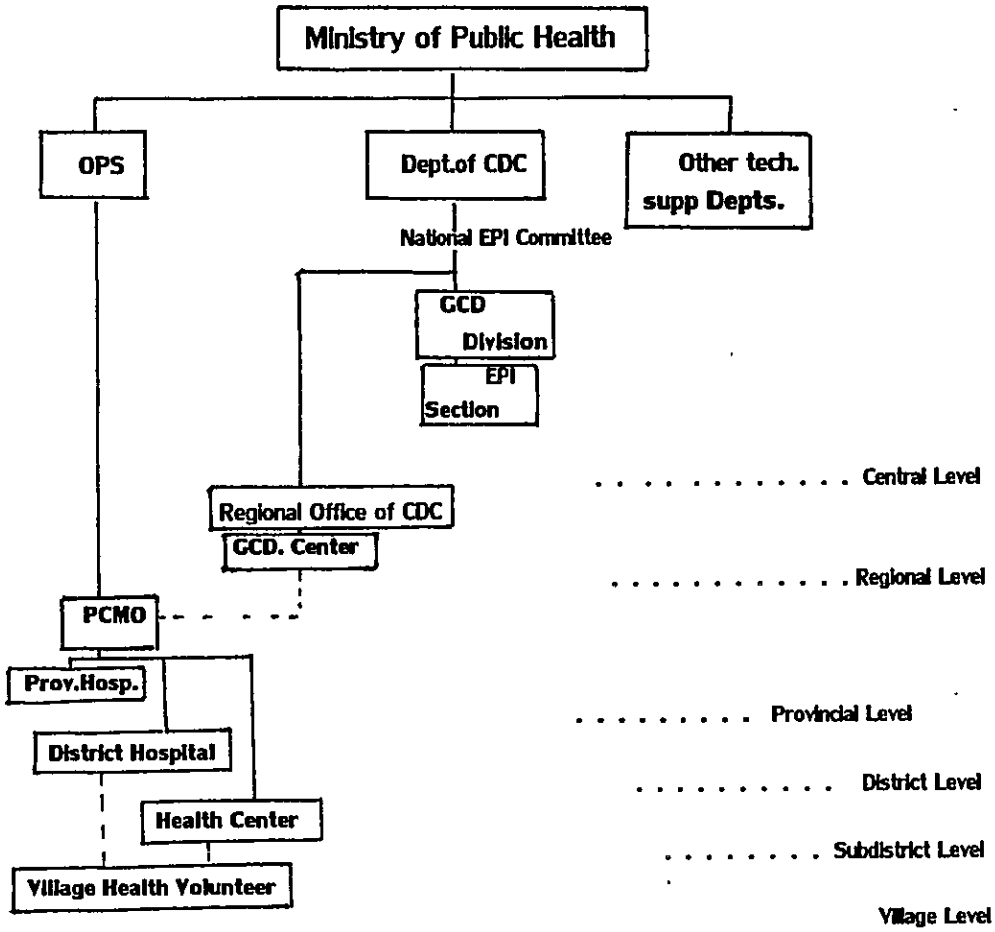
## THAILAND COUNTRY REPORT ON POLIO ERADICATION

1. **Title of seminar** : **Polio Eradication, Its Theory and Practice**
   (for Person Engaged in E.P.I)
2. **Name of participant** : Mr. CHAWALIT NATPRATAN
3. **Participant's position** : Director,Office of Communicable Disease Control,
   Region 10, Chiangmai,THAILAND

4. **Organizational structure in the participant's country** , dealing with national poliomyelitis eradication program: (figure I)




(Annex 1)

## 5. Current status of national polio eradication program :

### 5.1 Incidence and epidemiological surveillance

Thailand has the infectious disease surveillance system that includes 67 diseases, All health facilities report the poliomyelitis cases to each PCMO in each province . Then all reports go to the Epidemiology Division to be processed and distributed. No laboratory surveillance of polio virus has been done until mid 1992 when AFP Surveillance began. The incidences of poliomyelitis cases are shown in table 1.

**TABLE 1**

**Morbidity/mortality of poliomyelitis reported in Thailand (1977-1993)**

| year | # case | rate/100,000 pop | # deaths | case fatality rate ( % ) |
|---|---|---|---|---|
| 1977 | 911 | 2.10 | 18 | 2.09 |
| 1978 | 640 | 1.44 | 13 | 2.03 |
| 1979 | 1,083 | 2.38 | 46 | 4.25 |
| 1980 | 300 | 0.65 | 11 | 3.68 |
| 1981 | 257 | 0.54 | 5 | 1.95 |
| 1982 | 276 | 0.57 | 2 | 1.02 |
| 1983 | 144 | 0.29 | 2 | 1.40 |
| 1984 | 81 | 0.16 | 2 | 2.46 |
| 1985 | 65 | 0.12 | 0 | 0 |
| 1986 | 94 | 0.17 | 2 | 2.17 |
| 1987 | 25 | 0.04 | 0 | 0 |
| 1988 | 11 | 0.02 | 1 | 9.09 |
| 1989 | 19 | 0.03 | 1 | 5.26 |
| 1990 | 4 | 0.007 | 0 | 0 |
| 1991 | 5 | 0.009 | 0 | 0 |
| 1992 | 7 | 0.012 | 0 | 0 |
| 1993 | 8 | 0.014 | 0 | 0 |

**Source : Div. of Epidemiology, MOPH (Dec 8,1993)**

**1992-93 are confimed cases by the Viral Research Institute**

## 5.2 Clinical diagnosis of the disease

Since May,1992 MOPH started the AFP (Acute Flaccid Paraslysis) surveillance in 87 provincial hospitals and extended to all governmental and private hospitals. Pediatricians diagnose AFP patients together with collection of stool specimen. The symptoms and signs of AFP include general symptoms, neurological signs and symptoms, types of paralysis and associated findings with paralysis . Pediatricians report all AFP cases to PCMO for further investigation and control measures. They report "zero reporting" monthly if they found no case of AFP.

## 5.3 Laboratory diagnosis of the disease

**All stool specimen collected from AFP patients will be transfered under cold chain system to the Viral Research Institute, Department of Medical Science in Bangkok for cultiure and typing.**

## 5.4 Vaccine supply and its quality control

All vaccines are procured and stored in central cold rooms of the General Communicable Disease Division. Monthly, the GCD division send vaccines to regional GCD centers by train or by refrigerated truck. The GCD centers carry vaccines to provincial central stores in PCMO'S. Each PCMO takes care of its own distribution of vaccines to its facilities.

Along the way from GCD division to health centers the temperature of cold chain is checked to assure the efficacy of vaccines. Random sampling of vaccines in health centers and hospital to be tested at the Department of Medical Science, is another way of quality control.

## 5.5 Vaccination program-routine and vaccination day

**The National EPI Committee suggested the following EPI schedule:**

| Age of target group | Vaccine given |
|---|---|
| At birth | BCG , HBV, |
| 2 month | DTP , OPV , $HBV_2$ |
| 4 month | $DTP_2$ , $OPV_2$ |
| 6 month | $DTP_3$ , $OPV_3$,$HBV_3$ |
| 9-12 month | measle vaccine |
| 1.1/2 year | $JE_1$ , $JE_2$, $DTP_4$ , $OPV_4$ |

Vaccines are given to babies in all health facilities in routine basis. There is no national vaccination day in Thailand. The coverage of $OPV_3$ is shown in table 2.

**TABLE 2** Polio vaccine coverage ($OPV_3$)In under one year children, Thailand, 1977-1992

| year | $OPV_3$coverge (%) |
|---|---|
| 1977 | - |
| 1978 | 6.0 |
| 1979 | 9.0 |
| 1980 | 13.0 |
| 1981 | 19.12 |
| 1982 | 33.75 |
| 1983 | 46.39 |
| 1984 | 52.66 |
| 1985 | 61.78 |
| 1986 | 70.36 |
| 1987 | 73.71 |
| 1988 | 69.84 |
| 1989 | 76.21 |
| 1990 | 85.64 |
| 1991 | 86.24 |
| 1992 | 83.94 |

**Source** : Activity report, Health Statistic Div, MOPH

Since May 1992,after AFP cases diagnosed,health workers should go out to community to investigate and provide mopping up vaccination. Children under 5 years are the target group. If the cases are older than 5 years we consider to give vaccines up to that age group.

## 5.6 Target year of eradication in my country

**MOPH , Thailand targets to eradicate all poliomyelitis cases from Thailand in 1996.**

6. Estimate of the quantity of the vaccine required during 1992-1995

| year | vaccine required (Million dose) | budget (Milion BAHT) |
|---|---|---|
| 1992 | 6.107 | 13.435 |
| 1993 | 5.691 | 15.366 |
| 1994 | 5.893 | 17.679 |
| 1995 | 5.839 | 19.259 |

7. **Problems being encountered in the participants country when the activities** mentioned in 5 are being carried out:

**7.1 AFP Surveillance**

**There are some under reported,delayed reported and incomplete reported of AFP cases from pediatricians.**

7.2 Investigation and Control

Because of delay in reporting causes delay in investigation and mopping-up vaccination

**7.3 Specimen collection and transfer**

**Some sites of surveillance system do not transfer specimen under cold chain**

7.4 Imported cases

There are some cases from neighboring countries come to be treated in our facilities.

**7.5 Coverage of vaccine**

**In some under privillage area the vaccination coverage is still low, such as in hill tribe villages or slum areas in big cities**

8. Any special remark:

Polio eradication can be achieved in Thailand by 1996, if we can solve the problem in (7).

## Annex 1

Abbreviation for figure 1:--

OPS = Office of Permanent Secretary

Dept. of CDC = Department of Communicable Disease Control

Other tech. supp. Depts. = Other technical supporting Departments

GCD Division = General Communicable Disease Division

PCMO = Provincial Chief Medical Office

Prov. Hosp. = Provincial Hospital

Report on Future Program of Polio Eradication

Title of seminar: Polio Eradication, It's Theory and Practice

Name of participant: Mr. Chawalit Natpratan

Participant's position: Director, Office of Communicable Disease Control,Region 10, Chiangmai, Thailand

LESSON LEARNT FROM THE SEMINAR

The reporter learnt four important aspects about polio eradication from the seminar:

1.WHO-suggested strategies for polio eradication

WHO technical consultative group suggested two strategies:

a. Polio surveillance strategies include high risk area identification and immediate outbreak response of acute flaccid paralysis cases

b. Immunization strategies include strengthen of routine immunization,conduct the National Immunization Days, outbreak response immunization and mopping-up immunization.

The group also suggested the staging of the strategic plan of eradication into four stages:.Thailand has passed stage1 entering to stage2,except the activities of the NID.

2.The difficulties in eradication and the ways to overcome

Many lecturers pointed out difficulties encountered in polio eradication.The efforts to overcome should be multisectoral collaboration,started with political commitment,followed by comprehensive planning,mobilization of resources,good implements, intensive monitoring and evaluation and modification of further plans.

3. The experiences of some activities from participants

It is a good chance to exchange the experiences in some eradication activities with participants from other countries.Some participants described about thier activities in conducting the NID and the fruitful results.Some figured-out the difficulties and problems they found in eradication activities.Some asked for supports internationally regarding budgets,experts,and technical supports,such as lab.confirmation of cases.

4.The network of supports from Japan

JICA provided the reporter the opportunity to know about the success of polio eradication in Japan,through the assignment of the Japanese participants to be in the seminar,giving

the experiences gained in Japan.Furthermore, the study trips to various organization provided the information about the network of supports for polio eradication which one can request for fulfilling his country's needs in the future.

## THE POLIO ERADICATION PROGRAM IN THAILAND

### Situation Analysis

- Thailand by the Ministry of Public Health (MOPH) formulated the policy of the eradication of wild type polio cases within1996. In1994 the government allocated6.29%of the national budget to MOPH.With this financial allocation,there should be no problem for procurement of vaccines.
- With good health infrastructure strengthened by the network of primary health care,most of the poeple in Thailand access to health services.The routine EPI program covered over80% of under one year children in1994.The acceptability of the mothers to vaccination is good except in some small areas in the south and mountaineous area in the north.
-The transportation in Thailand in general is good.There are some unpaved roads remained in remote areas.But that causes minor problem in vaccines and specimen transportation.
- AFP surveillance covered only70%of expected cases in1994. There were some delay and incomplete reports from the pediatricians.Some stool specimen were collected and transfered in inappropriate way.However,the immediate investigation of cases was good except there were few reports about follow-up for residual paralysis.There was no detail about cases reported from Bangkok where the density of population is highest.
-Immunization strategies included only the routine immunization with supplementary mobile teams to under-covered areas and outbreak response immunization which is called'mopping-up' in Thailand.

### Proposed Modification of the Program

1.convince the Division of General Communicable Disease to invite the experts to form the technical advisory group chaired by the current polio eradication consultant

2.the technical advisory group revises the definition for diagnosis and the strateties including the surveillance and immunization, emphasize on the supplementary immunization

3.strengthen the surveillance system by:

a.reorientate the pediatricians and general practitioners both in governmental and private hospitals include Bangkok Metropolitan area about the technical aspects,their activities and network of eradication

b.emphasize the completeness and timeliness of the AFP reports including zero reporting from the hospitals and the appropriate stool collection and transfer (AFPcase includes under 15y-o)

c.reorientate the Provincial Chief Medical Office (PCMO) staffs and the Communicable Disease Control Division staffs of BMA about eradication plans and assign them to be the centers of all activities in their catchment areas

d.thePCMO and BMA staffs investigate AFP cases follow by outbreak response and follow-up

e.the technical advisory group and the regional General Communicable Disease Center teams review,monitor and supervise surveillance activities monthly

4.strengthen the immunization coverage by:

a.identify high risk areas and use the mobile teams vaccination to increase the OPV4 routine coverage

b.emphasize the immediate outbreak response immunization for AFP cases to cover at least district level

c.conduct the regional immunization mopping-up for the regions having confirmed cases

d.try to sustain the high vaccine coverage along the border

5.conduct training courses and research if necessary

The modification of polio eradication program can be implemented nation-wide if the National EPI Committee accepted. But the reporter can modify the plan for implementation in region10 in1994.There is the possibility to eradicate wild type polio cases from the reporter's region in1996.

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# COUNTRY REPORT

1. Title of seminar: seminar on polio eradication, its theory and practice.

2. Name of participant: THANH KIM DUNG.

3. Participant's position: Medical doctor responsible for polio surveillance - National Institute of Hygiene and Epidemiology Hanoi.

4. Orgnizational structure in participant's country, dealing with poliomyelitis:

Vietnam has total population of 70 millions 1993. Every year about 2,0 million newborn need to be immunized in the country. There are 53 provinces. which consists of 557 districts (10.001 communes and wards) locates in 4 regions in the whole country (Northern, Central, West Highland and Southern).

Organizational structure of health service, dealing with EPI and polio eradication is shown in flow chart. All EPI/polio eradication activities are coordinated by Ministry of health at National and Health services at provincial/districts/communal levels. There are some National and regional Institutes, which are responsible for technical aspects of the program (laboratory diagnosis, vaccine production...)

The country began its EPI acceleration in 1985 with objectives to reach the 80% coverage for children under 1 and reduce morbidity of 6 target childhood diseases. Two immunization strategies are implemented: Regular immunization (immunization session is organized once every week/2 week or month) which now takes up 80% of total number of communes; Compare immunization is organized in Winter - Spring period of the year mainly for the remote mountainous areas.

Up date more than 95% of communes in our country are carrying out EPI. Three national EPI reviews were held in 1985, 1987, 1989 and May 1992 with the participation of national health authority and WHO, UNICEF.
Immunization coverage of children under 12 months and Pregnant Women was presented in table 1.

5. Current status of national polio eradication program.

5.1. Incidence of AFP during the last few years in the country is about 1.0-2.0 cases/100,000 children < 15 years old with varies at different regions/provinces. Every year about 600-700 cases of AFP are reported in the whole country. In order to implement activities of polio eradication program by 1990-1995, 53 provinces in the country were classified according to the 4 staging system of WHO. Epidemiological surveillance of EPI target diseases is carried out by existing Hygiene and Epidemiology network. Staff from each province receive notification of AFP cases conduct case - investigation and follow-up visits, collect stool specimens, and send

investigation forms and monthly reports to regional and central level. Surveillance staff are notified of AFP cases by health workers from lower levels or by hospitals were a case has been admitted. Line listing registers are kept in each district and province, and the monthly reports include identification and simple information on each case in a line-listing format.

There fore, information on each case at regional or central level comes from case-investigation forms or from the monthly reports, complete case investigation forms are sent to regional level after follow-up has been completed, or after 3 months if no follow-up.

When cases have been admitted directly to a regional/central hospital the initial investigation is conducted at the hospital and information referred to the province for follow-up.

In addition to this routine surveillance system, a special, hospital based reporting system had been established in 1990, where district and provincial hospitals have reported new cases monthly directly to the central level.
Following is the summary of 1992 surveillance data:

In the 1992, 677 cases of AFP have been reported, and 97% were investigated (compared with 57% in 1991), 308 cases or 47%, submitted at least one stool specimen. Among 659 cases for with information is available, 554 were confirmed: 273 by residual paralysis, 65 by death, and 216 by lost-to-follow-up. There were 49 cases confirmed by wild virus isolation. However, of 554 confirmed cases, 167 had a positive poliovirus isolate. 86 cases were discarded, and 13 remain pending, with positive poliovirus isolate but no other confirmation criteria. Cases were reported from 42 of 53 provinces, with 70% of cases occurring in the Southern province. Cases were confirmed in 210 of 557 districts. Cases occurred all year round with apeak from April to July 79% of cases were less than 4 years of age, and 14% were less than year of age. Among cases 1-4 years of age, 51% had received zero doses of OPV, and 26% were fully immunized. Overall. completeness of monthly routine reports by districts was approximately 50%

5.2. Clinical diagnosis of the disease:
Poliomyelitis cases are clinically diagnosed mainly hospitals and so it depends a lot on experience, skills of medical staff of each hospital.

5.3. Laboratory diagnosis of the disease polio laboratory diagnosis is carrying out only in 2:
- National Institute of Hygiene and Epidemiology Hanoi.

- Pasteur Institute Ho Chi Minh City laboratory limit is due to the problems in relation with stool specimen collection and the lack of capacity of our laboratories, to perform intra-typic differention.

5.4. Vaccine supply and its quality control:

There are to sources of OPV supply in the country.
- Local vaccine production at National Institute of Hygiene and Epidemiology Hanoi.

- Imported (donated) OPV from International Organizations, UNICEF, ROTARY

international etc...

National centre for vaccine quality control is the Institution responsible for vaccine quality control. Further efforts will be required to provide technical cooperation as well as donor coordination for the improvement of vaccine manufacturing facilities such as national inst of hygiene and epidemiology, inst of vaccine production Nha Trang and Pasteur institute Ho Chi Minh city.

5.5. Vaccination program-routine and vaccination days.

The routine immunization program is composed by 3 basis TOPV doses at 8, 12 and 16 weeks of age. In some big hospital in cities the program includes a zero dose of TOPV at birth. TOPV used for EPI is stored at regional institutes of Pasteur in freezing rooms and it is distributed to the provinces according to their monthly need. TOPV can be keep at provincial centers of hygiene and prophylaxis for 3 months. Commune health centers should be received vaccines just before immunization session by cold chain equipments like cold boxes/vaccine carrier from district level. The problem of cold vaccine storage is remained in remote mountainous areas.

As mentioned above the vaccination in the country up date did not cover 90% of the under 1 old, although because of EPI acceleration many provinces are attaining coverage of more than 80% with TOPV3. (in 1992, more than 80% of districts had coverage higher than 80% for children fully immunized before one year of age) coverage among the children in 1-4 years cohort or older children still remains low, leaving a backlog of susceptible children unimmunized. There fore efforts must be made to provide maximal immunization to children under 1 and those older children through vaccination days.

Due to the lack of TOPV in 1992 only the sub NTDs was conducted in eight high-sisk provinces out of 53 province clouding Hanoi and Ho Chi Minh City.

5.6. Target year of eradication in your country

Since 1991 the government of Vietnam implemented its activities toward the goal of polio eradication by the year 1995 as the same the target year of polio eradication in the western pacific region of WHO.

5.7. The total target population represented 1.4 million children less than 3 years of age, 23% of the country's total in that age group. Two rounds have been conducted between September and November OPV was the only antigen administered during the immunization days.

In 1993, which the supper of OPV the first NIDs will be conducted for all children < 5 regard less their status of previous immunization during 13-15/ November and 18-20/ December in every provinces in the whole country. Beside these 2 doses of OPV children should also receive Vit.A

**6. Estimate of quantity of the vaccine required during 1992-1995 (in 1,000 doses).**

| Vaccine | 1992 | 1993 | 1994 | 1995 |
|---|---|---|---|---|
| BCG | 4,500 | 4,570 | 4,590 | 4,630 |
| DPT | 10,500 | 10,600 | 10,650 | 10,740 |
| OPV (*) | 36,000 | 36,200 | 36,500 | 36,600 |
| Measles | 3,500 | 3,530 | 3,550 | 3,580 |
| TT | 4,000 | 5,800 | 6,670 | 6,740 |

(*) Including need of vaccine for supplementary immunization activities, ie NIDs.

**7. Problems being encountered in the participant's country when the activities mentioned in 5 are being carried out.**

There is a problems with supply of equipment to improve of laboratory diagnosis network. There is a problem in ensuring that appropriate specimens are collected, packed, labelled, stored and despatched from districts for laboratory diagnosis at regional level.

There is a problem due to poor communication insufficient demographic data, electric supply in remote areas.

**8. Anyy special remarks.**

Necessary strategies for improvement EPI and polio eradication.
- Raise and sustain immunization coverage to 90% in every district by routine EPI and NIDs.

- Provide good potency vaccines up to children at every immunization posts.

- Conduct appropriate disease surveillance.

- In volent of messmate, such as radio, TV programs, film, printed educational and propaganda materials and other non-health service sectors (educational system, Women union...) in program activities. The role of EPI committee with participation of local authority at each level is highly appreciated for good program performance.

Table 1

COUNTRY: VIET NAM

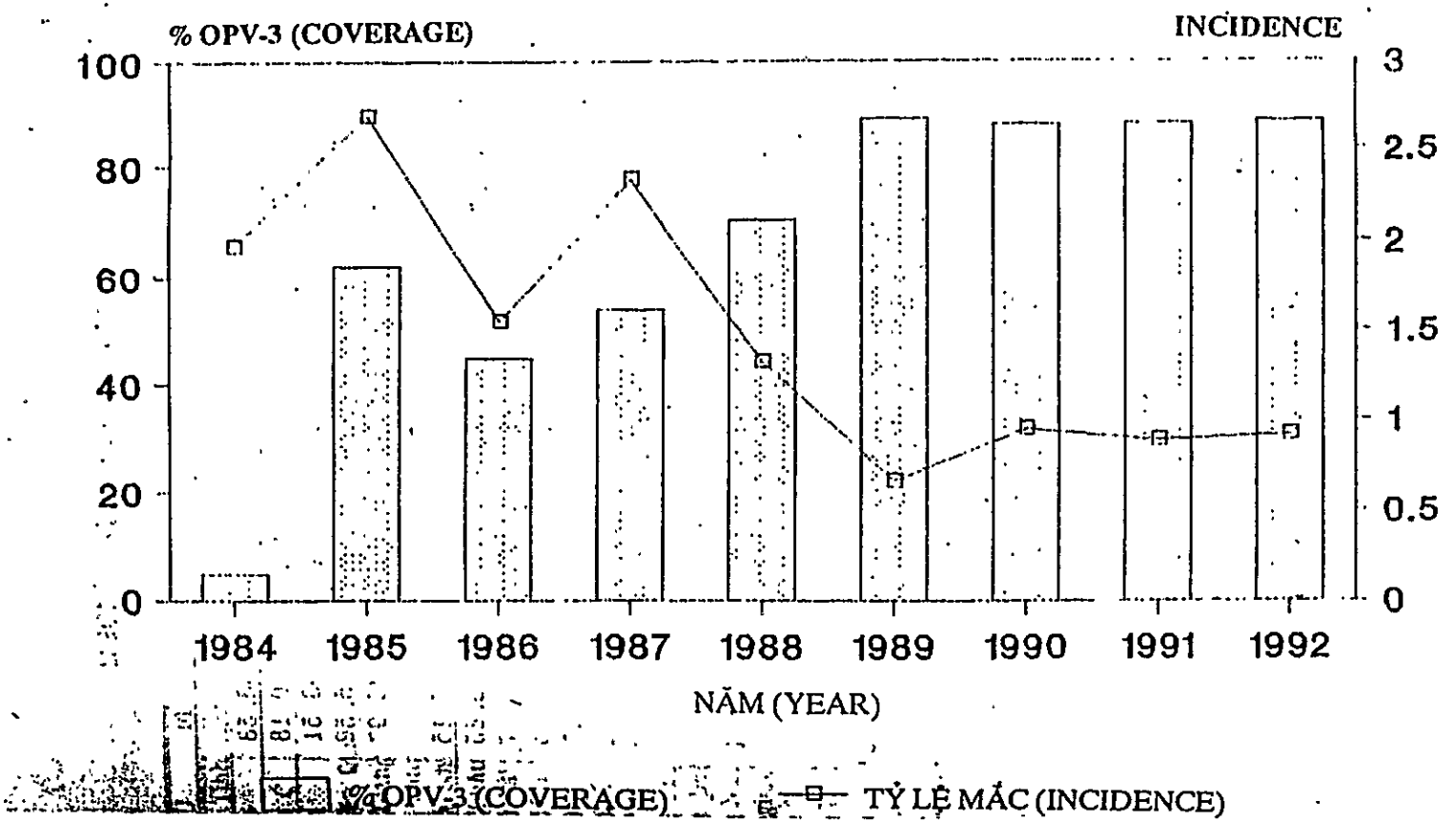
1A IMMUNIZATION COVERAGE BY 12 MONTHS OF AGE AND TETANUS TOXOID 1990-1992

| VACCINE | 1990 | 1991 | 1992 |
|---|---|---|---|
| BCG | 90.50 | 91.17 | 91.23 |
| DPT3 | 87.92 | 87.60 | 88.11 |
| OPV3 | 87.92 | 87.98 | 88.56 |
| MEASLES | 88.02 | 88.34 | 89.69 |
| F.I.C. | 86.24 | 87.47 | 88.58 |
| TT2+ (PREGNANT WOMEN) | 22.00 | 14.08 | 35.00 |
| | | | |

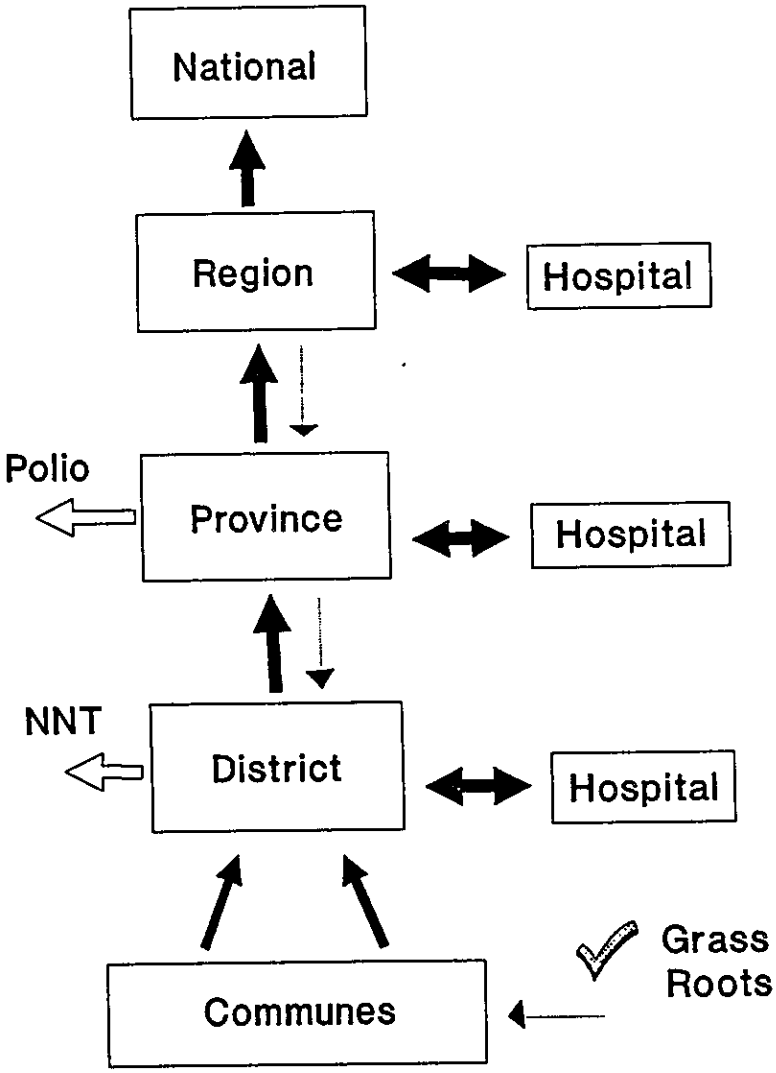
Table 2

## TƯƠNG QUAN GIỮA TỶ LỆ OPV3 & BỆNH BẠI LIỆT

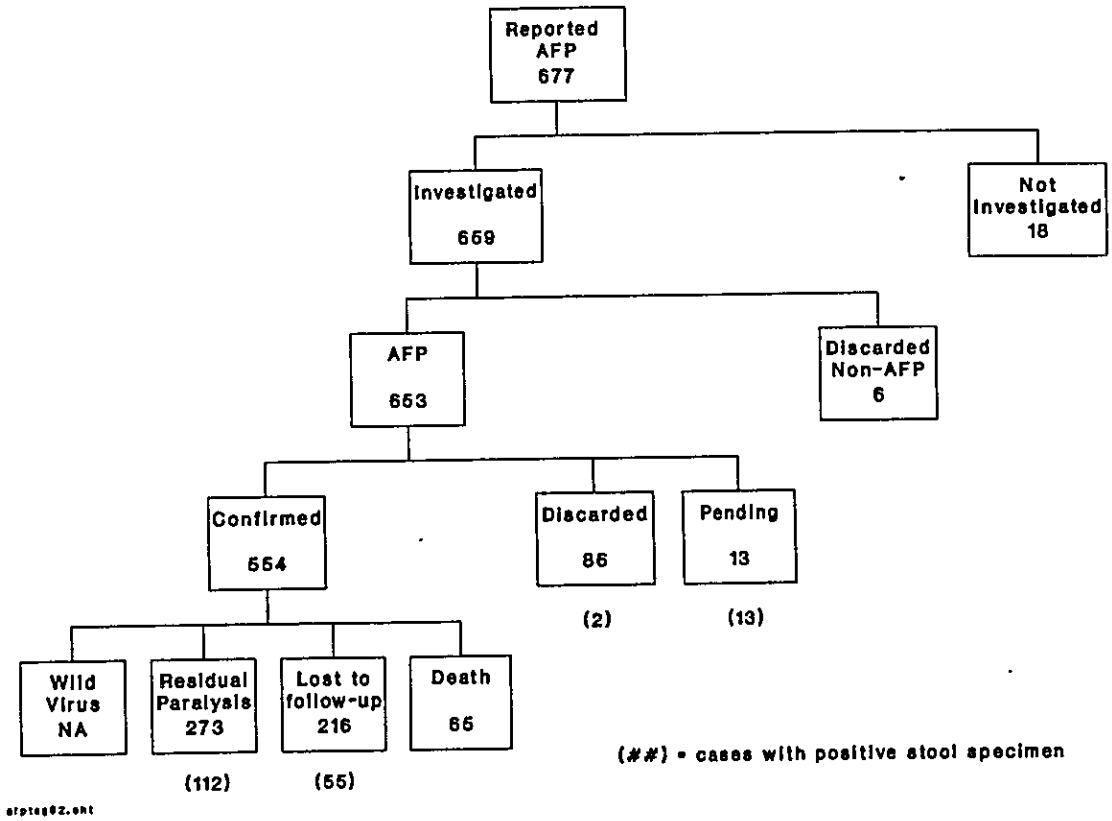
### CORRELATION BETWEEN POLIO INCEDENCE AND OPV-3 COVERAGE 1984-1992



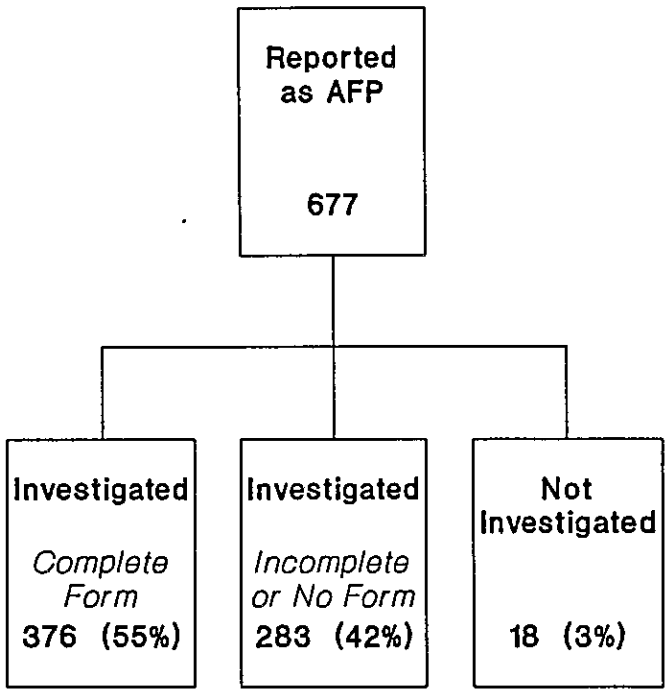
# Surveillance Channels



# Status of AFP Cases, Vietnam, 1992



# Investigation Status of AFP Cases Vietnam, 1992

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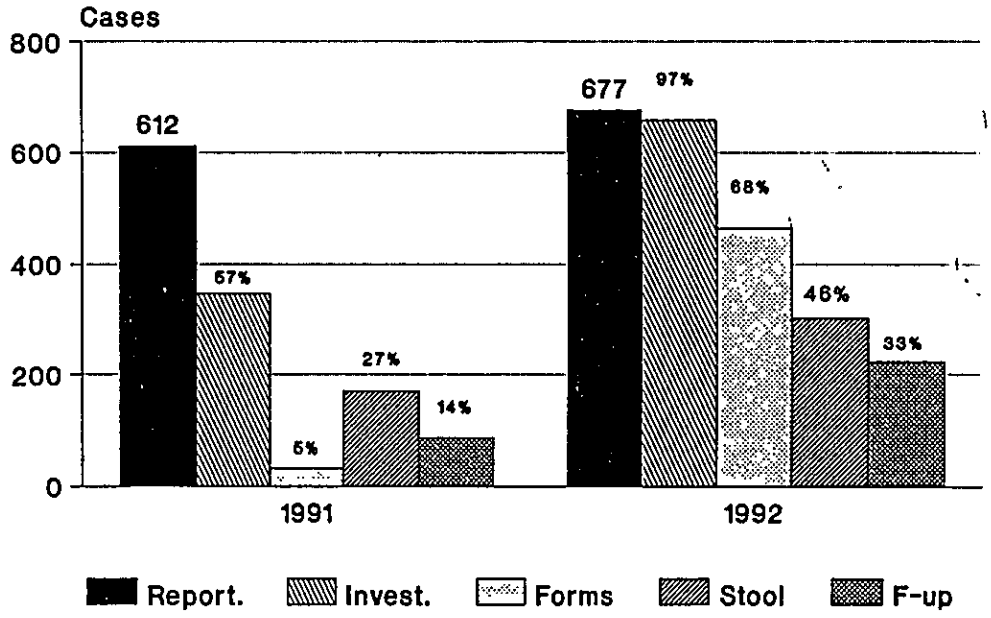
# Completeness of Investigation
# Vietnam, 1991-1992

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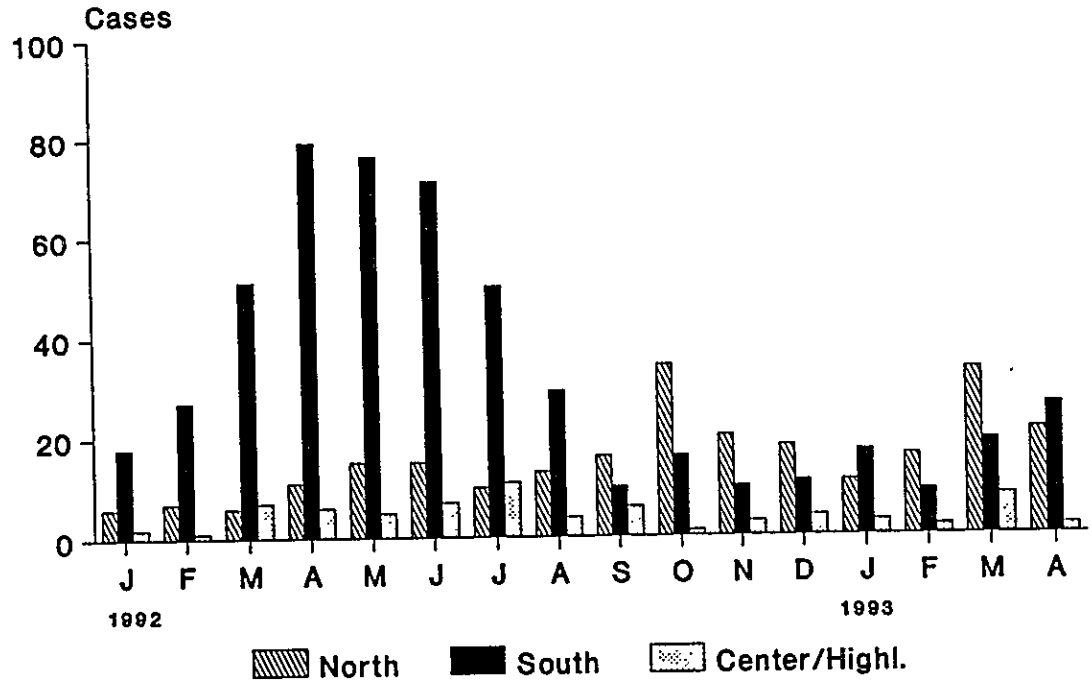
# AFP Cases, by Month of Onset
# Vietnam, 1992

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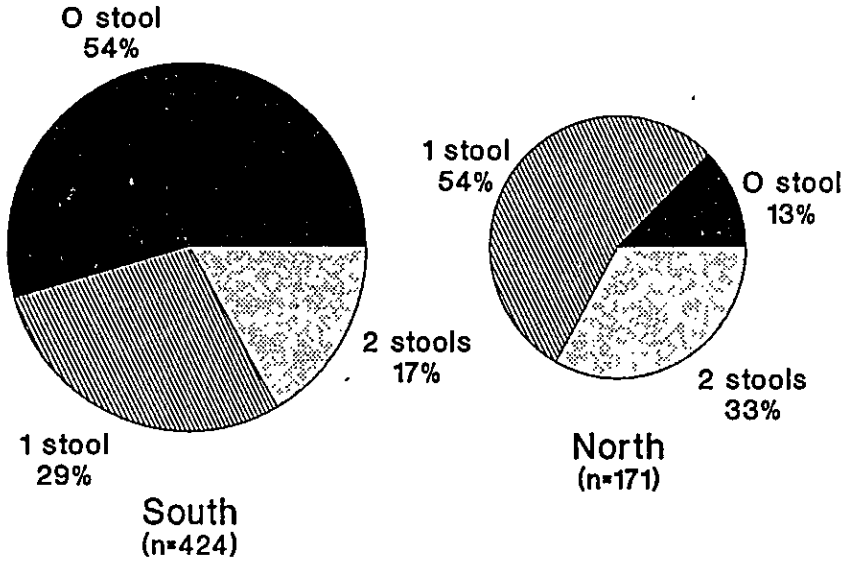
## Completeness of Stool Collection by Region, Vietnam, 1992

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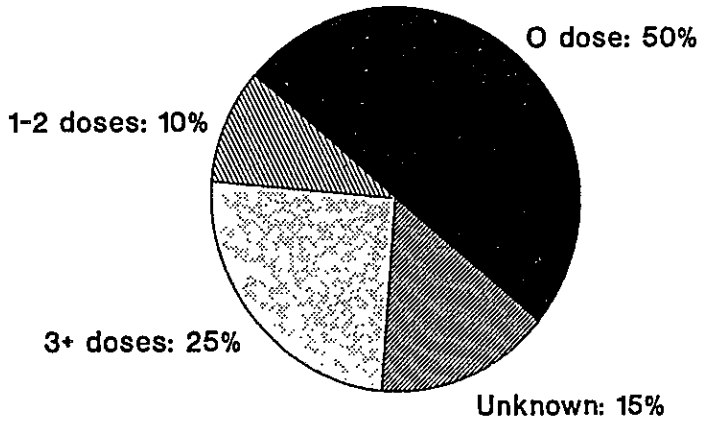
## OPV Status of Confirmed Polio Cases
## Age = 1-4 years (n=372)
## Vietnam, 1992

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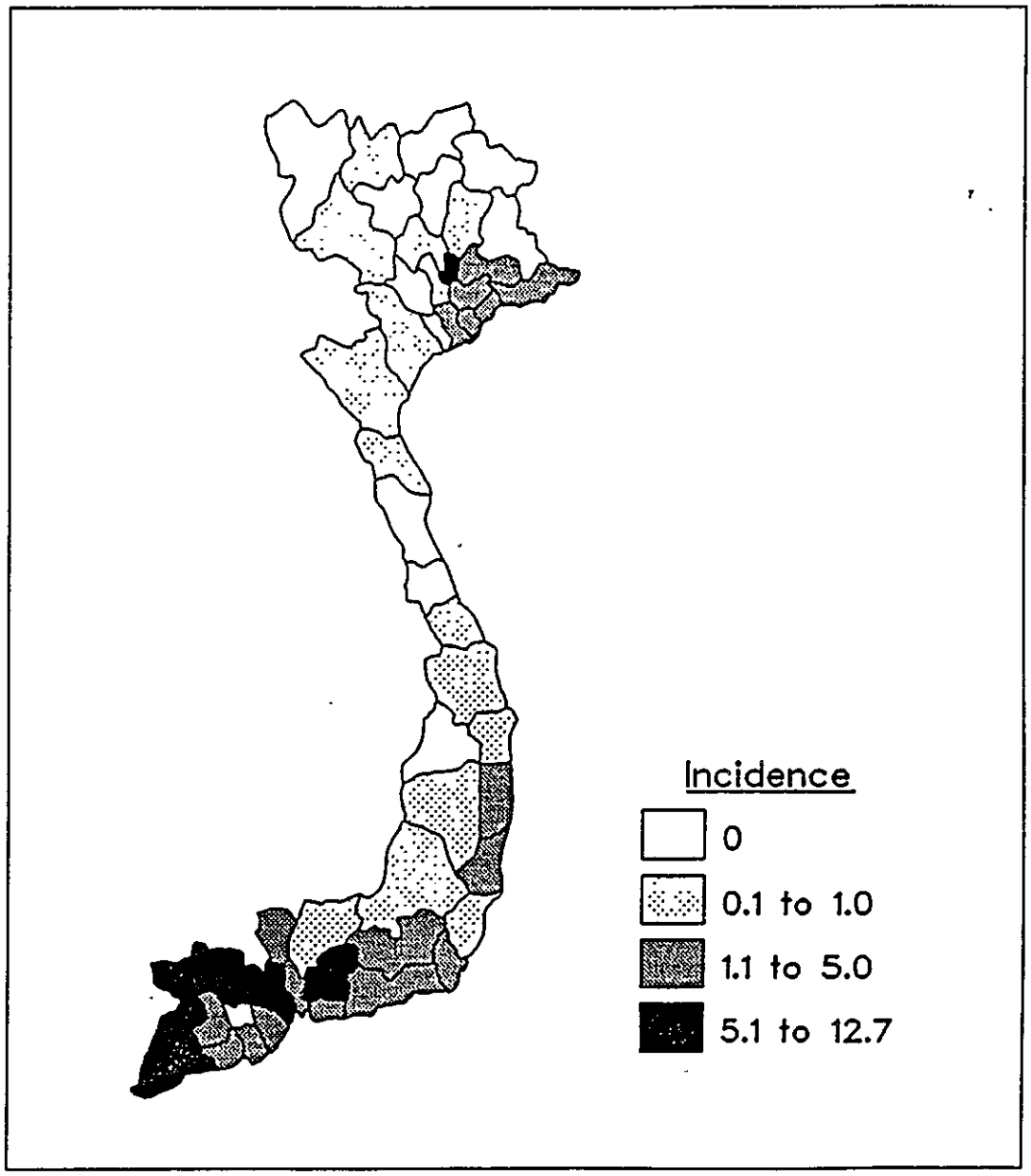



**Reported Cases of Acute Flaccid Paralysis per 100,000 children less than 15 years, Viet Nam, 1992**

Participant's Name: Dr. Thanh Kim Dung

Position: Epidemiology Doctor
Department of Epidemiology
National Institute of Hygiene and Epidemiology

Introduction:

Vietnam has a total population of 70 million in 1993. Every year about 2.0 million newborns need to be immunized in the country. There are 53 provinces, which consist of 557 districts (10.001 communes and wards) located in 4 reegions in the whole country (Northern, Central, Western highland and Southern). All EPI/Polio Eradication activities are coordinated by Ministry of Health at the national and Regional Institutes which are responsible for technical aspects of the program (Laboratory diagnosis, vaccine production).

Based on recent data, incidence and immunization coverage (as of 1988) - my country is classified as Stage C country in terms of implementation of polio eradication activities in Western Pacific Region WHO. Since 1991 the government of Vietnam implemented its activities toward the goal of polio eradication by the year 1995 as the same as the target year of polio eradication in the Western Pacific Region of WHO. Updated polio eradication program was conducted in collaboration with WHO field staff. The seminar on Polio Eradication is very helpful for me in planning and implementation of polio eradication program in 1994-1995, evaluation after 1995.

General views on the seminar

- polio eradication programme should have "special actions" and the external support is essential for eradication

- Each National/Regional/Provincial. . . programme must have an administrative structure and pattern of operations compatible with its own health and socio-cultural structure/ characteristics. The following are description of how lessons learnt from the seminar would be utilized to promote the National Polio Eradication Programme:

1. IMMUNIZATION COVERAGE:

- It must be more than 90% of all susceptible age group children in every district, especially in high population density areas in order to interrupt virus transmission.

- The routine immunization for all children under one year should be strengthened to achieve more than 90% coverage of TOPV3.

- In 1993 we had the first NIDs for all children less than 5 years at 13-15 November and 18-20 December in every province in the whole country. Beside these two doses of OPV. to achieve good results = 90% coverage and continuation in 1994, 1995.

2. SURVEILLANCE:

All districts, provinces should carry the following activities:

- immediate reporting of cases through telephones
- monthly reporting of cases from every district. For this purpose, the WHO standard case definition must be applied
- conducting outbreak investigation should be done by local health staff within the framework of the general epidemiological surveillance.
- collecting stool specimen from new cases and sending them to laboratory of National Institute of Hygiene and Epidemiology Hanoi or laboratory of Pasteur Institute in Ho Chi Minh City

In addition special surveillance team on the National/Regional level have the following main duties:

* Conduct active search for cases
* Conduct outbreak investigation with appropriate measures
*Laboratory diagnosis follow-up
*Computerized EPI information, polio surveillance system should be based on good data collection and reporting from district of polio eradication/EPI program

3. VACCINE SUPPLY AND QUALITY CONTROL

There are two sources of OPV supply in the country.

- Local vaccine production at National Institute of Hygiene and Epidemiology Hanoi.

- Imported (donated) OPV from International Organizations, UNICEF, Rotary International (RI), etc.
  Estimate of quantity of vaccine supply required from 1994-1995 ( in 1,000 doses)

| Vaccine | 1994 | 1995 |
|---|---|---|
| BCG | 4,590 | 4,630 |
| DPT | 10,650 | 10,740 |
| OPV* | 36,500 | 36,600 |
| Measles | 3,550 | 3,580 |

(*) Including needs of vaccine for supplementary immunization activities, NIDs.

4. TRAINING:

Special training courses on polio surveillance, outbreak control and reporting are urgent needs for all health staff, in-service of polio eradication. Polio eradication subject should be included in the current curriculum for post-basic training of health workers as well as for medical school and mid-level medical school. Folding polio picture, other training material and polio field manuals/brochures should be prepared and distributed to all health facilities, especially for peripheral health centers. Training for other non-health service sectors is also needed for active surveillance.

Country Report

1.Title of seminar:Seminar on polio eradication,its theory and practice.

2.Name of participant:Zhou Jun

3.Participant's position:

4.Organization structure in the participant's country, dealing with national poliomyelitis eradication programme:

(See attachment page I--II)

5.Current status of national polio eradication programme.

5.1 Introduction

After the Western Pacific Regional Office of World Health Organization and The Forty-first World Health Assembly adopted resolutions on poliomyelitis eradication by the year 1995 and the year 2000 respectively in 1988, China set the goal of polio eradication by 1995, and developed a national plan of action accordingly.

---- China is administratively divided into 30 provinces, autonomous regions and municipalities(excluding Taiwan province). These are further divided into 334 prefectures, 2831 rural counties and urban districts, 58,000 townships and finally divided into 776,000 villages.

---- According to the 1990 population census, the total population of China is 1.13 billion with 80% in rural areas. The provincial population ranges from 2 million in the sparsely populated province to over 100 million in the most densely populated one. The birth rate was 20/1000.

---- The country has a total area of 9.6 million square kilometres, of which 2/3 are mountainous areas, plateaus, or highlands.

5.2 Incidence of poliomyelitis

---- According to reported statistics,there was a annual average of more then 20,000 cases in the 1960's and an average of almost 13,000 cases per year in the 70's.

---- In the 80's, following the widespread use of OPV, large outbreaks of polio became infrequent, with the overall incidence of disease declining to approximately 0.05 cases/100,000 population in 1988 (667 cases). In 1989 and 1990, however, epidemic recurred throughout China,with nearly 10,000 cases reported over the two-year period.

---- For 1992, 1372 polio cases reported, compared to 1991(1926 cases), the number of polio cases declined 554 cases in 1992 , but the number of cases in 1992 is still not down to level of reported cases in 1987 and 1988 (Table1).

4. Organization structure in the participant's country, dealing with national poliomylitis eradication programme:

Because the eradication of polio in one task of EPI, all work related to it should be conducted by the organization of EPI.

A national EPI coordination committee has been set up at central level comprising of officers of 9 ministries commissions and mass organizations including the Ministry of Public Health, the State Education Commission, the All China Women's Federation, the State Nationalities Affairs Commission, Ministry of Radio, Film and TV, the All China Disabled Person's Federation, the State Management Bureau, Ministry of Foreign Economic Relations and Trade etc. The committee is responsible for the organization and coordination of social mobilization activities. EPI leading groups or coordination groups comprising of staff from health, finance, education, women's federation and culture department, etc. have been set up at each level of local governments and the immunization programme as an important task has been placed on the governmental agenda.

-- The Department of Epidemic Prevention of the Ministry of Public Health is in charge of leading, formulating of programme and evaluation of eradication of Polio nationwide, and health administrative sections of all areas are in charge of the tasks in responsible areas.

-- An EPI Expert Advisory Committee under the Ministry of Public health has been set up and held meeting regularly to discuss the progress of the implementation of EPI programme so as to give some advices and suggestions for improvement timely.
The Techincal Advisory Group of Eradication of Polio is one part of EPI Technical Advisory Committee comprising of epidemiologist and experts on production and inspection of vaccines, laboratory diagnosis, infections disease, pediatrics and neurology which is responsible for determination of the epidemics of polio, recommendation of suitable strategy and assistance of evaluation for the eradication polio, under the leadership of the Ministry of Public Health of China, with close cooperation of national diagnostic center and epidemic surveillance center.

-- A National Instructive Center for EPI has been set up in the Chinese Academy of Preventive Medicine and responsiable for the surveillance of polio, and analysis on the cause of outbreak of the disease in China, and provide polio information to the Ministry of Public Health for formulation of strategy. The center further divided into national center for polio epidemic surveillance and national center for diagnosis of polio which are responsible for guide of epidemiology and laboratory, methodology, manpower training, methodological and laboratory study, and treatment of difficult problems.

-- Same functions are carried out by the Technical Advisory

(Attachement page I)

Table I

Incidence of poliomyelitis case, China 1960--1992

| Year | No. of cases | Year | No. of cases |
|---|---|---|---|
| 1960 | 15,799 | 1976 | 4,645 |
| 1961 | 10,332 | 1977 | 7,413 |
| 1962 | 9,044 | 1978 | 10,353 |
| 1963 | 36,383 | 1979 | 5,520 |
| 1964 | 43,156 | 1980 | 7,741 |
| 1965 | 28,970 | 1981 | 9,625 |
| 1966 | 23,859 | 1982 | 7,741 |
| 1967 | 10,310 | 1983 | 3,296 |
| 1968 | 11,313 | 1984 | 1,626 |
| 1969 | 12,370 | 1985 | 1,573 |
| 1970 | 20,879 | 1986 | 1,844 |
| 1971 | 18,324 | 1987 | 969 |
| 1972 | 23,271 | 1988 | 667 |
| 1973 | 17,533 | 1989 | 4,628 |
| 1974 | 11,070 | 1990 | 5,065 |
| 1975 | 7,815 | 1991 | 1,926 |
| | | 1992 | 1,372 |

1372 polio cases reported in 1992, among which mostly cases occurred in children less then 36 months (table 2) and 63% of confirm polio case had received zero or 1 dose and only 18% had received 3 doses (table 3).

Table 2 Age distribution of confirmed polio cases 1992

| Age | No. of cases | % |
|---|---|---|
| 0-11 mo | 377 | 30 |
| 1 year | 531 | 43 |
| 2 year | 182 | 15 |
| 3 year | 59 | 5 |
| 4 year | 32 | 3 |
| 5-9 years | 40 | 3 |
| 10-14 years | 12 | 1 |
| 15+ years | 6 | 0.5 |
| Missing | 66 | 5 |

Table 3 Vaccination ststus of confirmed polio cases 1992

| Vaccination status | No. of cases | % |
|---|---|---|
| 0 doses | 606 | 44 |
| 1 doses | 255 | 19 |
| 2 doses | 128 | 9 |
| 3+ doses | 245 | 18 |
| Missing | 138 | 10 |

---- Three provinces reported zero cases in 1992. They are Beijing and Shanghai municipalities and Tibet autonomous region. But the sensitivity of reporting in Tibet is unknown.

In 1992,there were high rates in the sparsely populated northern and western provinces. In 1991 one western province--Xinjiang autonomous region-- had a very high rate of polio and the next year in 1992 another province--Qinghai Province--had one of the highest rates. These areas have minority populations and the coverage is low. Low-polio area in the middle of country has the highest population density. In the 5-provinces cooperative effort,consist of Shandong, Henan,Jiangsu,Anhui and Hebei

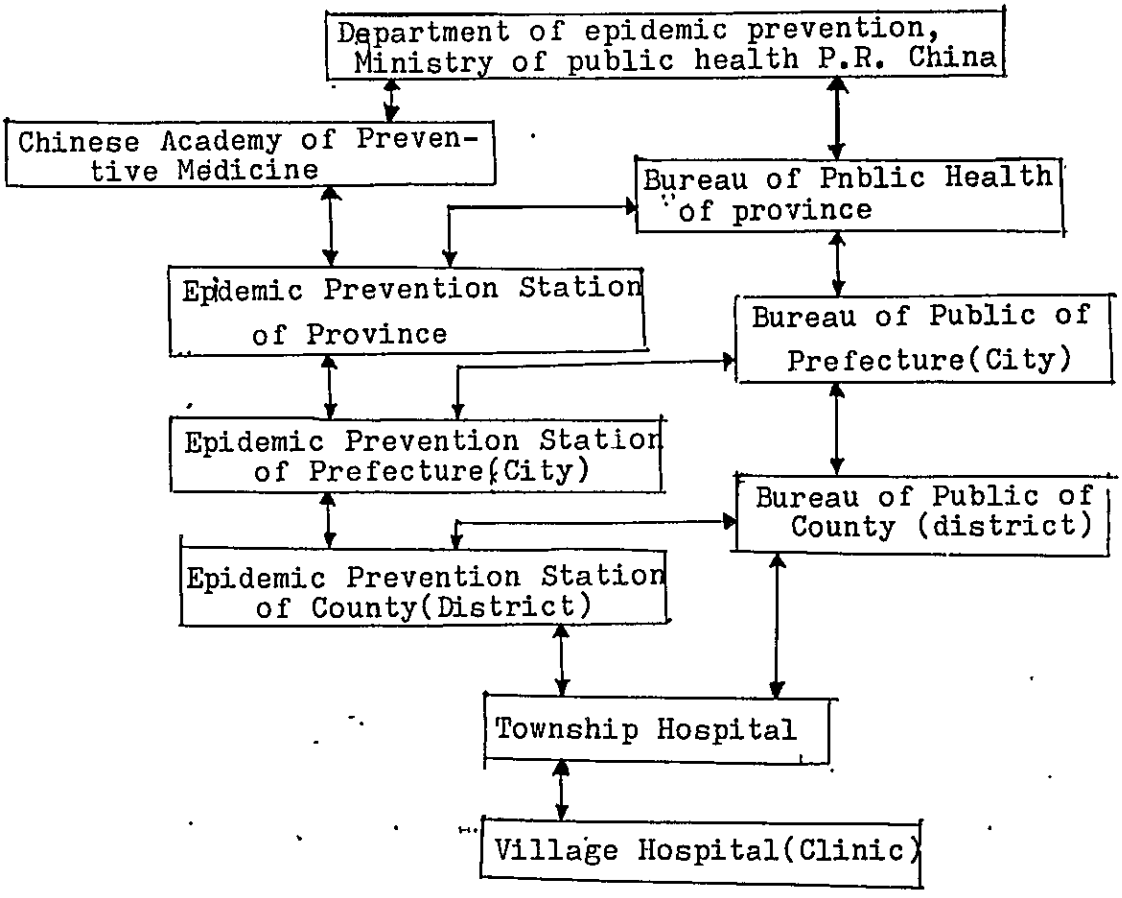
Group at provincial level, which consists of experts with the same special field as those in the national group.

-- The surveillance groups of special laboratory in the Epidemic Prevention Station (EPS), which are responsible for formulation of the implementation of the scheme, manpower training, technical guide, surveillance and analysis of epidemic situation, investigation of outbreak and isolation, and classification and sero-typing poliovirus.

-- EPS of prefecture and county are responsible for implementation of programme, report of polio cases, control outbreak, investigation of cases and manpower training for township hospital.

-- Medical care center of township and street, health section of city hospital and health center of village are responsible for provision of immunization, report of cases of communicable diseases and assistance of implementation of controlling outbreak.

ORGANIZATION STRUCTURE




(Attachement page II)

Table I

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---- Three provinces reported zero cases in 1992. They are Beijing and Shanghai municipalities and Tibet autonomous region. But the sensitivity of reporting in Tibet is unknown.

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provinces, supported by JICA, had a decrease in rate of confirmed polio from 1991 to the present. It is a real achievement to get all of these provinces to low rates of polio (Figure 1).

It is very important to note that only two provinces accounted for 43% of the 1,372 polio cases in 1992--Jiangxi Province with 301 cases and the one of the wealthiest province, Guangdong Province, with 277 cases.

---- The number of counties reporting confirmed cases of polio decrease 25% from 657 counties in 1991 to 429 counties in 1992. The number of rural counties reporting confirmed cases was 402 which is 20% of all rural counties in 1992.

83% of the cases were from rural counties and the rate of reported polio cases from rural countries in 1992 was 0.16 per 100,000 total population or 2.2 times higher than the rate of reported polio cases in urban areas.

5.3 Polio surveillance

Up to now China has two surveillance systems reporting polio cases. One is the routine notifiable diseases system which provinces use to report count or summary information on 36 notifiable disease by county monthly to the national level. The second system is the acute flaccid paralysis (AFP) reporting system. WHO standard cases definition has been used for diagnosis of suspected and confirmed polio cases.

---- The AFP reporting system composed of all Epidemic Province Station (EPS) in the country has been established since 1991. There are designated people responsible for AFP surveillance information and required to submit AFP reports every ten days at each level EPS. The content reported by AFP system include AFP case's age, sex, vaccination status, stools collected etc. On the July last year, most provinces's computer terminal has been connected with that of Chinese Academy of Preventive Medicine (CAPM) in Beijing. The surveillance work became more and more standardized and systematic (Figure 2).

---- AFP surveillance. A total of 2488 AFP cases were reported in 1992, among which 1372 confirmed, 1116 discarded. There are 313 million children 0--14 years old in China. From Jan. to Nov. 1993, there are 1609 AFP cases reported, among which 252 confirmed, 297 discarded, and 1060 pending. Rate of non-polio AFP was 0.36 per 100,000 children less then 15 years old. Most provinces, in fact, only suspected cases of polio are being reported and not all children less than 15 years with acute paralysis, especially in children 5 to 14 years old. The average rate of reporting non-polio AFP is not achievement a rate 1 non-polio case per 100,000 children less than 15 years in China.

5.4 Laboratory

In order to strengthen capability of laboratory diagnosis of polio, the laboratory network composed of national laboratory and all provincial polio laboratories has been established. proficiency testing of 29 provincial laboratory has been conducted since 1991. Results show that almost all provincial laboratories are capable of isolating and serotyping poliovirus.

Through the active surveillance for AFP in each county, the stool collection rate will increased and the proportion of confirmed polio cases by virus isolation will be increased. At present the national laboratory has been identify whether the poliovirus is of wild or vaccine strain origin.

From stool collection to differentiation of poliovirus in 1992 are as described in figure 3.

5.5 Vaccine supply

There are two vaccine manufacturers in China which produce trivalent oral polio vaccine and annual supply of OPV in China is around 325 million doses. Although the provinces purchased a total of 250 million doses OPV for routine immunization and supplementary immunization activities with our own funds in 1993, there was a total of 75 million doses OPV of locally produced will not was purchased with our funds due to fund shortages. A total of 32 million doses of imported OPV has been provided to China for National Immunization Day (NID) by Government of Japan and JICA in 1993. Another a total of 2.2 million US$ was provided by international organizations to purchase OPV.

Table 4 Vaccine supply in 1993

| AVAILABLE OPV SUPPLY | TOTAL (IN THOUSAND DOSES) |
|---|---|
| All provinces of China | 250,000 |
| Government of Japan | 25,400 |
| JICA | 5,800 |
| Agency Cooperation Health International in JICA | 3,400 |
| Rotary, Japan | 40,680 |
| Rotary International | 41,000 |
| UNICEF | 9,000 |
| Total | 375,280 |

5.6 Vaccine quality control

There is a centre for vaccine quality control in the country level responsible for the quality checking of OPV produced by two vaccine manufacturers. All the vaccines produced locally meet national standards but not the WHO requirements due to poor thermostability or lack of GMP. In addition, OPV in the form of dragge is considerably more difficult to administer compared with liquid vaccine.

5.7 Vaccination programme-- routine immunization

---- Immunization schedule

| Age | Vaccine |
|---|---|
| Birth(or soon after) | BCG |
| 2 months | OPV1 |
| 3 months | OPV2, DPT1 |
| 4 months | OPV3, DPT2 |
| 5 months | DPT3 |
| 8 months | measles-1 |

| | |
|---|---|
| 18-24 months | DPT4 |
| 4 years | OPV4 |
| 7 years | BCG2, measles-2 |
| 12 years | BCG3 |

In some areas at high risk for poliomyelitis, a dose of OPV at birth has been added to the schedule, and some areas include fourth and fifth doses of OPV.

---- Vaccination services are provided routinely in the urban areas and in some of the rural areas by health workers from medical facilities or designated centres. Regular EPI services (daily,weekly and monthly) cover about 44% of the total population. EPI services to vast rural areas are provided on bimonthly or quarterly basis by health workers from township hospitals and villages clinics to children at designated places.

---- National EPI reviews were jointly conducted by the Ministry of Public Health, UNICEF, WHO and JICA in 1988, 1991 separately. The result shows ~~separately~~ that routine immunization coverage rate among 12-month-old children achieved over 85% in every province in 1988 and achieved over 85% in every county in 1990 in China.

5.8 National Immunization Days (NIDs)

As you know,the purpose of supplementary immunization is rapid interruption of wild poliovirus transmission. It is one of key strategy for polio eradication. Supplemental vaccination activities in China have included administering one or two extra doses of OPV to young children (generally those aged <4 years) at 1-2 month intervals during the low-incidence season for polio (i.e, December - March).

---- The number of provinces conducting the WHO-recommended two rounds of supplemental vaccination activities during low-incidence season increases from six of 30 during 1991-92 to 25 provinces during 1992-93. The number of supplemental doses of OPV administered during the low incidence season increased from 71 million during 1990-91 to 186 million during 1992-93. In 1993 there was no characteristic summertime seasonal increase in reported cases during Jan. to Nov. 1993 (Figure 4).

---- In Nov 1993, with the approval of the State Council of China, December 5-6 and January 5-6 every year during 1993 to 1995 are National Immunization Days. The target population is all children less than 4 years of age, regardless of prior vaccination history. The Ministry of Public Health formulated and promulgated the " A Plan For National Immunization Days". A international review team inspected the preparations for NID in 14 provinces in Nov 1993.

---- President Jiang Zemin and other state leaders participated in the first round of national supplemental vaccination activities in Dec.1993 and administered OPV to children. The media, i,e, TV, radio and newspapers disseminated NID and poliomyelitis knowledge by conducting all sorts of health education activities.

5.9 Target

The goal of eradicating polio from the Western Pacific Region of WHO by 1995. China has committed to eradicate paralytic poliomyelitis cases cause by the wild poliovirus by 1995.

6. OPV requirements during 1994-1995.

Approximately 160 million doses of OPV will be need annually for routine immunization. According to the Plan for NIDs , 250 million doses of OPV will be required annually in 1994-1995 for NID. The estimated OPV requirements were as presented in the tables below:

Table 5 (In millions doses)

| OPV | 1994 | 1995 | TOTAL |
|---|---|---|---|
| Routine OPV | 160 | 160 | 320 |
| NIDs | | | |
| Optimal NID (1) | 310 | 310 | 620 |
| Minimum NID (2) | 250 | 250 | 500 |
| ORI Requirement(3) | 40 | 40 | 80 |
| Total Optimal | 350 | 350 | 700 |
| Total Minimum(4) | 250 | 250 | 500 |
| Total(Optimal) | 510 | 510 | 1,020 |
| Total(Minimum) | 410 | 410 | 820 |

Notes:

(1) NID (Optimal requirement): 2 doses of OPV for all children less than 5 years of age (national figures).

(2) NID (Minimum requirement): 2 doses of OPV for all children less then 4 years of age (national figures).

(3) Outbreak Response Immunization (ORI) only in limited area around outbreaks due to shortages of vaccine.

(4) Minimum requirement includes only Minimum NID and excludes ORI due to shortage of vaccine.

7. Problems

The polio eradication initiative in China is important to the global polio eradication effort because of the large population size in China and the proportion of all reported polio cases occurring in China. In 1990, 5065 of 16,398 or 31% of total polio cases reported to WHO were reported from China. Although China's polio eradication activities has made remarkable progress in recent years, the goal of eradicating paralysed polio cases caused by wild poliovirus by 1995 are even more difficult to achieve. The major issues are as follow:

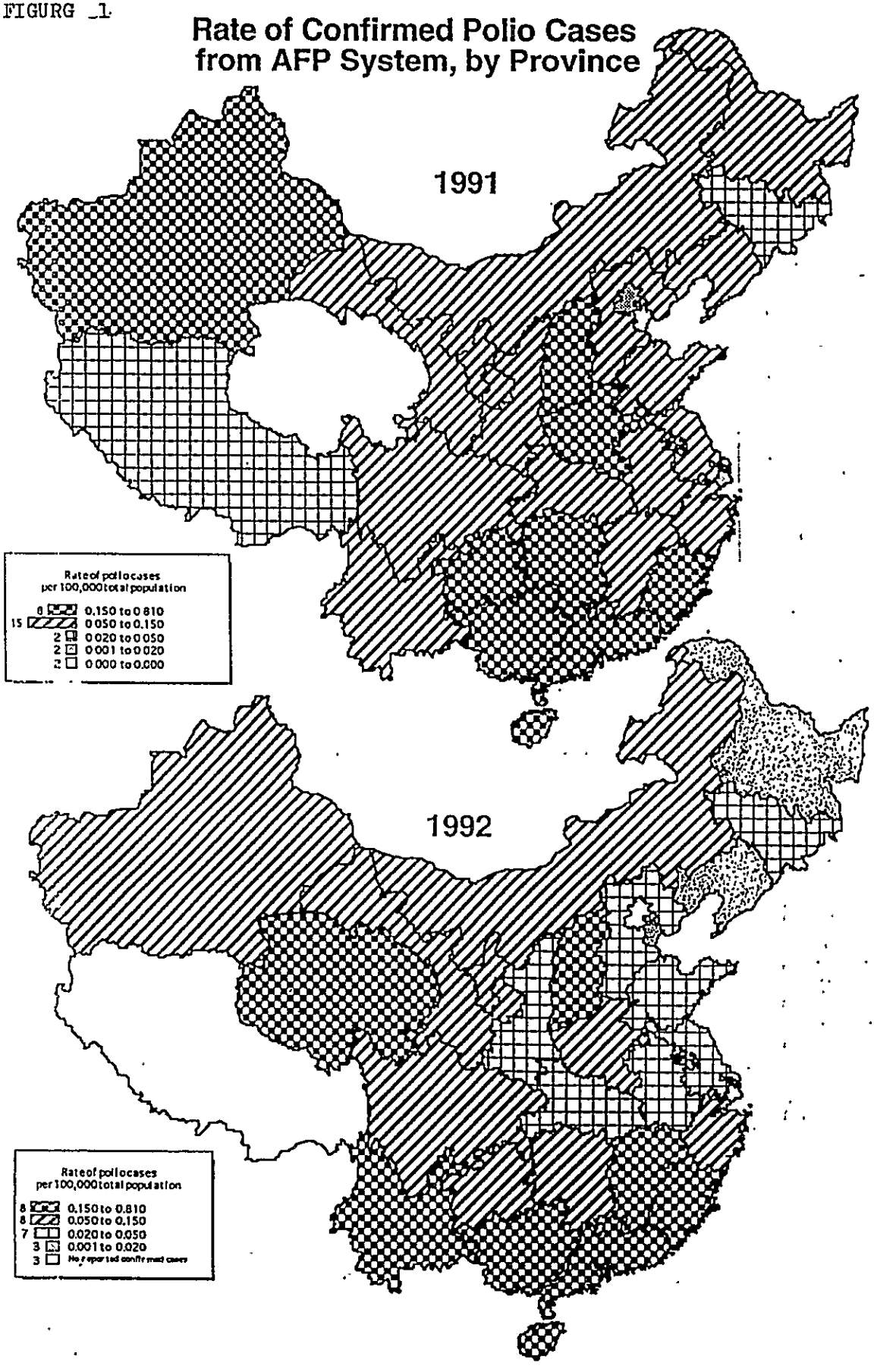
---- The major problem is the un-even development of EPI activities in different parts of the country due to its wide divergence in economy, culture, and in medical and health services, influence the development of polio eradication activities.

---- In some provinces, the surveillance system of AFP are

not still sensitive enough. It does not achieve a rate of 1 non-polio AFP cases per 100,000 children less than 15 years. The percentage of AFP cases with 2 stool specimens collected within 0-14 days of onset of paralysis is still lower.

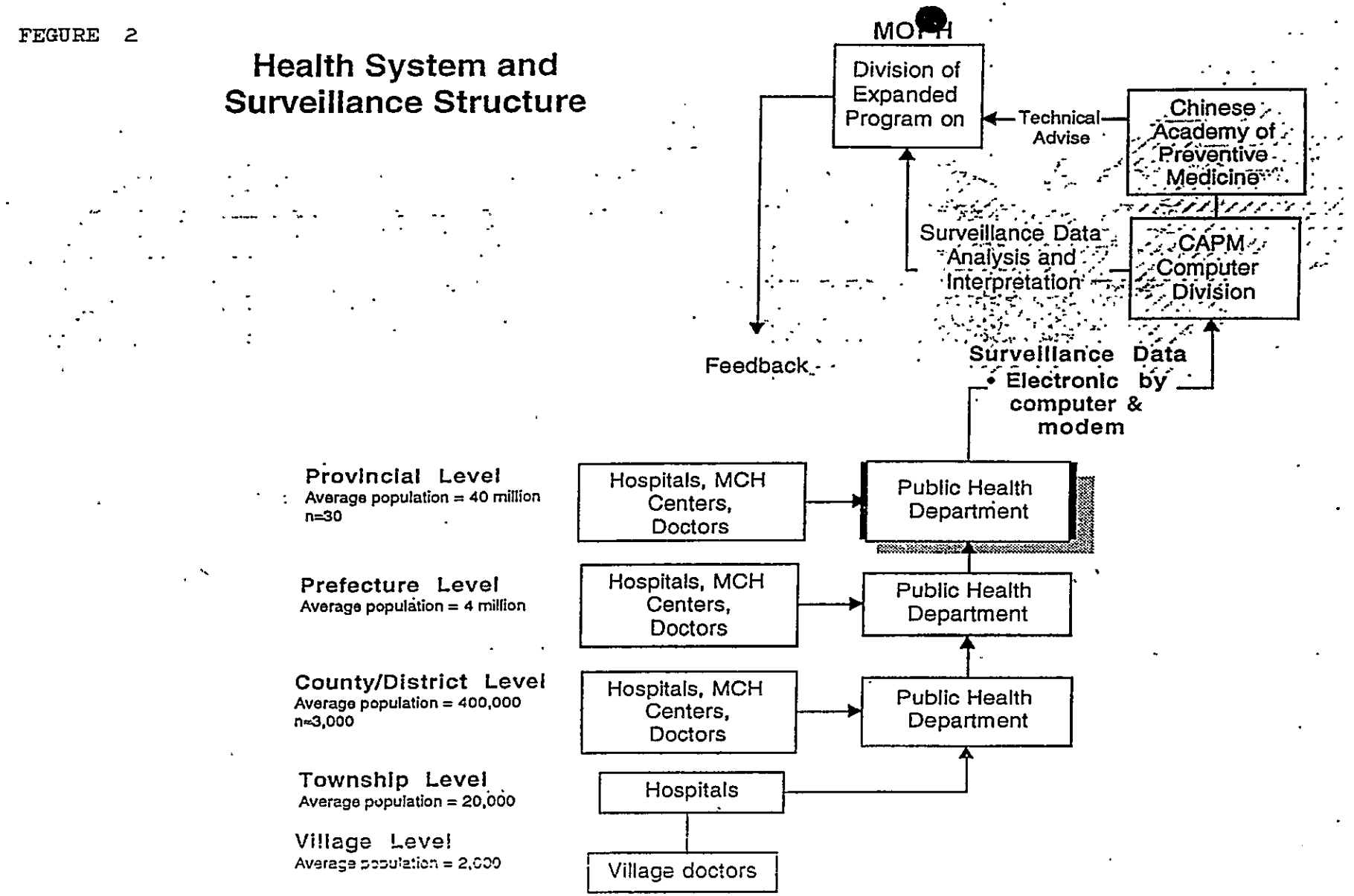
---- Although production capacity for OPV in China has been increased to 325 million annually, it still could not meet the total minimum requirement.

FIGURG _1


Rate of Confirmed Polio Cases
from AFP System, by Province
1991
Rate of polio cases
per 100,000 total population
0.150 to 0.810
0.050 to 0.150
0.020 to 0.050
0.001 to 0.020
0.000 to 0.000
1992
Rate of polio cases
per 100,000 total population
0.150 to 0.810
0.050 to 0.150
0.020 to 0.050
0.001 to 0.020

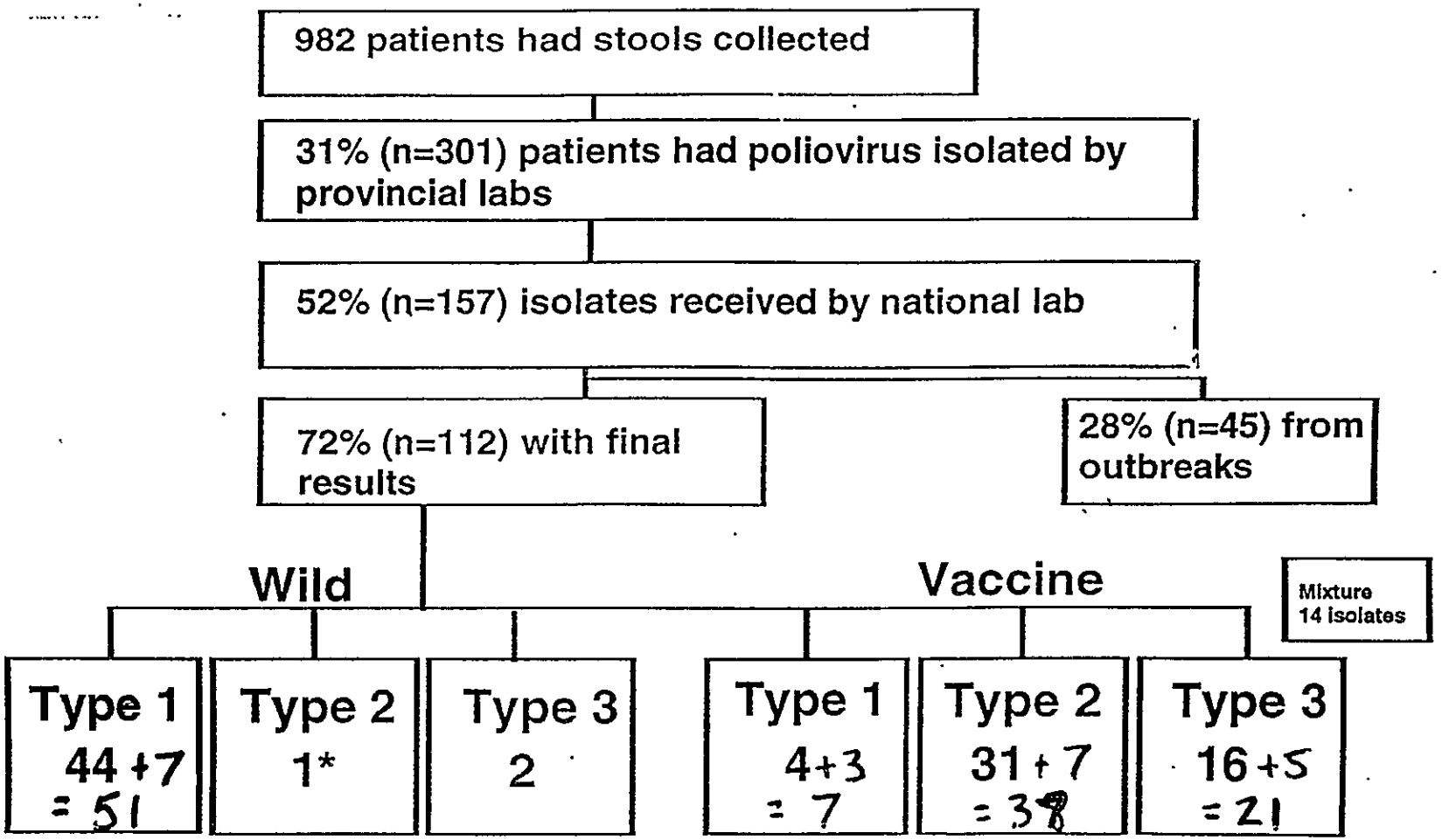
FEGURE 2

# Health System and Surveillance Structure

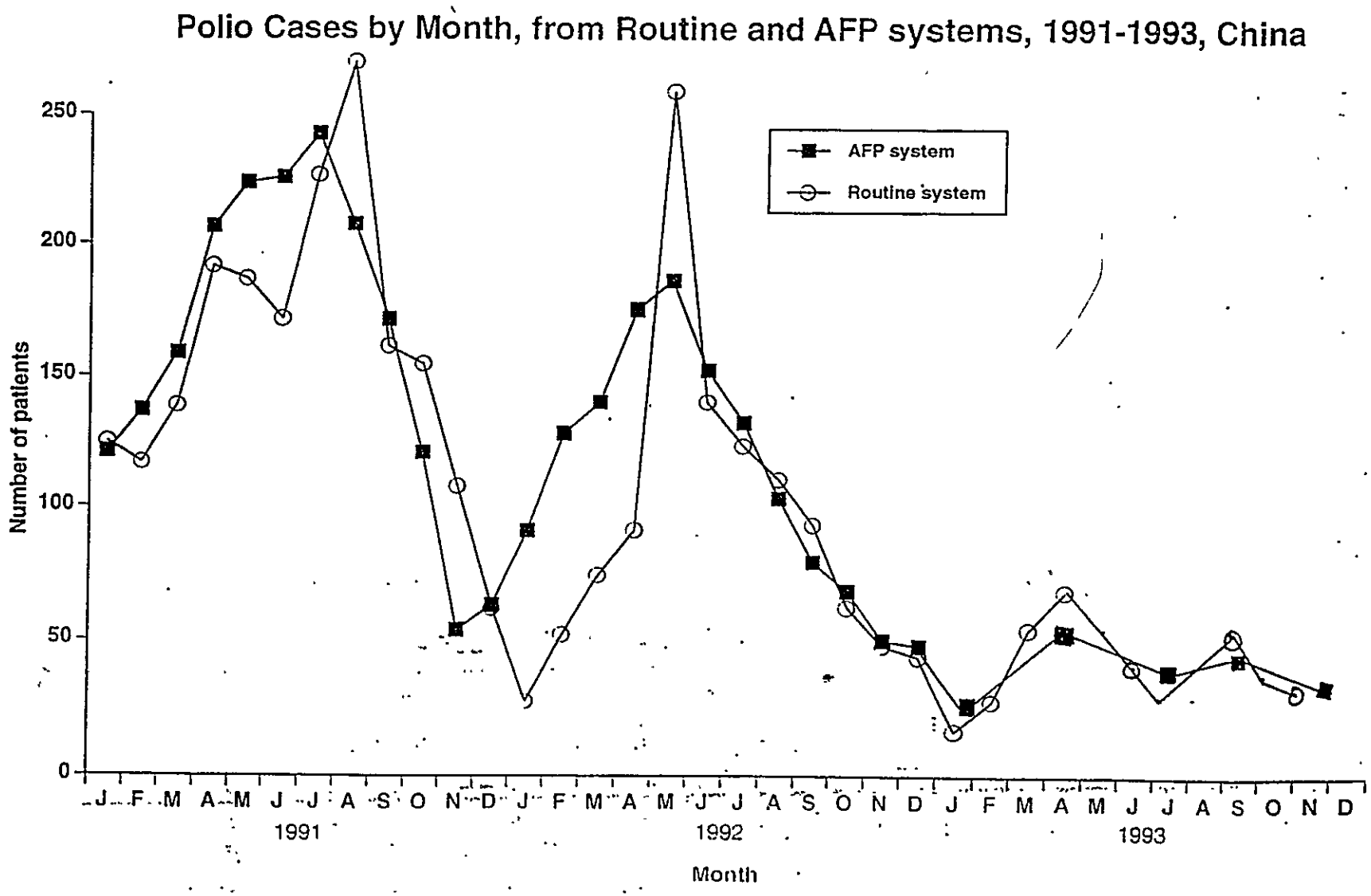


FEGURE 3

# From stool collection to differentiation of poliovirus, 1992



FEGURE 4


Polio Cases by Month, from Routine and AFP systems, 1991-1993, China
AFP system
Routine system
Number of patients
250
200
150
100
50
0
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1991
1992
1993
Month

# Future Program of Polio Eradication in China

By

Dr. Zhou Jun EPI Division Department of Epidemic Prevention, Ministry of Public Health P.R. China

Through taking part in the training course, there are many aspect helped me in complete understanding of polio eradication program. I learned a lot of the new knowledge and got lot of expsriance through the experience of polio eradication of other countries. I will introduce them to my country, thus quickening our pace of activities of polio eradication, achieving the goal of polio readication by 1995 on time. The following is my opinion about future activities of polio eradication in China, according to above mentioned.

Although the number of confirmed polio cases declined 32% in 1992 as compared with 1991, wild poliovirus circulation is still widespread occuring in 20% of all rural counties in China in 1992. The surveillance system is not sensitive enough and the prapration of diagnosis polio cases by laboratory is still lower. For this reason I think:

1. Strengthening and maintaining routine immunization service.

1.1 Identify out-of-plan and floating children using special methods, for example, village volunturs or house-to house searches in advance of NIDs, issueing immunization certificates to those children as well.

1.2 Increase the frequency of immunization services to least 6 times per year in the areas that services are offered quarterly.

1.3 Establish a new method for measuring and monitoring vaccination coverage at the county and district levels. Based on this new method, indentify all counties and districts with coverage levels more than 85% by 12 months of age, review programme to identify resoursss needed to resolve such problems.

2. Continuous conducting of NIDs in 1994-1995, 1995-1996.

2.1 Due to shortages of OPV, it did not allow 2 doses of OPV for all children less than 5 years of age. According to WHO's Recommendation, the target population is still all children less then 4 years of age, regardless of prior vaccination history, administering two extra doses of OPV. The dates are December 5-6 and Junary

5-6 every year during 1994 to 1996.

2.2 Reaching unimmunized children

Although supplementary OPV immunization activities is carried out in most provinces in China in recent years, A significant number of polio cases continues to occur widdly in affected provinces. Most of these polio cases occur in a group of children who continue to be missed by the rountine and supplementary programs. The majority of these unimmized children belong the "floating" population or are out of plan children. Unless as many as possible of these unimmiunized children are found and immunized, the NID in the coming few years will be a failure. For this reason, First, the mobile immunization posts should be set up at train and bus stations, markets etc. during the NID. Second, House to house visits to identify eligible children.

3. Strengthen epidemiologic surverllance

3.1 Continuous conduct active survelliance for AFP by the staff who are responsible for AFP surveillance at the EPI section of all epidemic prevention station of counties or districts level. It is required from the doctors at all hospital to report all cases of AFP in children less then 15 years of age, regardless of clinical diagnosis, promptly to the epidemic prevention station.

3.2 All AFP cases should be investigated within 48 hours after receiving report. Ensure 2 stool specimens collected from every case of AFP within 0-14 days of onset of paralysis. Moreover, stool collected from 5 people who contact with the same AFP case.

4. The national laboratory should begin enviroument sampling within polio-free zones and continues conduct the proficiency testing for all provincal laboratory.

5. Because a part of cold chain facilitis was equiped in early years have scrapped, moreover, the quanlity of OPV requive greatly increase for NIDs. Therefore, present state of cold chain have not adapt to the needs of activites of polio eradication, the shortage of equipments for vaccine storage and transport have to be supplemented in coming two years. A comprensive plan for vaccine storage and transport for the administration of all EPI vaccines should be formulated by the Ministry of Public Health at once.

6. Strengthen collaboration with international organizations and friend countries, thus get more help on technical support, equipment and vaccine in activities of polio eradication respects.

Country Report
for
Seminar on Polio Eradication

# POLIOMYELITIS ERADICATION PROGRAMME IN JAPAN

Noriko Kohagura, M.D.
Yoshihiro Takashima, M.D.
Chushi Kuroiwa, M.D.

## 1. Title of Seminar

Poliomyelitis Eradication - Its Theory and Practice -

## 2. Name and Affiliation of Participants

Noriko Kohagura,M.D., 1st Department of Internal Medicine, Faculty of Medicine, The University of Ryukyus

Yoshihiro Takashima,M.D., Department of Public Health, Osaka University Medical School

Chushi Kuroiwa,M.D., Bureau of International Cooperation, International Medical Center of Japan

## 3. General Aspect on Control of Infectious Diseases in Japan

### 3-1. Current Situation of Infectious Diseases

Infectious diseases including poliomyelitis have not been major concerns of the public health policy recently in Japan. Although tuberculosis was the leading cause of death followed by cerebrovascular diseases in 1950, malignant neoplasms has been the first leading causes, heart diseases the second, and cerebrovascular diseases the third since 1985(Fig.1).While infant mortality rate has been declining remarkably as shown in Fig.2, infectious diseases are not leading causes of infant death(Fig.3). Fig.4 shows case rates of selected communicable diseases. In the situation mentioned above, the nosocomial infection, the imported infection, and AIDS are getting more public concerns among infectious diseases in the country.

## 3-2. Countermeasures for Infectious Diseases

Countermeasures for infectious diseases in Japan are divided into main three components such as for infection sources, for infection routes, and for population with infection sensitivity, which are based upon the Infectious Disease Prevention Law and some laws targeting environmental sanitation. System for infectious diseases control in Japan is shown in Fig.5. The diseases regulated by the Infectious Disease Prevention Law are including 11 legal communicable diseases, 2 designated communicable diseases, and 13 reportable communicable diseases(table 1). A doctor diagnosing a patient or corpse as legal or designated communicable disease should immediately notify the case to a director of health center exercising jurisdiction of the case, while he should notify a case of reportable communicable disease to the director of health center within 24 hours from the diagnosis (Fig.5).

## 3-3. Surveillance System for Tuberculosis and Infectious Diseases

Preventive measures for infectious diseases are implemented more effectively by monitoring of the diseases through examination of cases and pathogens and providing the findings therefrom for the local communities involved. Under such concept, the Surveillance System for Tuberculosis and Infectious Diseases was set up and started by the Ministry of Health and Welfare in January 1987 succeeding the Surveillance System for Infectious Diseases founded in 1981. Poliomyelitis is excluded from the targeted diseases of this Surveillance System (Fig.5).

## 4. Organizational Structure for National Poliomyelitis Eradication Programme in Japan

### 4-1. Immunization Procedures for Poliomyelitis

The Ministry of Health and Welfare (MHW) carries out the immunization programme for the control of poliomyelitis under regulation of the Preventive Vaccination Law, which are regulating the routine immunization for diphtheria, pertusis, poliomyelitis, measles, and rubella and the extra immunization for influenza, Japanese encephalitis, and Weil's disease. Implementation of polio vaccine administration is compulsory for all children aged 3 to 48 months under the responsibility of municipal governments numbered approximately 3300 in the country, which consists of cities, towns, or villages. The budget for poliomyelitis vaccination is granted from each local government (Fig.5).

### 4-2. Polio Surveillance

The Poliomyelitis Surveillance Committee (PSC) was set up in 1962, the next year of the rampant outbreak of the epidemic, which was a predecessor of the recent surveillance system for communicable diseases in the country. The committee consisted of pediatricians, epidemiologists, virologists, and neuropathologists under the guidance of the Ministry of Health and Welfare. The issues investigated by the committee were as follows ;

1. the incidence of both notified and unnotified cases of clinical poliomyelitis,
2. the clinical findings of the reported cases,

3. the epidemiological situations in the area where the cases were reported,

4. the results of the virological examinations of the cases as well as the characterization of a type of the isolated viruses,

5. the nationwide survey on the distribution of antibody against polio virus, and

6. the carriage rate of polio virus among children.

## 5. Current Status of National Polio Eradication Programme

### 5-1. Incidence and Epidemiological Surveillance (Fig.6)

The regulation for the official notification of all cases of poliomyelitis was enforced in 1947, when the case number of the disease was reported to be 993. From 1948 to 1958, the annual incidence of notified poliomyelitis cases was approximately 2000 to 3000, with morbidity rates of 1.5 to 5.0 per 100,000 population. The number of the cases in 1959 was 2610, in which year the disease was specified as one of designated communicable diseases.

In 1960, a rampant epidemic of poliomyelitis broke out in Hokkaido, a northern island of Japan, where the number of reported paralytic cases was 1602 among residents numbered 5,039,162 with the morbidity per 100,000 population amounting to 31.8. In the year the highest incidence of the disease was recorded in the country with the case number amounting to 5606. In the late spring to the early summer of the next year, moreover, another remarkable epidemic of the disease occurred in the southwestern part of the country.

Although the initial public health policy of the government for the control of poliomyelitis was based upon the introduction of IPV in 1959,

the rampant epidemics in 1960 as well as 1961 followed by an aggressive and nationwide public claim for the establishment of effective prevention measures against the epidemic with live polio vaccine encouraged the government to introduce OPV and administrate it with the nationwide campaign. In 1961 the first nationwide mass immunization of OPV was implemented with thirteen million doses of the vaccine administered to children aged three months to five years, 80-90 % of which were vaccinated within about two weeks.

The remarkable decline of the notified cases since the next year of the introduction of OPV proved the effectiveness of mass administration of Sabin vaccine and almost all children aged 3 months to 12 years were fed with at least two doses of Sabin vaccine from 1961 to 1963. Since the routine administration of the two doses of trivalent OPV for every infant 3 to 18 months old was started in 1964, the number of the cases has never exceeded 100 and the last case of domestic wild strain was reported in 1980.

While the number of the cases was less than ten in each year of the 1970s, the accumulated number in 1980s was 8 and the last 2 cases was reported in 1987 in the country.

## 5-2. Clinical Diagnosis of the Disease

Clinical manifestation of the typical poliomyelitis is asymmetric flaccid paralysis without sensory disturbance. The number of cells and the amount of protein in CSF of the patient slightly increase, but the findings are not specific. All cases of poliomyelitis thave been classified into three categories by the PSC (Table 2).

## 5-3. Laboratory Diagnosis of the Disease

Definite diagnosis is carried out by two laboratory examinations. One is the isolation of polio virus from clinical specimens like stool sample, rectal swab, pharyngeal swab and autopsy specimens, whereas negative data from the isolation of the virus does not deny the possibilty of polio virus infection. The other is the serological diagnosis that utilizes pair samples from a patient in both acute and recovery phases. If the neutralizing antibody of the latter sample exceeds that of the former sample by four times or more, it is considered that the patient is infected by polio virus.

5-4. Quality Control of vaccine

Polio vaccine in Japan is the trivalent Sabin vaccine that includes type 1, 2 and 3 viruses. It is frozen and kept below the temperature of -20 $^{o}$C. Whenever we use it, it is melted at the room temperature. One bottle of OPV contains 1.0 ml (20 doses) and one dose contains the different quantity of each type of virus ( type1:106.0CCID50, type2:$10^{5.0}$CCID50, type3:$10^{5.5}$CCID50 ).

The vaccine can be used within one month at the temperature of 0 to 4 $^{o}$C or within seven days below 10 $^{o}$C after melted.

5-5. Vaccination Program - Routine and Vaccination Days

Routine vaccination

OPV is administered two times as routine vaccination to every child from 3 months to 48 months of age. In practice, the regional and simultaneous mass immunization is proposed to be carried out to children from 3 months to 18 months of age.

Interval

While the virus from OPV is under the mutiplication phase in gut after the first administration, polio virus from the next dose can not increase (Interfere Phenomenon). The interval between two administration of OPV is recommended to be more than 6 weeks.

Season for vaccination

In summer, other enteroviruses can highly interfere with polio virus. Therefore we administrate OPV in spring and autumn.

5-6. Target year of Eradication in Japan

According to the record of the PSC from 1962 to 1991, there have been no report of poliomyelitis cases since 1988. The annual data from the isolation of healthy child's stool indicated that the rate of polio virus isolation has been approximately 0.1 percent since 1988 and the isolated virus has been only associated with the vaccine virus (Fig.7). Poliomyelitis, especially due to wild strain, has been considred to be eradicated in Japan since 1980.

## 6. Estimate of the Quantity of the Vaccine Required during 1992-1995

In 1990s, approximately 1.22 million babies have been born in Japan annually without remarkable increase of birth rate. The infant mortality rate has been not so high for the calculation of the quantity of the vaccine supply, immunization coverage of OPV has been approximately 95 %

(Fig.8), and then,consequently, vaccine quantity required during 1992-1995 is estimated by the next formula ;

1.22 x 2 x 1.33 x 4 = 13.0 miilion doses

## 7. Problems being encountered in Japan when the activities mentioned in 5 are being carried out

As we described the above, Japan has succeeded in wild polio eradication since 1981. However, we are facing following problems:

Only Two Doses of OPV Administration:

In Japan, two doses of OPV administration is recommended. As a result, 80-90% of people who received OPV have serum neutralizing antibody to polio virus type 3 although almost 100% show positive antibodies to polio virus types 1 and 2.

Low Antibody to Type 1 in Teenagers:

Teenagers born between 1975 and 1977 received Lot 13, 14 of OPV, and only 50% of them show positive serum neutralizing antibody to polio virus type 1.

Two items mentioned above suggest that another administration of OPV is required for people especially those visiting polio virus endemic areas and those born between 1975 and 1977.

The Risk of Imported Cases:

Owing to the internationalization of the Japanese economy, more and more foreigners have become interested in working in Japan and the number of Japanese going abroad has increased sharply. Under this tendency, importation of polio virus from endemic areas may occur in the future.

Vaccine-Associated Paralytic Poliomyelitis:

From 1981 through 1991, there were 6 cases of paralytic poliomyelitis reported and all of them were vaccine associated. Several reports have suggested the advantages of combination of IPV and OPV to solve this problem(Table 3,4).

Post-polio syndrome (PPS):

About 20 to 40 years after the poliomyelitis infection, patients may develop weakness or paralysis in the limbs which were intact during the first infection as well as in the affected limbs. 60 cases of this PPS were reported in the 1991's nationwide survey. Because of aging of old polio cases, more and more PPS are expected to occur in the next decade. Excessive rehabilitation should be restricted to prevent polio patients from developing PPS, because overwork of nerves and muscles of polio patients is considered to be the main cause of PPS.

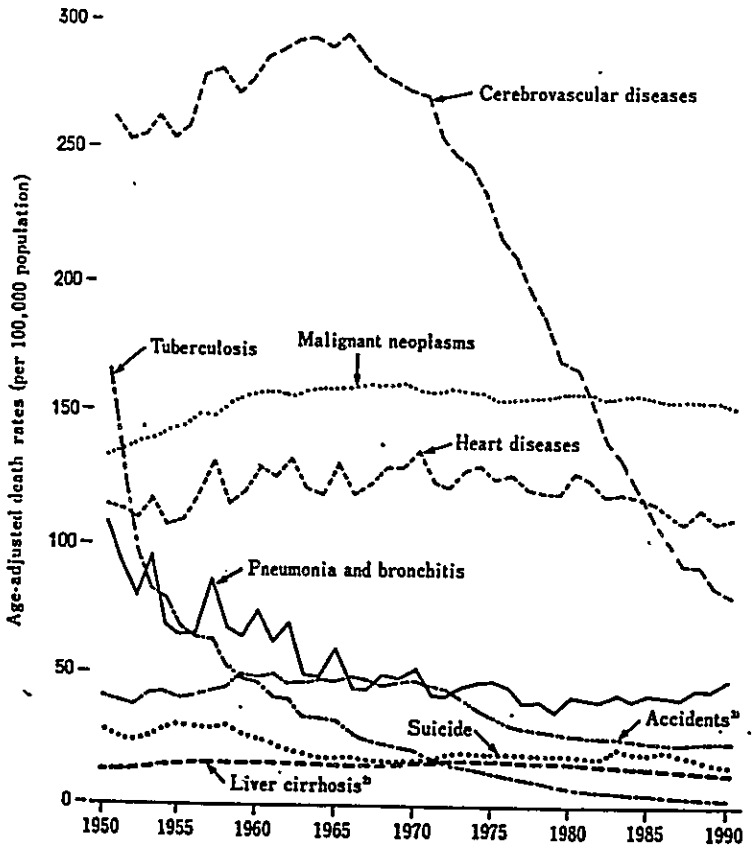
Outbreaks of Poliomyelitis in the Best Immunized Countries:

Netherlands, September, 1992 : sixty-eight cases were reported with polio virus type 3, of which two persons died. They belong to various religious groups which do not accept immunization on principle.

Jordan, the winter of 1991-1992 : thirty-two cases out of 55 acute flaccid paralysis were confirmed poliomyelitis. Wild type 1 polio virus was isolated from 56% of stool specimens tested. More than half were unimmunized. Because of the Gulf crisis a year before the outbreak, the potential for importation from nearby poliomyelitis endemic countries might be increased.

These outbreaks suggest that Japan is also at the risk of imported infections and epidemics until our planet is totally free of polio virus.

**Figure 1** Trends of age-adjusted death rates by leading causes of death, 1950–1990




Note; 1) Population used for computing the age-adjusted death rates is the model population for 1985.
2) Chronic liver diseases and cirrhosis
3) Accidents and adverse effects
Source: "Vital Statistics", Statistics and Information Department, MHW

**Figure 2** Trends of infant mortality rates, 1925–1990

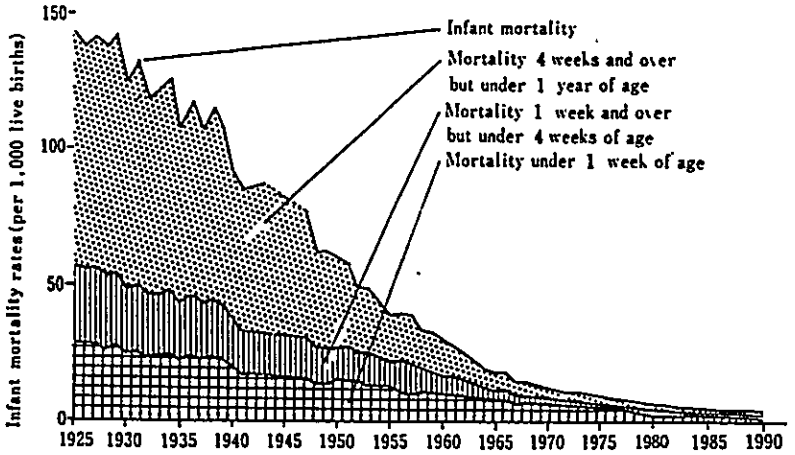
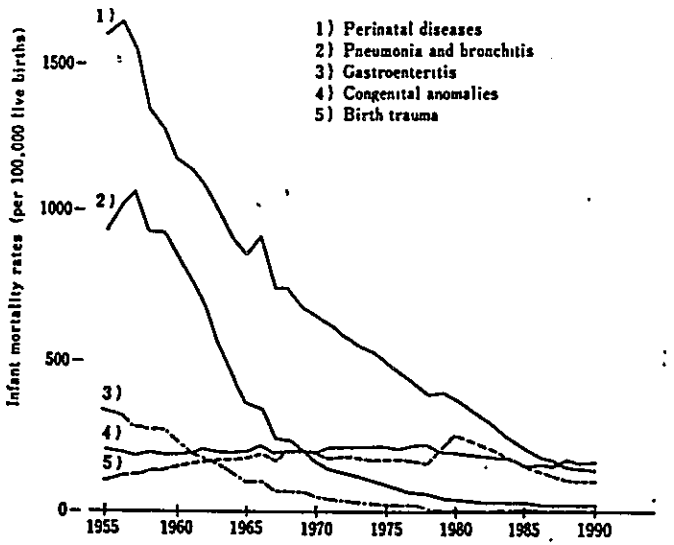
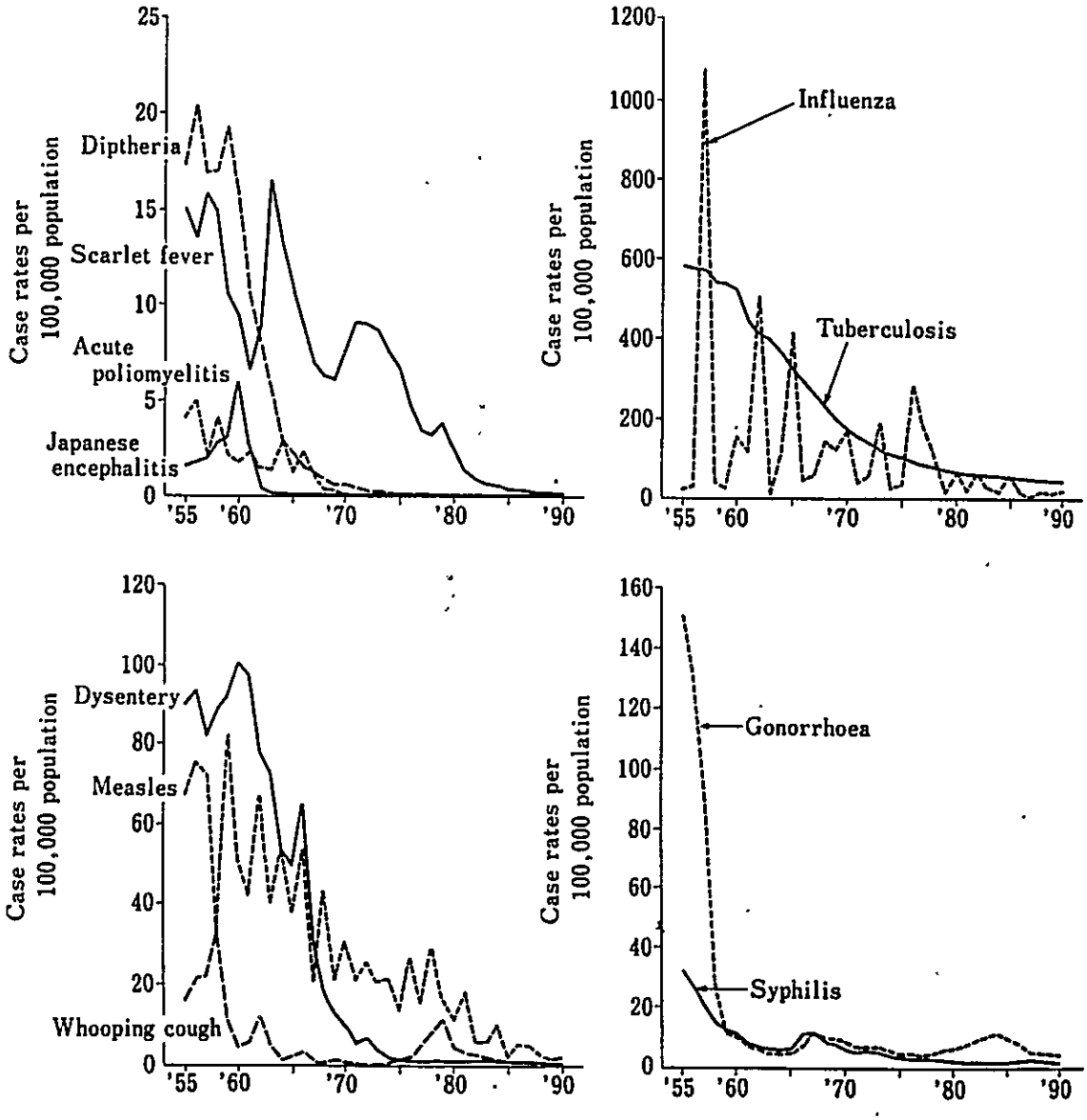



**Figure 3** Trends of infant mortality rates by leading causes of death, 1955–1990




Source; "Vital Statistics", Statistics and Information Department, MHW

**Figure 4** Case rates of selected communicable diseases, 1955–1990




Source; "Statistical Report on Communicable Diseases and Food Poisonings", Statistics and Information Department, MHW

**Table 1** Number of reported cases, case rates (per 100 000 population) of communicable diseases, 1970-1990

| Diseases | 1970 | | 1975 | | 1980 | | 1985 | | 1989 | | 1990 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cases | Case rates | Cases | Case rates | Cases | Case rates | Cases | Case rates | Cases | Case rates | Cases | Case rates |
| Legal communicable diseases | 18 844 | | 9 814 | | 4 312 | | 1 959 | | 1 331 | | 1 240 | |
| Cholera | — | — | — | — | 22 | 0.0 | 34 | 0.0 | 95 | 0.1 | 73 | 0.1 |
| Dysentery | 9 996 | 9.6 | 1 498 | 1.3 | 951 | 0.8 | 1 128 | 0.9 | 924 | 0.7 | 920 | 0.7 |
| bacillary dysentery | 9 986 | 9.6 | 1 489 | 1.3 | 926 | 0.8 | 991 | 0.8 | 826 | 0.7 | 808 | 0.7 |
| amebic dysentery | 10 | 0.0 | 9 | 0.0 | 25 | 0.0 | 137 | 0.1 | 98 | 0.1 | 112 | 0.1 |
| Typhoid fever | 211 | 0.2 | 524 | 0.5 | 294 | 0.3 | 211 | 0.2 | 105 | 0.1 | 120 | 0.1 |
| Paratyphoid fever | 50 | 0.0 | 81 | 0.1 | 123 | 0.1 | 141 | 0.1 | 65 | 0.1 | 26 | 0.0 |
| Smallpox | — | — | — | — | — | — | — | — | — | — | — | — |
| Epidemic typhus | — | — | — | — | — | — | — | — | — | — | — | — |
| Scarlet fever | 7 774 | 7.5 | 7 518 | 6.7 | 2 804 | 2.4 | 368 | 0.3 | 96 | 0.1 | 29 | 0.0 |
| Diphtheria | 596 | 0.6 | 139 | 0.1 | 66 | 0.1 | 10 | 0.0 | 4 | 0.0 | 5 | 0.0 |
| Meningococcal meningitis | 72 | 0.1 | 33 | 0.0 | 24 | 0.0 | 27 | 0.0 | 10 | 0.0 | 12 | 0.0 |
| Plague | — | — | — | — | — | — | — | — | — | — | — | — |
| Japanese encephalitis | 145 | 0.1 | 21 | 0.0 | 28 | 0.0 | 40 | 0.0 | 32 | 0.0 | 55 | 0.0 |
| Designated communicable diseases | 8 | | 4 | | 2 | | 1 | | — | | — | |
| Acute poliomyelitis | 8 | 0.0 | 4 | 0.0 | 2 | 0.0 | 1 | 0.0 | — | — | — | — |
| Lassa fever | • | • | • | • | — | — | — | — | — | — | — | — |
| Reportable communicable diseases | 205 575 | | 52 721 | | 85 339 | | 68 305 | | 14 345 | | 29 908 | |
| Influenza | 173 371 | 166.9 | 36 250 | 32.4 | 66 744 | 57.1 | 63 572 | 52.5 | 11 508 | 9.3 | 25 021 | 20.2 |
| Rabies | 1 | 0.0 | — | — | — | — | — | — | — | — | — | — |
| Anthrax | 2 | 0.0 | — | — | — | — | — | — | — | — | — | — |
| Infectious diarrhoea | 20 | 0.0 | 1 | 0.0 | 24 | 0.0 | — | — | — | — | — | — |
| Whooping cough | 655 | 0.6 | 1 084 | 1.0 | 5 033 | 4.3 | 938 | 0.8 | 229 | 0.2 | 583 | 0.5 |
| Measles | 31 248 | 30.1 | 15 217 | 13.6 | 13 219 | 11.3 | 2 810 | 2.3 | 1 753 | 1.4 | 3 259 | 2.6 |
| Tetanus | 243 | 0.2 | 103 | 0.1 | 50 | 0.0 | 43 | 0.0 | 42 | 0.0 | 47 | 0.0 |
| Malaria | 17 | 0.0 | 30 | 0.0 | 55 | 0.0 | 56 | 0.0 | 57 | 0.0 | 55 | 0.0 |
| Tsutsugamushi disease | 6 | 0.0 | 12 | 0.0 | 212 | 0.2 | 885 | 0.7 | 754 | 0.6 | 941 | 0.8 |
| Filariasis | 12 | 0.0 | 24 | 0.0 | 2 | 0.0 | 1 | 0.0 | 2 | 0.0 | — | — |
| Yellow fever | — | — | — | — | — | — | — | — | — | — | — | — |
| Relapsing fever | — | — | — | — | — | — | — | — | — | — | — | — |
| Trachoma | 6 928 | 6.7 | 1 863 | 1.7 | 438 | 0.4 | • | • | • | • | • | • |
| Schistosomiasis japonica | 61 | 0.1 | 154 | 0.1 | 2 | 0.0 | 1 | 0.0 | 3 | 0.0 | 5 | 0.0 |
| Venereal diseases | 14 841 | | 8 860 | | 8 819 | | 13 448 | | 7 610 | | 7 584 | |
| Syphilis | 6 138 | 5.9 | 3 635 | 3.2 | 2 081 | 1.8 | 1 904 | 1.6 | 2 108 | 1.7 | 1 877 | 1.5 |
| Gonorrhoea | 8 349 | 8.0 | 5 127 | 4.6 | 7 661 | 6.6 | 11 443 | 9.5 | 5 439 | 4.4 | 5 646 | 4.6 |
| Chancroid | 151 | 0.1 | 97 | 0.1 | 75 | 0.1 | 94 | 0.1 | 54 | 0.0 | 53 | 0.0 |
| Lymphogranuloma inguinale | 3 | 0.0 | 1 | 0.0 | 2 | 0.0 | 5 | 0.0 | 9 | 0.0 | 8 | 0.0 |
| Tuberculosis | 180 833 | | 110 118 | | 73 230 | | 58 567 | | 53 112 | | 51 821 | |
| Tbc. of respiratory system | 160 532 | 154.6 | 98 216 | 87.7 | 65 373 | 55.9 | • | • | • | • | • | • |
| Other forms | 20 301 | 19.5 | 11 902 | 10.6 | 7 857 | 6.7 | • | • | • | • | • | • |
| Leprosy | 46 | 0.0 | 83 | 0.1 | 37 | 0.0 | 42 | 0.0 | 26 | 0.0 | 12 | 0.0 |

Source; "Statistics of Communicable Diseases", Statistics and Information Department, MHW

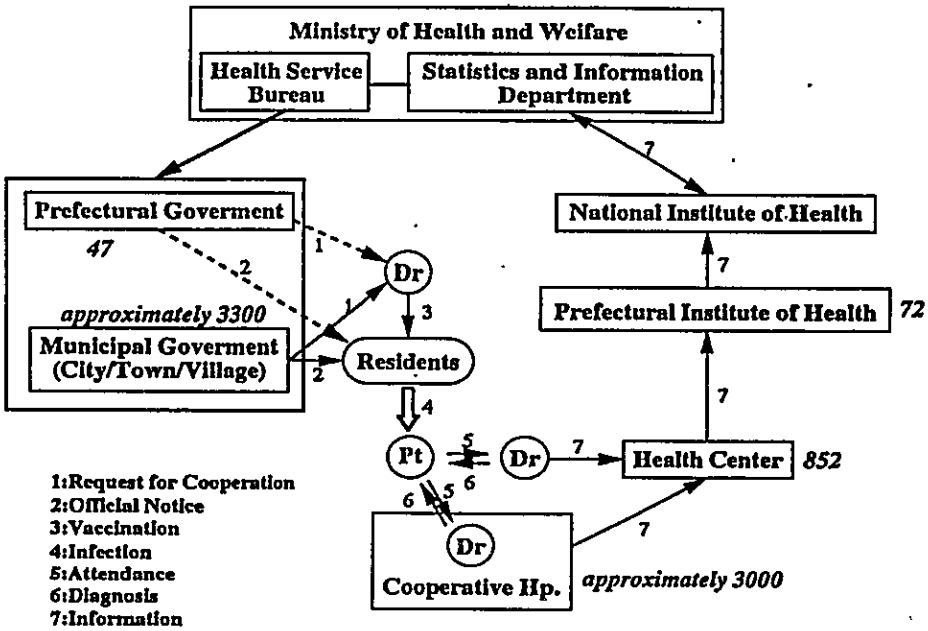



**Figure 5. Organizational Structure for Vaccine Supply and Surveillance of Infectious Diseases**

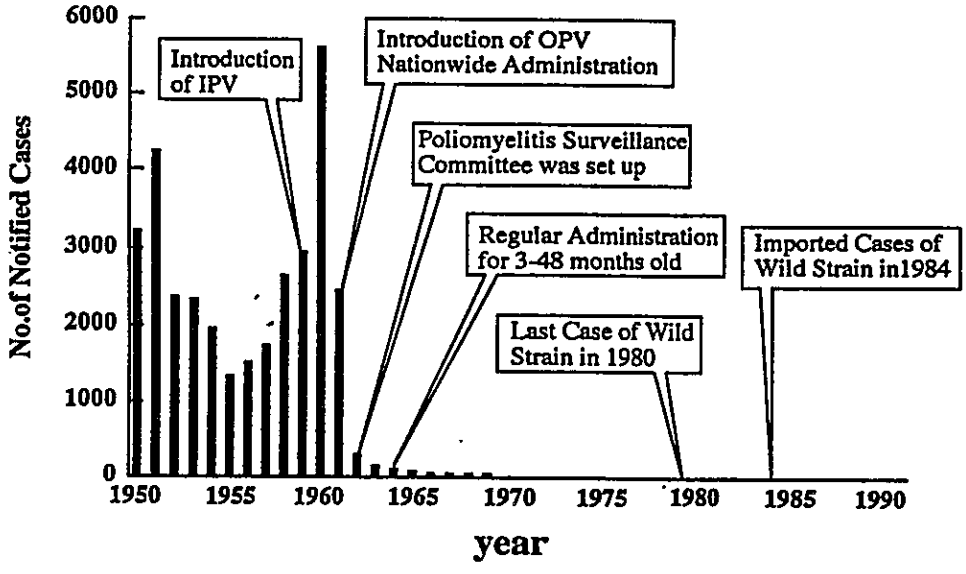



**Figure 6. Number of Notified Cases of Poliomyelitis and Main Issues related to Polio Eradication Programme in Japan**

Table2 Clinical Classification

A.Typical paralytic poliomyelitis:
1)onset of fever with paralysis
2)flaccid paralysis,DTR's reduction, and meningism without sensory loss and pathogenetic reflex
3)clear CSF in the early stage with slight increase of TCC and protein

B.Atypical paralytic cases:
clinically diagnosed polineuritis or fasial palsy or Guillain–Barre syndrome or myelitis

C.Non poliomyelitis cases:
brain tumor or cerebral paralysis or encephlitis or injury without paralysis

Fig.7 Entero virus isolation from healthy children

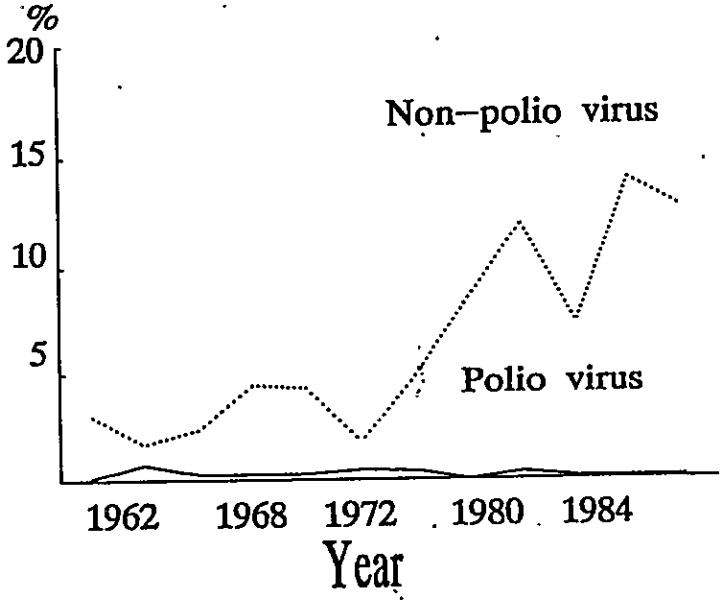
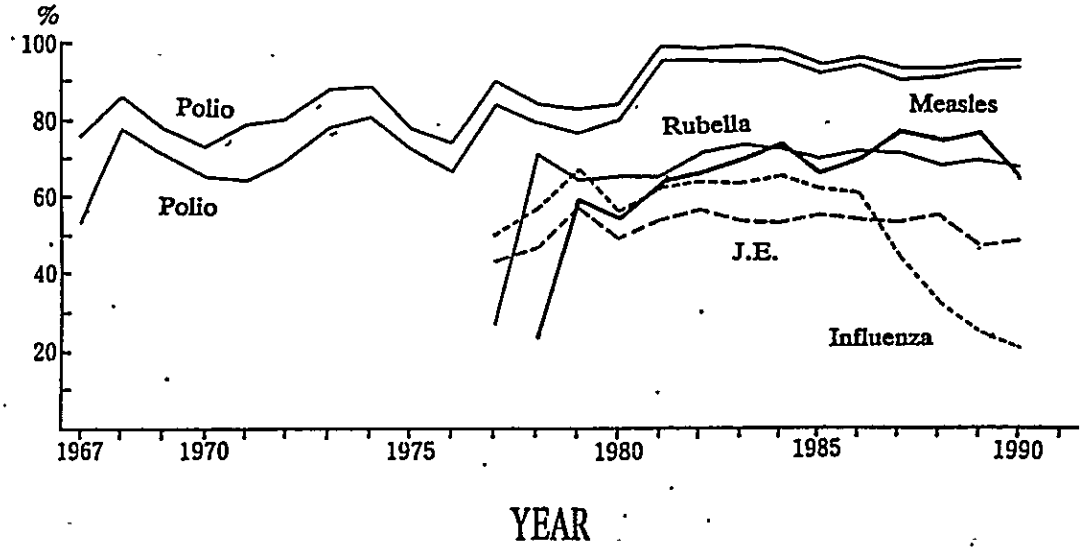



Fig.8 Immmunization Coverage in Japan



Table, country report

Table 3 OPV characteristics

| Advantages | Limitations |
|---|---|
| 1 Good humoral immunity | 1 Humoral immunity needs boosting |
| 2 Good secretory IgA response | 2 May prevent seroconversion after three doses or more |
| 3 In mass administration, blocks the gut replication of the epidemic virus | 3 Lower immune response to epidemic than to the vaccinal strain |
| 4 Satisfactory protective efficacy | 4 Gut immunity transient, needs boosting |
| 5 Routine administration easy | 5 May fail to prevent replication and transmission of wild virus in vaccinated communities |
| 6 Cheap | 6 Vaccine-asspciated diseases |
| | 7 Poor thermostability |

Table, IPV characteristics

Table 4 E-IPV characteristics

| Advantages | Limitations |
|---|---|
| 1 Very high humoral immune response | 1 Lower gut immunity than observed with OPV |
| 2 Similar antibody response to epidemic and vaccinal strains | 2 Limitation in preventing replication and spread of wild virus not different from OPV |
| 3 Good immunological memory | 3 Community protection requires a very high coverage |
| 4 Protective efficacy fair-excellent | 4 Cost |
| 5 No risk of vaccine-associated disease | |
| 6 Can be combined with other vaccines | |

# FUTURE PLAN FOR POLIO ERADICATION PROGRAMME IN JAPAN

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## 1. Introduction

The incidence of poliomyelitis in Japan has decreased abruptly after the introduction of OPV with mass immunization campaign since 1961 and the last case of wild poliovirus was reported in 1980. In spite of improved sanitation and hygiene, the frequent international migration from or to the country is increasing the possibility of outbreak of polio induced by imported poliomyelitis with the reduction of immunity in some population.

Moreover few interests in the eradication programme conducted in whole world as well as poliomylitis itself among some medical officers in the government and most medical doctors in the country might decelerate this global project. In such viewpoints as mentioned above, we will recommend the responsible organization or persons in charge to carry out following items.

## 2. Set up AFP Surveillance System

National certification of polio eradication should be achieved before the regional one that is also indispensable for the completion of the global eradication of the disease. For the certification of polio eradication in national level as well as the effective implementation of immunization programme, each country should try its best to found and maintain the surveillance system for cases of AFP and for wild polio viruses before the global polio eradication can consider to be certified.

Since the foundation in1962, the Poliomyelitis Surveillance Committee (PSC) in Japan has investigated the incidence of both

notified and unnotified cases of clinical poliomyelitis and made the virological examinations of the cases as well as the characterization of a type of the isolated viruses. The Committee reported the last case of indigenous poliovirus in 1980. For the detection of AFP, on the other hand, there is no surveillance system in the country. To complete the certification of polio eradication in Japan, we strongly recommend the AFP surveillance to be set up and conducted continuously for full three years at least.

The Ministry of Health and Welfare set up the Surveillance System for Tuberculosis and Infectious Diseases in1987, which, in spite of exclusion of poliomyelitis, obtain both weekly incidence reports on 27 infectious diseases from approximately 3000 hospitals in whole country and information on communicable diseases notified by doctors through health centers. The system can be utilized, until the polio eradication is certified, for both the AFP surveillance and the detection of wild poliovirus with effectiveness and few obstacles once political commitment can be obtained from the government and some medical associations or academic societies.

## 3. Problems of the OPV2

The EPI Gloval Advisory Group has recommended a schedule with three doses of OPV at 6,10, and 14 weeks of age. However, in Japan only two doses of OPV are administerd, which started in 1964 as routine immunization. As the result, the positive rate of the neutralizing antibody in the immunized people shows 80-90% for polio virus type3 although almost 100% for polio virus type1 and type2. The neutralizing antibody of the persons who were immunized decreases year by year. For example, the neutralizing antibody in people who are more than 10 years old shows 80% for polio virus type1 and 50-60% for polio virus type 3. Especially teenagers born between 1975 and 1977 received Lot13,14 of OPV, only 50% of them show positive for neutralizing antibody to polio virus type1.

According to the result of mentioned above, two doses OPV is not enough and it is better to start OPV3. Nowadays the case of poliomyelitis doesn't have reported since 1985. Some scientists and pediatricians suggest to change OPV3 from OPV2 although Japan

Ministry of the Health and Welfare doesn't have the plan for the shortage of budget.

OPV3 should be required to people especially those visiting polio virus endemic areas and those born in between 1975 and 1977 although the Japanese people haven't been informed of the possibility of being infected with polio virus.

## 4. Introduction of enhanced Inactivated Polio Vaccine (eIPV)

Vaccine associated paralytic poliomyelitis is a main disadvantage of OPV. A WHO collaborative study during 1980 to 1984 found that the number of cases among OPV recipients and contacts of vaccine recipients was about one case per 3.3 million doses of trivalent OPV distributed or administered in 8 countries. In the United States from 1973 to 1984, 105 out of 138 paralytic poliomyelitis were OPV associated cases. In Japan 6 cases of paralytic poliomyelitis have been reported since 1980, when the last indigenous wild poliovirus was isolated, and all of them were vaccine associated.

Thus, the following schedules are considered by Japan Polio Research Institute to solve this problem,

### 1) Combination of eIPV and OPV

An immunization schedule combining both OPV and eIPV could potentially achieve both the high serum antibody levels provided by eIPV and intestinal protection provided by OPV, besides Strebel et al reported that the relative frequency of paralysis associated with the first dose in the OPV series was one case per 700,000 doses compared with one case per 6.9 million subsequent doses (1992). Therefore, three doses of eIPV (combined with DPT) should be administered by children's first birthday, followed by two doses of OPV.

### 2) eIPV alone

After global wild polio eradication is succeeded, all polio vaccine should be changed to eIPV and it should be continued until poliovirus including vaccine associated virus is eradicated from the earth.

## 5. Accelerate International Tackle for Global Eradication of Poliomyelitis

Although the Regional Office for the Western Pacific of WHO and its member states have continued to make strenuous efforts for the eradication of poliomyelitis from the region by 1995, the remnant time may be too short for some countries in the region to achieve the project by the targeted year due to lack of man power, finance, and techniques.

International migration in the region, on the other hand, has been getting more and more frequent, which has made domestic health affairs involved in international health environment more profoundly. It means that the international tackle for the control of communicable diseases is indispensable for the improvement of domestic health condition.

In these points of view, we strongly recommend the Japanese government and some medical societies to make more active contribution to the achievement of the polio eradication in the region by the targeted year. Much greater amount of financial support should be directed concentratively to the implementation of mass immunization campaign and the foundation of dependable AFP surveillance system in infected countries of the region.

The active promotion of understanding on the project among all medical personnel and the more development of expert man power in the field of the international health can not only accelerate the execution of the programme but also make continuous contribution of the country to the development of world health.

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