CONSULTATION ON SURVEILLANCE OF POLIOVIRUS IN EUROPE

WORLD HEALTH ORGANIZATION
REGIONAL OFFICE FOR EUROPE
COPENHAGEN

ABSTRACT

The incidence of poliomyelitis is low in Europe, but surveillance is now vital if it is to be finally eradicated. A WHO meeting was held to review the adequacy of poliovirus surveillance. The participants agreed that immunization coverage should be reported district by district to identify any pockets of low coverage, and countries' surveillance systems should be reviewed to ensure that: all cases of acute flaccid paralysis are thoroughly investigated, sero-surveillance is used to identify susceptible groups, reporting of cases to the Regional Office becomes more regular, indicators of surveillance and laboratory services are developed, and countries have policies for outbreak control. Laboratories need support to characterize the wild polioviruses circulating in Europe.

TARGET 5

REDUCING COMMUNICABLE DISEASE

Index terms

COMMUNICABLE DISEASE CONTROL
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POLAND
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CONSULTATION ON SURVEILLANCE OF POLIOVIRUS IN EUROPE

Report on a WHO Meeting

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Introduction

The Consultation on Surveillance of Poliovirus in Europe was held at Veyrier-du-Lac, France, 26 – 27 August 1991.

The scope and purpose of the meeting was:

— to review existing policies on poliomyelitis eradication and on epidemic control;

— to discuss criteria and methods for the certification of Member States as free from poliomyelitis; and

— to formulate ways of implementing the WHO recommendations on improvements in surveillance, to meet the criteria for certification.

Facilities for the meeting were kindly provided by the Fondation Mérieux. The officers elected for the meeting were: Dr Ivan Masar, Chairperson, Dr Colette Roure, Vice-Chairperson, Dr David Salisbury, Rapporteur and Dr G. Oblapenko, Secretary. The list of participants is attached as Annex 2.

Global and regional overview

Global progress towards the goal of poliomyelitis eradication continues, with an increasing number of countries implementing plans of action and achieving high immunization coverage. The poliomyelitis programme in the Americas is particularly successful.

Global immunization coverage

Between 1985 and 1990, immunization coverage rose from 48% to 84%, and in five WHO regions coverage now exceeds 80%: only the

African Region has less. Problems remain of pockets of low coverage, failures of seroconversion to human poliovirus 3 despite high coverage with oral poliovirus vaccine (OPV), and evidence that some routine services may provide high coverage in infancy yet fail to interrupt the transmission of wild poliovirus. Supplementary policies to raise immunization coverage have led to shortages of vaccine and on occasion mop-up work has been selective rather than extensive.

Surveillance

Although 450 000 cases of acute paralytic poliomyelitis are prevented each year, it is likely that 150 000 still occur. The number of cases fell steadily between 1987 and 1990. Most reports are from the South-East Asia (49%) and the Western Pacific regions (40%); reports from the African Region contribute only 1%. The European Region with 2% has now been overtaken by the Region of the Americas (with under 1%). The quality of surveillance data can be reduced by many factors, such as the failure to investigate all cases of acute flaccid paralysis (AFP), a lack of both human and financial resources for surveillance, incomplete and late reporting, and an incomplete laboratory network.

Region of the Americas

In 1986 – 1987, 16 countries had endemic poliomyelitis. A poliomyelitis elimination campaign with two essential components was begun: first, a strategy for the most effective delivery of vaccine through routine services, national immunization days and mop-up campaigns and, second, a strategy of heightened surveillance. This surveillance involves the use of case definitions, reporting of AFP even when no cases occur (zero reporting), computer links between individual countries and the Pan American Health Organization, a laboratory network, and the use of appropriate indicators for the investigation and management of the programme. Examples of indicators are as follows:

— the percentage of cases of AFP reported within 15 days;

— the percentage of cases of AFP with appropriate stool samples;

— the percentage of cases of AFP with stools collected at appropriate times;

— the percentage of cases of AFP where mop-up activities were undertaken within 72 hours;

— the incidence of AFP.

As a result of elimination activities, by 1991 only two countries had any cases in which wild poliovirus was isolated, whereas in 1987 wild poliovirus was identified throughout much of the Region.

Building on this success, the Region is now considering certification procedures. These will require the demonstration of a complete lack of confirmed cases of poliomyelitis and of wild poliovirus identified in cases, their contacts or the environment, an evaluation of the programme, and the demonstration of mechanisms to deal with the importation of the disease.

Progress in the European Region

In the late 1980s, morbidity from poliomyelitis appeared to be stable at 200 – 300 cases per annum, but in 1990 the number rose to 383 cases, most of which were indigenous cases occurring in the USSR. In the first half of 1991, 65 cases had already been reported, including 33 cases in an outbreak in Bulgaria, 7 in Romania, 4 in Turkey and 21 in the USSR. Problems in surveillance continue with late reporting and investigation, poor quality specimens, no reporting of suspected cases, little AFP surveillance, delayed reporting of laboratory results and few data on immunization coverage by district. Only 12 countries report poliomyelitis surveillance weekly, 14 report monthly and 5, including Turkey and the USSR, do not publish bulletins of communicable disease surveillance.

The regional plan of action for 1991 – 1992 is attached as Annex 1.

Country reports

Bulgaria

Until 1990/1991, Bulgaria had considered itself to be in the pre-elimination phase, having seen no cases of poliomyelitis between 1970 and 1979, or in 1985 and 1988. Any cases that had occurred had been in migrant or travelling families. The surveillance of children in travelling families for seroconversion showed that 55% had no detectable antibodies to human poliovirus 1 and 67% had none to human poliovirus 3.

In December 1990, a seven-month old baby developed acute paralytic poliomyelitis and silent transmission of wild poliovirus continued for at least a month. In January 1991, there were 5 suspected cases, and by May there were 33 confirmed cases, 44% of which were due to human poliovirus 1. Five of these were nosocomial infections that occurred in children who were sharing hospital facilities with poliomyelitis cases, and there was overreporting of children suffering from infections due to coxsackievirus B4. In response to the outbreak, intensive mopping-up activities were undertaken, including immunizing all travelling children under seven years of age in the locality of the cases, immunizing all children under 18 months old (including travelling children) nationwide, and introducing zero reporting for any high-risk group of infants. The national vaccination schedule was changed to provide the first dose of OPV at two months instead of three months. A second dose of OPV has since been given to all children who received a first dose during the mopping-up campaign.

Since the outbreak, surveillance has been intensive with weekly zero reporting, cases reported within 24 hours by telephone, a review of hospital records and the use of standard case definitions. Some 90% of suspected cases are now reported within three to five days and stool specimens are obtained from all probable cases.

Czechoslovakia

Despite no reported cases of poliomyelitis for many years, attempts at AFP surveillance have been relatively unsuccessful. A thorough review of hospital inpatient data showed that cases of AFP have not all been appropriately investigated, nor could the possibility of poliomyelitis be excluded in all cases.

France

The last case of acute paralytic poliomyelitis from wild poliovirus occurred in 1989 and hospital admissions for AFP have recently been reviewed retrospectively. The intention is for surveillance of AFP, including Guillain Barré syndrome, to start in October 1991. Neurologists, intensive care specialists and paediatricians will be asked to report cases meeting the case definitions and investigate them according to a standard procedure that includes virological and serological investigations. If the present successes are maintained, France will move from stage B to stage A (in other words, it will be considered free of poliomyelitis).

Germany

Cases occurring in Germany in the last four years have been vaccine-associated, imported or, in one case, of unknown origin. Epidemiological surveys suggest that seropositivity to all poliovirus types exceeds 80% and immunization coverage in eastern Germany is exceptionally high. No systematic area-specific data on coverage exist for the western *Länder*. Throughout 1990, environmental surveillance demonstrated only vaccine-like viruses, and no wild polioviruses were found at the reference laboratory in Berlin from over 200 samples. Nevertheless, the national reference centre for enteroviruses, in Munster, disconcertingly isolated 16 wild polioviruses from 300 samples, although these were not associated with cases of acute paralytic poliomyelitis.

Hungary

In Hungary, reporting involves both immediate contact with the National Epidemiology Centre when suspected cases of poliomyelitis

are found, along with statutory notification as for other communicable diseases. In the last 14 years, 14 cases of acute paralytic poliomyelitis have occurred, all caused by human poliovirus 3 and vaccine-associated; their occurrence followed national immunization campaigns. The successful recognition of polio-like paralysis caused by enterovirus 71 indicates the sensitivity of AFP reporting. Hungary plans to change from delivering monovalent OPV through campaigns to providing vaccine through routine services, using inactivated poliovirus vaccine (IPV) for the first dose and then trivalent OPV. The National Laboratory hopes to establish facilities for intratypic differentiation of poliovirus isolates by monoclonal antibody testing and the polymerase chain reaction method.

Poland

Cases of AFP are reported along with other notifiable communicable diseases. In the last 10 years, 21 cases have been diagnosed as poliomyelitis – 18 vaccine-associated and 3 of unknown etiology. No wild polioviruses were identified in cases of AFP, but in 1982 and 1984 wild polioviruses were isolated from one case each of non-paralytic illness. A retrospective analysis revealed 107 cases of AFP in Warsaw between 1988 and 1991, suggesting a rate of 1 per 100 000 population. Only 59 of these cases were fully investigated with virological tests as financial constraints limit such testing. On the grounds of serological surveys, the vaccination schedule has been changed to incorporate booster doses for previously immunized children.

Romania

Despite the use of appropriate case definitions and the investigation of suspected cases, some underreporting of AFP still seems to persist in children under 15 years of age. Although faecal samples are taken from 79 – 90% of suspected cases, about 30% of cases are reported over two weeks after the onset of paralysis. In late 1990/early 1991, there were 7 cases due to wild human poliovirus 1: 6 occurred in travelling children (3 of whom were unvaccinated, 2 incompletely vaccinated and 2 HIV

positive). All 7 had received intramuscular injections 7 – 25 days before the onset of paralysis.

Despite a considerable improvement in the poliomyelitis elimination programme, case investigations are occasionally superficial, the cold chain is weak, and guidelines are needed for use in the field.

Spain

Suspected cases are reported immediately and investigated. In the last 5 years, 16 cases have occurred, mostly in fringe population groups. Health professional groups are still not sufficiently aware of poliomyelitis and standard criteria for case definitions, reporting and investigations need to be introduced. A commission is expected to be set up to follow up cases.

Turkey

Although some concern exists about the accuracy of immunization coverage data, through the use of imprecise target populations, the number of doses used in the Expanded Programme on Immunization (EPI) has steadily increased. Cluster sample surveys from 1989 suggest that coverage is improving, and data on coverage and disease surveillance are now fed back quarterly to service providers. Individual provinces carry out monitoring, but clearly still too many opportunities are missed. AFP surveillance started in 1989, and in 1990 there were 86 suspected cases, 24 of which were confirmed to be poliomyelitis. In the first half of 1991, there were 32 suspected cases from 20 provinces: 4 were poliomyelitis, 16 were not, and 12 are still pending identification. These data suggest that AFP surveillance identifies less than 1 per 100 000 cases in children under the age of 15 years, indicating the possible need to strengthen surveillance. The interval between the onset of paralysis and reporting is still too long but is diminishing.

USSR

In 1989, 91 cases were reported, but in 1990 these rose to 337, mostly in Azerbaidjan, Turkmenia and Uzbekistan with some also occurring in

Armenia and Georgia. These republics are still at stage C (defined as reporting 10 or more cases a year and with immunization coverage above 50%). Only sporadic cases have occurred in Byelorussia, Kazakhstan, Kirgiziya, Moldavia, Tadzhikistan and the Ukraine. Recent reports suggest that there was an outbreak during the summer of 1991 in Tadzhikistan. No cases of poliomyelitis have been reported from Estonia, Latvia and Lithuania, which are considered stage A countries. Despite reports of high immunization coverage throughout the USSR, 84% of cases occur in individuals who have not been fully immunized; 70% of virus isolates are human poliovirus 1, 17% human poliovirus 2 and 13% human poliovirus 3. The fact that less than 50% of reported cases are virologically investigated gives concern.

United Kingdom

Immunization coverage in the United Kingdom is now over 90%, with around 75% of districts reaching or exceeding this figure. Data are available quarterly from all districts and can now be obtained by individual general practitioners for the cohorts of children for whom they are responsible. Any possible pockets of low uptake can thus be identified and action taken. No cases of acute paralytic poliomyelitis have been caused by wild poliovirus since 1978, and all cases in the last five years have been either vaccine-associated (contacts or recipients) or imported. Nevertheless, from 1 July 1991, the British Paediatric Surveillance Unit has instituted active stimulated surveillance of AFP. Under this scheme, all consultant paediatricians are asked to report once a month on any of 12 rare conditions, one of which is AFP. All paediatricians have received a protocol for case definitions, reporting procedures and laboratory investigations. In the first month of the study, six cases of AFP were reported against an expected eight cases, using a rate of 1 per 100 000 children under the age of 15 years.

Discussions have taken place about the most suitable form of environmental surveillance, concentrating on either sewage analysis or formal investigation of all stool samples shown to contain poliovirus in otherwise healthy young children. At present, all such cases reveal a recent history of immunization.

USA

Since the introduction of Salk and then Sabin vaccine, reports of acute paralytic poliomyelitis have fallen to exceptionally low levels. There are continuing reports of vaccine-associated poliomyelitis and occasional importations, but no cases of poliomyelitis due to wild poliovirus. Surveillance of reports of enteroviruses have failed to identify any wild polioviruses, yet surveillance appears sufficiently sensitive to detect outbreaks and/or sporadic cases of illness caused by enterovirus 71, human echoviruses or human coxsackievirus B. Cases of paralysis caused by poliovirus are therefore highly unlikely to go undetected.

Yugoslavia

Cases of poliomyelitis caused by wild poliovirus have occurred in 1989, 1990 and 1991. A considerable amount of work still needs to be done to improve immunization coverage, surveillance, the cold chain, laboratory services, case definitions and case investigations.

Laboratory services

Laboratory services have an essential role in poliomyelitis elimination activities by detecting wild polioviruses and determining the effectiveness of these activities.

In low incidence areas such as much of the European Region, laboratories are able to isolate viruses and provide diagnostic serology, type identification and intratypic differentiation in all cases. A coordinated effort is urgently needed, however, in the molecular characterization of poliovirus genotypes circulating in Europe. In some countries, environmental surveillance shows the intermittent presence of wild poliovirus, even when no wild poliovirus cases have occurred for many years.

The global programme on EPI calls for a network of national, regional and global laboratories. The responsibilities of national laboratories are the confirmation of cases, potency testing of vaccines, sero-epidemiology, environmental surveillance, standardized reporting to national programme managers and participation in the global network. Regional responsibilities are to coordinate the response to national needs, provide back-up for countries without laboratory services, distribute cell lines and standardized reagents, and undertake quality control work and advanced testing. Specialized reference laboratories assist in the provision of reference and standard materials, act as a resource for training, undertake molecular characterization and develop diagnostic techniques.

Problems that remain for laboratory services in the European Region are the collection and transmission of samples, communication between clinicians, epidemiologists and virologists to ensure rapid diagnosis, delays between the collection of specimens and the availability of results and, most importantly, lack of financial resources.

Certification

The three requirements for certification of poliomyelitis elimination will be:

— failure to detect any wild poliovirus;

— evidence of sufficient activities to interrupt transmission;

— documentation to show that cases would have been detected by existing surveillance.

The requirements for certification are complicated, however, by particular circumstances. The poliovirus causes the same clinical picture as other viruses and hence the clinical diagnosis is not specific. The virus may be irregularly excreted by infected cases; vaccine-associated cases and subclinical infections occur and viruses may persist in the environment. Awareness is low in many countries so staff

have little incentive to investigate cases or report them. They also have difficulty conducting retrospective analyses.

To fulfil certification criteria, it will be necessary to demonstrate certain facts about the operation of the eradication programme and the clinical surveillance and viral surveillance in use.

Proof must be available that the programme would stop disease, provides high levels of immunization coverage in all geopolitical areas, has an effective cold chain, applies appropriate surveillance, uses programme indicators, has detailed laboratory records and uses health care staff with sufficient awareness of the importance of poliomyelitis diagnosis.

Clinical surveillance should involve the appropriate investigation of all cases of AFP (except facial palsy), regular zero reporting from all geopolitical areas, investigation of vaccine-associated cases, and high public and professional awareness.

Viral surveillance should include detailed laboratory records, sampling for wild poliovirus in high-risk groups such as patients with meningitis, contacts of cases of AFP, and cases of facial palsy, and environmental sampling.

Environmental sampling poses as yet unanswerable questions, although it will be an essential part of the certification process. The methodology of sampling is unresolved in terms of the size or volume of materials, the virus detection methods, the site, frequency and duration of sampling, the population to be covered, the significance of positive findings and the action to be taken.

Conclusions

1. Having previously been the Region with the lowest morbidity from poliomyelitis, Europe has now been overtaken by the Region of the Americas. The number of poliomyelitis cases in Europe has increased

in part because of outbreaks in the USSR and the Balkan countries and in part because of improvements in surveillance.

2. Despite high levels of immunizaton coverage reported from many countries, some with highly sophisticated infrastructures still have wild poliovirus in circulation.

3. Surveillance is improving but much needs to be done to introduce the timely surveillance of AFP and case investigations. The laboratory network needs to be strengthened and requires more financial support if poliomyelitis is to be eliminated. The molecular investigation of European polioviruses is a priority.

4. The considerable political changes of 1990 and 1991 will undoubtedly have a major impact on communicable diseases as people become more mobile and services are disrupted. These changes will have important implications for poliomyelitis elimination activities in Europe. Priority will need to be given to the provision of services for hard-to-reach groups, such as travelling families, who are the foci for the continuing transmission of the poliovirus in many countries.

Recommendations

Immunization coverage

1. In addition to data on national immunization coverage, data on the proportion of districts reaching or exceeding 90% coverage should be made available regularly. Appropriate plans should be made to ensure coverage is improved in any districts or population groups with low uptake.

Surveillance

2. In addition to the routine clinical reporting of suspected cases, there should be secondary reporting at the national level through the laboratory networks. All countries should develop appropriate methods

for their health systems to collect information on AFP, to ensure that no possible poliomyelitis cases are overlooked. As a first step, countries should evaluate their surveillance systems to investigate whether any cases of poliomyelitis caused by wild poliovirus could have occurred, but not been detected.

3. Surveillance of seroconversion may help to identify any susceptible groups where immunity is less than optimal. Immunization campaigns with appropriate vacines should then follow.

4. Countries receiving national reports on poliomyelitis weekly or monthly should report to the WHO Regional Office for Europe weekly or monthly, as appropriate. Countries not yet reporting to the Regional Office should start doing so as soon as possible at convenient regular intervals, including zero reporting at these intervals. The Regional Office in turn should provide regular summaries to all countries based on these reports.

5. Indicators of surveillance should be developed, such as the proportion of cases that have had appropriate samples taken, or the frequency of samples.

6. Countries should have a policy ready for outbreak control that includes the maintenance of adequate vaccine stocks, a system for emergency distribution, the selection of appropriate target populations and resources to meet containment needs.

Laboratories

7. Networks of national and regional laboratories should be established as soon as possible, and indicators of laboratory services should be developed, such as the time between the arrival of samples and the issuing of reports.

8. The European regional laboratories should be supported in their attempts to characterize European wild polioviruses through molecular techniques.

Annex 1

ERADICATION OF POLIOMYELITIS IN EUROPE: PLAN OF ACTION 1991 – 1992

The main background used for the preparation of the plan of action was:

— a list of identified problems;

— the targets set for poliomyelitis eradication for 1991;

— recommendations made at the latest European Meeting of National Programme Managers on EPI, at St Vincent, Aosta, Italy, in May 1991;

— recommendations made at the 13th Global Advisory Group Meeting on EPI, Cairo, in October 1990;

— the progress report on EPI to the fortieth session of the Regional Committee, Copenhagen, in September 1990;

— the project proposal for the 1992 – 1993 regional budget.

The main problems affecting poliomyelitis eradication activities in Europe are as follows:

— the low priority given to EPI and poliomyelitis eradication activities by the ministries of health of many countries of the Region;

— the low immunization coverage in certain areas, especially in those with a high level of transmission of wild poliovirus;

— inadequate surveillance systems in many countries;

— the poor operation of the reporting systems for poliomyelitis at local, national and regional levels;

— lack of laboratory support in certain countries;

— unclear availability of vaccines (including OPV) for the national immunization programme in certain countries of eastern Europe.

The extent to which the targets for 1991 were achieved is as follows.

The first target was (*a*) to reduce transmission of wild poliovirus in Turkey and the USSR, and (*b*) to stop transmission in France, Romania and Yugoslavia. Whether transmission was reduced in Turkey and the USSR is still unclear. Transmission was halted only in France.

The second target was to improve surveillance:

(*a*) *at the local level* through reporting of suspected cases, proper investigation of cases, collection of specimens, and monitoring of immunization coverage;

(*b*) *at the national level* through monitoring of immunization coverage by districts, follow-up on case investigation, quality control of national surveillance systems and follow-up action and, where appropriate and possible, initiation of the monitoring of wild poliovirus in the environment;

(*c*) *at the regional level* through the development of better relations with countries, feedback on the poliomyelitis situation, and monitoring of morbidity from poliomyelitis on a district basis.

Few positive changes have occurred at any of the three levels, but much has yet to be done.

The third target was to develop a regional laboratory network. The plan of action is in the final stage of preparation; operational activities have already been initiated by the regional programme on EPI with the assistance of the global programme on EPI.

The fourth target was to develop criteria for certification of a country as free of poliomyelitis. These criteria were adopted in St Vincent, Aosta, in May 1991.

The fifth target was to strengthen national training activities. Documents or training materials produced by the EPI were used in Bulgaria, Turkey and the USSR.

The regional target proposed for 1992 – 1993 is to increase the proportion of the population in Europe living in areas free of poliomyelitis to 85 – 90% by the year 1993. Some 41% of the European population live in areas free of poliomyelitis at present. To achieve this target, poliomyelitis eradication activities must be reinforced in different areas, starting in those where poliomyelitis is still endemic.

The highest priority throughout the Region must be given to efforts to increase immunization coverage. High priority should also be given to the implementation of aggressive policies to control outbreaks, and to surveillance. Laboratories should concentrate on improving both case diagnosis and environmental surveillance.

On the basis of the above developments, the preliminary plan of action for 1991 – 1992 could be proposed as follows.

1. At the country level, surveillance should be improved by:

(*a*) putting into use a poliomyelitis reporting form (for countries at stages A and B);

(*b*) collecting monthly reports on poliomyelitis cases on a district basis and informing the regional programme on EPI accordingly (countries at stage C);

(*c*) collecting and reporting the number of suspected poliomyelitis cases (all countries);

(*d*) improving case investigation (all countries);

(*e*) monitoring of immunization coverage by district, at least twice a year (all countries participating in the meeting);

(*f*) carrying out a project on the surveillance of AFP in children under the age of 14 (United Kingdom);

(*g*) carrying out a project to review the case definition of poliomyelitis (Turkey and the USSR jointly with the Centers for Disease Control in Atlanta, GA, USA).

2. At the country level, immunization coverage should be increased, especially in geographical areas where poliomyelitis is still being reported, by:

(*a*) implementing mopping-up operations (Romania, Turkey, USSR, Yugoslavia);

(*b*) applying aggressive policies to control outbreaks (countries affected or all countries).

The assistance of the regional programme on EPI may be necessary.

3. At regional level, the reporting system on poliomyelitis should be improved by:

(*a*) encouraging countries at stages A and B to use the poliomyelitis reporting form to report immediately to the regional programme on EPI each notified case of poliomyelitis;

(*b*) promoting the recommendation of the Fourth European Meeting of National Programme Managers on EPI (at St Vincent, Aosta, in May 1990) on the reporting of cases of AFP;

(*c*) providing regular feedback to all Member States.

4. At the regional level, laboratory support for poliomyelitis eradication activities should be improved by:

(*a*) putting into operation the laboratory network (with the assistance of the global programme on EPI);

(*b*) coordinating the work of the regional laboratory network.

5. At the regional level, the availability of OPV should be assured in each European country (with the assistance of the global programme on EPI).

6. At the regional level, the procedure for the certification of a country as free from poliomyelitis should be agreed on by:

(*a*) finalizing the methods and process of certification (with the assistance of the global programme on EPI);

(*b*) following up on the results of the comparative study of methods for monitoring wild poliovirus in the environment;

(*c*) assisting countries to establish a system for monitoring the occurrence of wild poliovirus in the environment.

Annex 2

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