

Report on the

**Third intercountry meeting of
national containment coordinators for
laboratory containment of wild polioviruses
and potential infectious materials**

Amman, Jordan
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1. INTRODUCTION

The third intercountry meeting of national containment coordinators for laboratory containment of wild polioviruses and potential infectious materials was held in Amman, Jordan, on 27–28 August 2003.

Dr Faten Kamel, Medical Officer, Polio Eradication, EMRO, welcomed the participants and delivered a message on behalf of Dr Hussein A. Gezairy, WHO Regional Director for the Eastern Mediterranean. In his message, Dr Gezairy welcomed the participants and thanked the Government of Jordan for hosting the meeting. He drew attention to the global and regional progress towards polio eradication. He urged countries which had been polio free for more than 2 years and were behind in implementation of their national containment plans to accelerate their activities and to resolve any obstacles facing implementation of containment activities. He stressed the need for all countries to utilize the containment quality assessment guidelines to ensure the quality, thoroughness and accuracy of conducting the laboratory survey and establishing the national inventory.

Dr Ali Assaad, Assistant General Director Primary Health Care, Jordan, welcomed the participants and delivered a message from His Excellency Dr Hakem Al Qadi, Minister of Health. In his message, the Minister drew attention to the commitment of the Government of Jordan to all polio eradication activities. He also pointed out that Jordan, which had maintained polio free status since 1992, was prioritizing the completion of Phase I of its National Containment Plan, initiated in 2001.

Dr Vandah Barakat (Lebanon) was elected Chairperson for the first day and Dr Hala Saba (Syrian Arab Republic) for the second. The programme and list of participants of the meeting are included as Annexes 1 and 2, respectively.

2. STATUS OF IMPLEMENTATION OF THE RECOMMENDATIONS OF THE LAST MEETING

Dr S. Hafez, WHO/EMRO

- Recommendations of the second intercountry meeting of national containment coordinators addressed the countries of the Region according to the state of implementation of phase I containment requirements.
- Countries of the Region that have not reported polio cases for more than one year and are reasonably assured that indigenous wild poliovirus circulation has been interrupted were strongly encouraged to start implementing containment activities. This recommendation addressed the Libyan Arab Jamahiriya, Sudan and Yemen. The Libyan Arab Jamahiriya and Sudan responded.

- All countries currently implementing containment activities were asked to:
 - Identify obstacles hindering the implementation of containment activities and create a plan for overcoming these obstacles. This recommendation addressed 7 countries: Egypt, Iraq, Jordan, Kuwait, Morocco, Syrian Arab Republic and Tunisia. Obstacles were identified and dealt with accordingly. The war in Iraq and the looting of the NPL were a major challenge to containment yet the containment committee in Iraq appropriately dealt with the situation through appropriate and documented collection and destruction of all poliovirus materials from three laboratories.
 - Establish a computerized containment database to facilitate entry, analysis, and updating of data generated by the laboratory containment process. Necessary modifications were made in the containment database and were demonstrated during the third Intercountry meeting. A few countries were utilizing *EPI Info* for data entry and analysis.
 - Establish a national inventory and provide detailed supporting documentation of all laboratory containment activities, to be presented to the NCC for review and endorsement. All eligible countries submitted summary of their activities within the annual updates for RCC. Six countries submitted the inventories of their NPL (all except Kuwait). Formats for containment documentation awaited the finalization of the quality assessment guidelines, which are expected to provide the appropriate framework for written documentation of containment activities.
- All countries that have completed Phase I containment activities were required to create a plan for regular updating of the national containment database and national inventory and submit an annual report to the NCC and RCC. All nine countries that completed Phase I activities submitted an update on containment activities as part of the annual update for the RCC.
- Countries were asked to identify laboratories at high risk of receiving clinical materials from individuals recently arriving from polio endemic areas. Periodic contact with these laboratories was required to ensure compliance to BSL-2/polio and that they are not storing potential infectious materials. In response to this recommendations EMRO alerted Djibouti if any laboratories particularly in border areas of southern part are receiving samples from refugees and nomads from Somalia and Ethiopia (last case 2001). Attention was directed to laboratories in high risk areas in Islamic Republic of Iran: Khorasan, Sistan va Baluchistan and Kerman as well as other areas with Afghanistan refugees.
- WHO was expected to provide countries with the quality assessment tool and documentation format for reporting implemented containment requirements. The tool is now finalized, is enclosed in the background materials of the meeting. It will be presented during the course of the ongoing meeting and further discussed by the working groups.

3. GLOBAL STATUS OF POLIO ERADICATION

Dr E. De Gourville, WHO/HQ

The global polio eradication initiative continued to witness remarkable progress. Between 1988 and the end of 2002, the number of polio endemic countries decreased from 125 to 7. In 2002, 1918 cases were reported from 7 countries in the globe as compared to an estimated 350 000 cases in 1988. Type 2 wild poliovirus has not been detected worldwide since October 1999, in the presence of an improved and sensitive surveillance. Poliovirus transmission continued in 2002 in Afghanistan, Egypt, India, Niger, Nigeria, Pakistan and Somalia. All endemic countries except Somalia continued to report wild polio cases in 2003.

A considerable increase in number of cases occurred in India in 2002, where 1600 cases were reported, which accounted for 85% of global wild polio cases, as compared to 268 cases in 2001.

AFP surveillance has attained certification standard quality in most countries of the world. In 2002 the annual non-polio AFP rate per 100 000 population <15 years of age remained well above the required rate of 1.0 in all regions and endemic countries, but concern remains in a few countries like Algeria. In 2002, WHO regions reached the certification standard requirement of collection of 2 adequate stool specimens from at least 80% of AFP cases. However, Somalia and Djibouti in the Eastern Mediterranean Region and Chad in the African Region remained below the required rate.

In Nigeria, 202 cases were reported in 2002, which was more than the preceding year; this increase was result of both an outbreak and improved surveillance. A decline in number of cases reported is seen in 2003. Most of the cases were reported from the northern states, yet few cases have been reported from southern states, which were polio free for more than a year. In some parts of Nigeria cases occurred recently even after SIAs. Programme implementation was affected by ongoing security concerns and elections in the second quarter of 2003.

The impact of efficiently implementing polio eradication strategies resulted in reducing the transmission of poliovirus in Pakistan. The number of cases dropped from 119 in 2001 to 90 in 2002. During 2002, cases were reported from 35 districts, compared to 39 in 2001 and 59 in 2000. In 2003, 54 cases were reported up to August.

In 2002, cases were detected in India from all along the Northern border. In 2003, virus transmission decreased to a great extent and less transmission was detected, but remaining concerns were appearance of wild polioviruses in Andhra Pradesh, West Bengal, Karnataka and Rajasthan, which were previously polio free, but these were importations from the north, rather than re-establishment of infection.

Genetic data indicated imported viruses in Burkina Faso and Zambia in 2002 and in Lebanon and Ghana in 2003. It also indicated the persistence of endemic genotypes in Afghanistan, Egypt and Pakistan but decreasing genetic diversity. It also indicated the persistence of P3 genotype for several years in Somalia. The decrease from 3 to 2 genotypes

in Nigeria yet increased diversity of the two remaining genotypes was due to the outbreak in 2002 and improved surveillance. Nigeria and Niger have the same genotypes. Genetic data also indicated that two indigenous genotypes persist in India with wider spread outside of Uttar Pradesh and Bihar in 2002 and reestablishment of transmission in some areas, e.g. West Bengal and Madhya Pradesh.

Vaccine-derived poliovirus (VDPV) outbreaks had been reported previously in Egypt, type 2, 32 cases in 1988–1993, in Hispaniola type 1, 21 cases in 2000–2001, in Philippines type 1, 3 cases in 2001, and in Madagascar type 2, 4 cases in 2002. These outbreaks are attributed to low immunization coverage and poor surveillance. In October 2002, laboratories started reporting VDPVs from AFP cases, healthy children and sewage samples. VDPVs were reported from 3 AFP cases in the Syrian Arab Republic from 2001, detected in 2002 due to delay in genomic sequencing. VDPVs were also detected in 2002–2003 from AFP cases in Nigeria, Kazakhstan and China; from healthy children in Thailand and Mongolia; and from sewage in Estonia and Slovakia. These VDPVs did not cause any outbreaks.

In India, wild poliovirus type 2 (MEF-1) was detected in 7 AFP cases, 1 contact and 1 environmental sample between November 2002 and February 2003. The MEF-1 virus is used in IPV production and is a commonly used laboratory reference strain. After long investigations, which are still ongoing, it was found that these were linked with contaminated OPV. The main issue is to determine the source and mechanism of MEF-1 contamination of OPV.

In 2003, a strategy was designed to cope with the funding shortfall. The available resources were targeted to remaining polio endemic countries and 6 other countries at risk of re-establishing transmission (Angola, Bangladesh, Democratic Republic of Congo, Ethiopia, Nepal and Sudan). The main strategy is to increase quantity and quality of SIAs in remaining endemic countries to achieve interruption of wild poliovirus transmission. In addition, advocacy efforts are being strengthened in remaining endemic and at risk countries to increase political commitment.

4. REGIONAL STATUS OF POLIO ERADICATION

Dr F. Kamel, WHO/EMRO

Significant progress towards the eradication of poliomyelitis is continuing in all countries of the Eastern Mediterranean Region. The number of cases shows relatively regular decrease to a minimum in 2002, in the presence of a well developed and efficiently performing surveillance system. As of the end of 2002, poliovirus transmission had been interrupted in 18 countries of the Region for more than 3 years. In addition, Sudan has not reported wild poliomyelitis cases since April 2001. The number of confirmed cases of poliomyelitis during 2002 was 110 cases, reported from only 4 countries of the Region (Pakistan 90, Afghanistan 10, Egypt 7, and Somalia 3). Up to August 2003, 54 cases were reported. Fifty of these cases were from Pakistan, two were from Afghanistan, and one was from Egypt. One wild poliovirus importation into Lebanon was detected; the virus was genetically linked to virus strains from Uttar Pradesh, India.

In Afghanistan during 2002, cases were detected mainly in the southern region. During 2003, only two confirmed cases due to wild poliovirus type 3 were detected, one in the north-eastern region (Nangarhar province), and the other in the southern region (Kandahar). These cases were in areas bordering Pakistan where shared transmission between both countries had been observed before.

In Pakistan, efficient implementation of polio eradication strategies resulted in reducing the transmission of poliovirus. The number of cases dropped from 119 in 2001 to 90 in 2002. During 2002, cases were reported from 35 districts, compared to 39 in 2001 and 59 in 2000. During 2003, 50 cases were reported up to August.

In Egypt, in contrast to past years, cases were reported mostly from Lower Egypt and greater Cairo during 2002. All cases were of type 1 with onset in September or later, after intensification of surveillance activities which started in July 2002. Egypt is supplementing AFP surveillance with sampling from wastewater (environmental surveillance). The proportion of poliovirus positive environmental samples has declined from 16% in 2002 to 5% to date in 2003 (6 of 122 samples). Most of the viruses are from one cluster shared by Cairo, Sharkia, Minya and Beni Suef.

In Somalia, only three cases were identified during 2002, all in the highly populated Mogadishu region and nearby. No cases have been reported in 2003 to date.

All endemic countries of the Region continued to conduct NIDs and SNIDs, with independent monitoring conducted promptly to allow corrections to be made in subsequent rounds. Surveillance has improved and the non-polio AFP rate increased in 2002 and 2003 from 2.28 to 2.39 cases per 100 000 children, respectively. Adequate specimens are being collected from 90% of AFP cases.

As the polio eradication initiative moves into its final phase, with only four endemic countries in the Region at the end of 2002, increasing attention is being given to polio "endgame" issues: the laboratory containment of wild poliovirus, the certification of polio eradication and the development of post-certification immunization policy.

Poliomyelitis eradication activities are very closely monitored in the countries of the Region. Surveillance reviews have been conducted in Afghanistan, Egypt, Islamic Republic of Iran, Sudan and Yemen. In general, these have provided additional confidence in AFP surveillance systems. As well, Technical Advisory Groups (TAGs), for the priority countries regularly review the epidemiological situation and national plans and provide technical advice. Their collective conclusions indicate that if high-level commitment to achieve polio eradication is continued with enhanced strategy implementation, it is likely that poliovirus transmission in the Region will be interrupted in early 2004.

By the end of 2002, 18 countries had prepared a national plan for laboratory containment of polioviruses. It should be noted that 3 out of the remaining 5 countries still have ongoing virus transmission. The first phase of the plan has been successfully completed in 9 countries and is currently being implemented in another 9.

According to the recommendations of the Global and Regional Commissions for Certification of Poliomyelitis Eradication, all countries except Somalia have established National Certification Committees (NCC) with appropriate membership. The NCCs of 15 Member States that have high quality AFP surveillance and have not reported cases of poliomyelitis for at least 3 years submitted reports and national documentation to the Regional Commission for Certification of Poliomyelitis Eradication (RCC). The RCC accepted these reports. It is continuing to review annual updates from countries with satisfactory initial reports until regional certification. The RCC continues to guide all aspects of the certification process in the Region. Some of its members have made country visits to review the status of the certification activities and available documentation

The regional eradication programme, which is now passing through its final and most difficult phase, faces a number of challenges and constraints that must be surmounted in order to achieve polio eradication. It is crucial to maintain the political support and commitment in all countries of the Region. This must be done in endemic countries in order to avoid fatigue, ensure quality and accomplish the job as soon as possible, and in polio-free countries in order to consolidate the achievement until eradication can be certified. It is vital to ensure access to all children, especially those residing in insecure areas and in countries affected by war. Securing the required financial support for implementation of high quality activities is another major challenge facing the programme.

5. GLOBAL PROGRESS IN LABORATORY CONTAINMENT

Mr C. Wolff, WHO/HQ

Progress continues to be made globally with laboratory containment of wild polioviruses. All but one country (Switzerland) in the 3 WHO regions certified as polio-free have started containment activities. Many countries in polio endemic regions have also started the laboratory survey and inventory activities. Eighty countries have reported completing the inventory and a majority of these identified at least one laboratory in the country with wild poliovirus materials. Experience has shown that the survey and inventory can be successfully implemented in a wide variety of country settings and that they are effectively identifying laboratories around the world with wild poliovirus materials. Virology laboratories continue to present unique concerns that do not face other laboratory specialities, due to a number of reports of identifying wild poliovirus in mislabelled viral stocks and a report in *The Lancet* by Dr Tapani Hovi of contaminated cell lines. It is anticipated that all polio non-endemic countries can complete the Phase I activities by the end of 2004. A challenge to meeting this goal is addressing the problems of non responding laboratories and the lack of commitment, and deficient financial or human resources in some countries that are conducting the survey.

Progress is also being made in the development of containment policy for global certification. The second edition of the global action plan for containment is complete and in the process of publication. Guidelines for Phase II have been drafted, and guidelines for documenting the quality of Phase I wild poliovirus laboratory containment activities have been completed and are ready for distribution to countries.

6. REGIONAL PROGRESS IN COUNTRIES THAT COMPLETED THE IMPLEMENTATION OF PHASE I ACTIVITIES

Dr S. Hafez, WHO/EMRO

Nine countries of the Eastern Mediterranean Region have completed the implementation of Phase I containment requirements. Four countries had a national laboratory list comprising fewer than 25 laboratories: Bahrain (15 laboratories), Djibouti (20 laboratories), Qatar (22 laboratories) and United Arab Emirates (20 laboratories). Another four countries had fewer than 500 laboratories: Cyprus (221 laboratories), Lebanon (356), Oman (134) and Saudi Arabia (395). One country, Islamic Republic of Iran, listed 4545 laboratories. All laboratories on the National list of these countries were contacted, and all responded appropriately. No laboratories were identified to keep poliovirus or potential infectious materials in Bahrain, Djibouti, Lebanon, Qatar, and United Arab Emirates. Cyprus and Saudi Arabia each identified one laboratory, Oman identified two, and four were identified in the Islamic Republic of Iran. Oman carried out documented destruction of all infectious materials held by both laboratories identified.

The implementation of phase I containment activities in these 9 countries provides experience that could assist other countries of the Region in designing and implementing their containment plans. Strong political endorsement and support, an effective National Containment Coordinator, a well written nationally approved plan, a comprehensive national laboratory list, a high quality laboratory survey where compliance was assured with timeline set for distribution of survey questionnaire, receipt of reply to questionnaire, follow-up on non-responders, and analysis of responses were key elements for high quality phase I activities that led to the compiling of a thorough national inventory.

7. COUNTRY PRESENTATIONS ON PROGRESS OF IMPLEMENTATION OF PHASE I ACTIVITIES

7.1 Egypt

Dr Ossama Rasslan, National Containment Coordinator

Egypt is still polio endemic; the last confirmed poliomyelitis case was reported from Minya governorate in June 2003. This was concomitant with positive environmental samples from Minya governorate.

Out of a total of 8212 registered laboratories, 7719 were contacted in August 2003, and 2440 responded to the survey questionnaire. There is also a considerable number of unregistered laboratories. It has been noted that a large majority of non-responding laboratories belong to primary health care units, with limited or no freezing capacity and very remote risk of holding wild poliovirus infectious or potential infectious materials, and for which a risk assessment is to be calculated to justify their exclusion from the national survey. Future activities include coordinated multisectoral efforts to raise awareness among laboratory workers, verification visits to laboratories, ensuring the implementation of BSL-

2/polio by laboratories holding poliovirus materials, as well as preparation for the Global Certification Phase.

7.2 Iraq

Dr Muneim Fethi, Chairperson of Containment Committee

The last wild poliovirus isolated in Iraq was in January 2000. Implementation of Phase I of the National Containment Plan was launched in January 2001 with the nomination of the National Containment Coordinator and members of the national multisectoral task force. The National Plan for Containment was developed and by April 2001 the national list of laboratories was prepared. Containment activities during 2001–2002 included:

- Organization of two containment conferences for focal persons in governorates to discuss survey issues.
- 22 field visits to institutions, laboratories and health directorates searching for laboratories with facilities for long-term storage of biological materials.
- 16 meetings conducted between committee members and focal coordinators and regional facilitators to seek information on laboratories with large freezing capacity, or those with previous research activities on enteroviruses, which may be holding virus strains for future research.
- Assessing the laboratories known to hold wild poliovirus infectious or potential infectious materials for proper implementation of biosafety level 2 measures, and ensure appropriate containment and handling of specimens.

All laboratories on the national list (788) were contacted; 451 (57.2%) responded and 339 (43%) were visited. Three laboratories were identified as holding poliovirus materials; NPL, National Control of Drugs and Research Centre (NCDRC), and the Nahrain Medical College, formerly Saddam Medical College. The materials included 71 wild poliovirus isolates in 1009 tubes, 60 seeds of poliovirus vaccine, and 200 seeds of polio virus vaccine in the three identified facilities, respectively. Collection and documented incineration of these materials were carried out following the looting of the laboratories.

7.3 Jordan

Dr Ali Muheidat, National Containment Coordinator

A national containment coordinator was assigned in November 2000, and the national containment committee was appointed in February 2001. Technical and administrative support was provided as required. The National Plan was drafted by the coordinator with help of WHO consultants in January 2001, approved by the national containment committee in April 2001, and endorsed by the Ministry of Health in May 2001. A timeline for activities was set in March 2001 and was revised three times in May 2001, in October 2001 and in September 2002. The national list comprised laboratories affiliated with Ministries,

universities and drug manufacturing companies. The total number of laboratories on the national list is 407 laboratories.

All survey forms were returned to the national coordinator. The response rate was 31%, 16%, and 45% to the initial survey questionnaire, first reminder and following reminders (>2), respectively. Twenty-seven (6.6%) laboratories responded by phone. Thirty-two laboratories were not functioning thus were not included in the national list. Thirty-four laboratories (9.6%) were subjected to verification visits. Only one laboratory was identified as holding potential infectious material; the National Polio Laboratory.

The main obstacles that led to delay in the implementation of the national plan were lack of updated lists of health institutions, lack of interest by the private sector and financial constraints. Future plans include regular updating of the national laboratory list, and maintaining communication with biomedical laboratories to ensure their compliance in implementation all phases of the national containment plan.

7.4 Libyan Arab Republic

Dr Salem Al Agili, National Containment Coordinator

A national coordinator was identified and a multisectoral National Containment Committee was established in February 2002. The committee is composed of six persons representing the Ministry of Agriculture and the military. Members of the containment committee prepared a national plan for identifying and surveying all laboratories in the country. A comprehensive questionnaire was prepared including elements on supervision of containment activities, analysis of survey data, verification visits and implementation of appropriate containment measures. The survey will start in November 2003 following finalization of a ministerial decree to impart authority and encourage compliance to the survey. The total number of centres to be surveyed is 240.

7.5 Morocco

Ms Amal Alla, country representative

The list of national laboratories was reviewed and updated after comparison with laboratory lists from syndicates of chemists, biologists and physicians and commercial medical registers indicated that the national laboratory list submitted to EMRO was incomplete. The total number of laboratories on the national list at the moment is 635 laboratories, as compared to the previous figure of 354. Laboratories that were missed from the national list were contacted. The national inventory is still to be reviewed according to the results of the survey. Containment data are maintained in an *EPI Info* program, and conversion to the *Access* system provided by EMRO is in progress. WHO assistance is needed in organizing an awareness meeting.

7.6 Palestine

Mr Zakaria Al Astal, Country representative

Laboratory services in the Ministry of Health are at three levels: central, intermediate and peripheral. The central laboratories are reference laboratories. They are specialized for advanced analyses and receive samples from the governorates. The intermediate laboratory is hospital based, serving inpatients and outpatients, while the peripheral laboratory is localized within the primary health care centres. There are 67 peripheral, 15 intermediate and 2 central laboratories in the Ministry of Health.

No steps have been taken to prepare a national containment plan. The present political situation in Palestine necessitates having two containment coordinators and containment committees, one for Gaza and one for the West Bank.

7.7 Sudan

Dr El Nageeb Saeed, National Containment Coordinator

The national containment coordinator was designated in January 2002 and a National multisectoral containment committee was established. The national plan has been prepared, reviewed and officially approved. The survey of laboratories has already started in 6 states. So far 313 laboratories have been listed. Survey results indicate that 7% (22) of laboratories have freezing capacity; only four are holding potential infectious materials (1.3%) and none of the laboratories are holding wild poliovirus infectious materials.

7.8 Syrian Arab Republic

Dr Hala Saba, National Containment Coordinator

The delay encountered in the implementation of the National Containment Plan was partly attributed to the lack of response from laboratories affiliated with the private sector and universities to address this problem, a list of these laboratories was prepared, meetings with the Director of the Private Laboratory Association and the contact person responsible for laboratories in university were organized, and the forms were sent through them.

The total number of laboratories on the national list is 1690, and includes those affiliated with the private sector (828), public sector (436), and Ministry of Health hospitals (375). The response rate from these laboratories was 79% (654 laboratories), 66% (290 laboratories) and 35% (130 laboratories), respectively. Only one laboratory was identified as keeping wild poliovirus, namely the national polio laboratory, the updated inventory of which has been submitted.

Follow-up of non-responders, verification visits to laboratories, and proper management of data through utilizing the *Access* containment database provided by EMRO has been planned. Stool samples were properly discarded by the responsible committee, and disposal was documented. Remaining samples will be destroyed later.

7.9 Tunisia

Dr Olaf Bari, Institut Pasteur de Tunis, Tunisie

During 2000, a multisectoral national committee for containment (NCC) was appointed and its coordinator was assigned. During 2001, the National Containment Committee approved the national containment plan and the questionnaires proposed for use in a national laboratory survey. In 2001, lists of laboratories under ministries of health, higher education, agriculture and environment were received and the survey questionnaire was distributed to laboratory. In 2003, lists from ministries of defence and social affairs were received. Laboratories lists from ministries of industry, commerce and economy were not yet available. In April 2003, the survey questionnaire was re-sent to non-responders, who were directly contacted in July 2003 by fax and phone.

Up to August 2003, only 68% of laboratories responded (326 laboratories from a total of 479); 12 may have infectious or potential infectious material stored in their freezers. An inventory of all laboratories surveyed was prepared and verification visits to the 12 identified laboratories initiated. In its meeting the National Containment Committee discussed plans to complete the national laboratory list, follow up non-responders, and resolve remaining difficulties.

7.10 Yemen

Dr Nabeel Ahmed Al-Romaem, National Containment Coordinator

No wild poliovirus has ever been isolated from Yemen. The last clinically diagnosed case was in 1999. Recently a national containment coordinator was assigned. No national containment committee has been established and the national plan is not yet prepared.

8. POLIO TYPE 2 MEF-1 DETECTION IN INDIA

Dr W. Dowdle, WHO, Temporary Adviser

In October 2000, the Lucknow National Polio Laboratory (NPL) reported the isolation of wild poliovirus type 2 from stool samples collected in September 2000 from 3 AFP cases in eastern Uttar Pradesh (2) and Bihar (1). Sequencing by the Enterovirus Research Centre (ERC), Mumbai found no relation of these isolates to the wild type 2 viruses that last circulated in India in 1999, but a virtual identity with a common laboratory type 2 reference strain MEF-1. A thorough investigation revealed no source of MEF-1 in the highly competent Lucknow laboratory, but in the absence of any other plausible explanation, the isolations were attributed to laboratory contamination of unexplained origin.

Two years later, in December 2002, ERC reported the isolation of MEF-1 from 3 AFP cases from western Uttar Pradesh. Laboratory contamination was again suspected, although considered most unusual. Nevertheless, MEF-1 had been a frequent contaminant worldwide in the past, often in laboratories unaware of its presence. When ERC reported MEF-1 from 3 more AFP cases in Uttar Pradesh in January, high on the list of suspected sources for contamination was the Sabin-like anti-serum distributed by RIVM, Bilthoven for the ELISA

intratypic differentiation test (ITD). The type 2 reagent was prepared by cross adsorption with MEF-1 and some lots had been found to contain traces of virus.

This lead proved to be incorrect based on 4 observations. First, the national and international reviewers who had been invited to visit ERC found no evidence for laboratory contamination. Second, further testing confirmed the presence of MEF-1 in the original stool sample. Third, also in March, the Headband NPL independently reported the recovery of type 2 from still another case, this time in the state of Gujarat, and identified by ERC as MEF-1. Fourth, the original Gujarat stool sample, which had never been in ERC, was confirmed by RIVM as positive for MEF-1.

All evidence indicated MEF-1 was present in the stool samples at the time of arrival in the laboratories. Contamination en route to the laboratories was unlikely, as stool samples were collected by different people in different locations, and reached the laboratories by three different routes. Clearly, MEF-1 had been re-introduced into the population, and at a time of intense supplemental immunization activities.

Genomic sequencing was performed by ERC and RIVM on 11 MEF-1 isolates. Two were from the AFP cases in 2000 (the authenticity of the stool from the third AFP case was questionable). Four were from the AFP cases in 2002. Five were from 2003 and consisted of 3 isolates from the AFP cases and one each from a healthy child and an environmental sample. Sequence data from the VPI gene revealed all isolates belonged to one of 2 closely related strains of MEF-1 and all were within 2 nucleotide strains. More importantly, 4 of the isolates from 2000 (1) and 2003 (3, including one from an environmental sample) were identical. These four isolates and one from 2002 had G at VP1 position 223, constituting a unique marker for identifying one of the specific MEF-1 strains involved. There was no mutational evidence of circulation in the community, with the possible exception of the Gujarat isolate and one December 2002 isolate from Uttar Pradesh. Taken together, these laboratory findings strongly suggested multiple introductions into the population from a single source, with only limited spread.

An extensive investigation within the affected region by the Government of India and WHO in March through June 2003 revealed no potential sources of MEF-1 in diagnostic and research laboratories, or vaccine bottling facilities, nor opportunities for intermittent contamination from laboratory waste materials. Simultaneously, batches of trivalent OPV thought to have been used in the affected communities were identified and collected from the field and control authorities and shipped to the National Institute for Biological Standards (NIBSC), UK, RIVM, and ERC. Using biologic assays with Sabin-specific type 2 antiserum in the presence of type 1 and 3 antisera (or specific monoclonal antibodies), or direct PCR tests using different MEF-1 specific primers, all three laboratories in late July independently found MEF-1 in the same batch of OPV. The breakthrough virus had the characteristics of wild poliovirus, e.g., non-Sabin-like in ELISA and growth at 40.5 degrees. Sequencing confirmed the breakthrough virus to be identical to the stool isolates, with the majority virus having the unique 223G marker. Tests of all other batches used in the area have been negative to date.

The investigation into how one OPV batch was contaminated with MEF-1 in 2002, and possibly in 2000, is expected to continue for some time, but several general observations can be made. First, it is unclear during this time of intensive immunization in western Uttar Pradesh just how many of the 9 AFP cases could be attributed to MEF-1. On several occasions the vaccine was given after onset of paralysis and days before stool samples were collected. Second, and very importantly, no further isolations have been made of MEF-1 from AFP cases in India since February 2003. Third, this investigation was successful because of the high quality field and laboratory surveillance and vaccination programmes in India. There was little evidence of AFP cases being missed, case investigations were thorough and stool samples were transported and shipped promptly. Cooperation at all levels was outstanding.

9. CONTAINMENT RISKS POSED BY REFERENCE STANDARDS AND NON-POLIO STOCKS GROWN IN POLIOVIRUS PERMISSIVE CELL LINES

Dr T. Hovi, WHO Temporary Adviser

Occasional cross-contamination of specimens and mislabelling of vials are unfortunate phenomena that have been probably always occurring in biological and other laboratories. The phenomena can be counteracted by strictly following standardized laboratory procedures. The context of emerging global polio eradication and the world-wide need to contain all laboratory specimens known or suspected to harbour wild poliovirus are giving the harmful contaminants a new dimension.

The discovery of a possible wild poliovirus or a highly drifted vaccine virus in designated rhinovirus stocks (Davies et al, 2003) was a reminder about another experience from a few years ago. Poliovirus was also found in several stocks of designated prototype strains of rhinovirus obtained from a respected source. One of the poliovirus strains was partially sequenced and found to be very close to PV1/brunhilde, an old wild-type prototype strain widely used as a reference in biological laboratories. Naturally, cross-contaminations are not limited to rhinovirus stocks but may occur in any combination of two specimens handled in the laboratory with less than optimal care. Another recent experience in KTL was isolation of poliovirus type 1, strain Sabina, from a preparation which was supposed to be coxsackievirus B4, strain E2. This result was reiterated in another laboratory in Sweden, which had received the stock from the same source. Yet another experience was discovery of a wild type 2 poliovirus in a preparation intended to contain only the poliovirus Sabin 2 strain and circulated widely around Europe in a diagnostic laboratory proficiency test panel.

Poliovirus is able to replicate in most cell lines derived from primate tissues and during sequential passaging, a poliovirus contaminant can readily overgrow any more slowly replicating viruses initially present in the stock. In principle, contamination may occur whenever infectious poliovirus is being handled in a laboratory concomitantly with another virus replicating in primate cells. To avoid this, sequential passage of virus strains should be avoided, when possible, by using an aliquot of early passage of seed virus in future experiments. As a consequence of these observations the new version of the WHO Action Plan for laboratory containment contains a chapter emphasizing the need to identify all virus

stocks grown in poliovirus permissive cells, and those with uncertain passage histories, and keep only those where the identity of the virus can be documented unequivocally.

10. INVESTIGATION AND FOLLOW UP OF LABORATORY WORKERS SUSPECTED OF WILD POLIOVIRUS EXPOSURE: AN EXAMPLE FROM THE NETHERLANDS

Dr Harrie Van Der Avoort, WHO Temporary Adviser

Escape of a few ml of wild polio 1 virus (10^{5-6}), under high pressure via tiny hole in a welded joint during alarm in IPV production process took place. Seven staff members (all IPV vaccinated) were believed to have possibly been exposed. These included 4 persons close to the incident who stopped leakage by lowering pressure and covering the leak with cotton wool and hypochlorite, and who were also involved in disinfecting and cleaning of the facility and apparatus. The other three persons were further away, and left the room immediately

A similar incident took place in 1992, in which escape of 200–300 ml of concentrated wild polio 1 virus (10^{11-12} /ml) under pressure via leaking junction during alarm of IPV production process. No follow-up after the incident was carried out, by chance P1 wild type was detected by routine screening in the stool of a hospitalized child of a staff member who was directly involved in incident. Father and child were both IPV vaccinated, and no poliovirus-specific symptoms were observed.

Following the 2003 incident, questions were raised related to risk for circulation to the community from infected staff. Action taken by RIVM included the following.

- All facilities were cleaned according to routine SOPs;
- Protective clothing was discarded (contamination not visible);
- The production lot was discarded;
- Advice for the following 2–3 weeks was given to staff, who were not isolated:
 - High hygiene when using toilets at work and at home;
 - No inter-human contact in which saliva is involved;
 - No visits to unvaccinated or immune-compromised persons, and co-operation in laboratory investigation.
- Laboratory investigation serum, stools and saliva samples were taken on days, 1, 5, 10, 15 and 30.

Samples were subjected to the following laboratory investigations:

- Stool: cell culture on HEP2C, RD and L20B; direct diagnostic enterovirus PCR, followed by internal probe hybridization.
- Serum: serum neutralization tests for P1, P2, P3; IgM for P1, P2, P3; IgA for P1, P2, P3.
- Saliva: IgM for P1, P2, P3; IgA for P1, P2, P3.

For the stool culture, all samples were negative in cell culture on all three cell lines, as well as in EV-specific PCR+ Prohyb. The conclusion drawn from stool cultures was that there was low risk for spread via oro-faecal route.

The serum neutralization tests confirmed the vaccination status of all staff members involved in the accident. There were no significant changes in SN titres after the incident except in one person; for person 6, a transient 4-fold antibody rise against polio 1 observed.

Results of serum IgM and IgA tests indicated constant positive IgM levels observed in persons 3 and 6 (both young and recently vaccinated). Transient and low IgM was detected in day 15 sample of person 5. Constant and positive IgA levels for person 2 (for only P2) and person 7 (all 3 types) were detected. Person 7 was born in 1952.

Results of saliva IgM and IgA tests showed no positive IgM observed in any saliva sample; high and increasing levels of saliva IgA against all three polio serotypes was observed in person 7. Similar results were obtained in IPV vaccinated persons, older than 55 years after monovalent OPV challenge (RIVM, Tiel study).

In summary:

- There was no indication for virus excretion in stools, no or very weak indications for infection among staff members involved in the incident.
- There is a need for a general plan of action for emergencies which can happen in diagnostic/research laboratories.
- Laboratory workers/IPV production workers should be (re)vaccinated with OPV. RIVM IgM and IgA tests are also available for other laboratories or institutions in similar cases.

11. UPDATE ON VDPVS: RISKS FOR THEIR OCCURRENCE AND POSSIBLE IMPLICATIONS FOR CONTAINMENT

Dr O. Kew, CDC

The recent recognition of VDPVs has important implications for the Global Polio Eradication Initiative. Polioviruses can be divided into two broad categories: wild polioviruses and Sabin vaccine-related polioviruses. The wild polioviruses are divided into serotypes, genotypes (groups of genetically related viruses endemic to wide geographic areas), clusters of closely related lineages, and lineages (roughly corresponding to chains of transmission). Sabin vaccine-related polioviruses of each serotype can be further divided into 1) OPV-like (or “Sabin-like”) viruses which show <1% VP1 sequence divergence from the corresponding OPV strain, and 2) VDPVs, which show $\geq 1\%$ VP1 sequence divergence from the corresponding OPV strain. The 1% demarcation is somewhat arbitrary, but will detect nearly all VDPVs of programmatic concern yet exclude typical OPV-like isolates commonly found worldwide. A divergence of 1% corresponds to approximately 1 year of virus replication or circulation, an unusual occurrence for vaccine-related polioviruses.

The large majority of vaccine-related isolates from AFP cases and contacts or the environment are OPV-like. The rare VDPVs are divided into three sub-categories: 1) circulating VDPVs (cVDPVs) that are biologically indistinguishable from wild polioviruses; 2) immunodeficient VDPVs (iVDPVs) isolated from patients with defects in antibody production who are chronic excretors of VDPVs; and 3) ambiguous VDPVs, where the available clinical, epidemiological and virological data do not permit further classification. Four cVDPV outbreaks have been described: Egypt (type 2), ~1983–1993; 2) Hispaniola (type 1) ~1998–2001; the Philippines (type 1), ~1999–2001; and Madagascar (two independent type 2 lineages) ~1999–2001 and 2001–2002.

The key risk factors for cVDPV emergence and spread are gaps in OPV coverage and the prior eradication of the corresponding serotype of wild polioviruses. Additional risk factors are the same as for wild poliovirus circulation: poor hygiene/sanitation, high population densities and tropical conditions. Areas that had previously been reservoirs for wild poliovirus circulation are potentially at highest risk for cVDPV emergence if the rates of OPV coverage were allowed to decline. iVDPVs occur more sporadically, and are associated with the exposure to OPV of people with rare conditions of immunodeficiency. Most chronic excretors spontaneously stop shedding VDPVs or die from complications of their immunodeficiency (including poliomyelitis). A very small number of people have been found to excrete iVDPVs for 10 years or more. Survival rates of chronic excretors appear to be highest in developed countries and middle-to high-income developing countries.

The occurrence of VDPVs has important implications for current and future polio immunization strategies, for poliovirus surveillance and for containment. Polio network laboratories currently use two methods for ITD: 1) one antigenic test (either the ELISA or neutralizing monoclonal antibodies, and 2) one molecular test (NAPH, PCR, or PCR-RFLP). Isolates giving discordant ITD results (usually “non-vaccine like” by the antigenic tests and Sabin OPV-related by the molecular tests) are candidate VDPVs, and are promptly referred to a Global Specialized Reference Laboratory for VP1 sequencing. Most of these isolates turn out not to be VDPVs, but some are, and these are subject to further characterization. A type 2 VDPV in the Syrian Arab Republic, in late 2001, was identified by this approach. Complete genomic sequencing of the isolate is nearly complete. Combined clinical, epidemiological, and virological investigation should help determine the proper classification of this VDPV case.

The VDPVs are important to containment. The available evidence indicates that cVDPVs and iVDPVs are neurovirulent and have potentially high transmissibility, and therefore should be handled as wild polioviruses for purposes of containment.

12. USING THE QUALITY ASSESSMENT GUIDELINES FOR THE NATIONAL SURVEY AND INVENTORY PHASE

Dr S. Hafez, WHO/EMRO

The numerical data generated through national laboratory survey and inventory phase activities should be supported by appropriate documentation on the quality of implementation

of phase I containment requirements. A flexible best practice model was developed to assess the quality of implementation of phase I containment requirements at national levels. The model determines the “essential components” of a successful programme, identifies “key features” for appropriate implementation of each identified component and the required activities for each key feature to achieve the best possible outcome.

The containment quality assessment tool is a three-part document, comprising guidelines and two checklists.

Guidelines

- The primary purpose of the guidelines is to allow self-evaluation of laboratory survey and inventory activities, before requesting the National Certification Committee to endorse and forward documentation to the Regional Certification Commission.
- Additionally, these guidelines provide a systematic framework for producing a written description of the survey and inventory activities undertaken by the country which can be assessed by the Regional Certification Commission.

Checklists (2)

- Checklist for interviewing national containment officers
- Checklist for reviewing submitted documentations on implementation of Phase 1 requirements.

Answering the questionnaire will give an account on the quality of implementation of Phase 1 containment requirements. The account will indicate any areas of weakness that will require further work or improved performances.

Components of the national plan are as follows.

1. Political endorsement and support. The key features and required activities for best practice outcome of this component include:
 - High-level political support for containment, with responsibilities and authority for implementation agreed upon and accepted by all sectors.
 - Legislation used effectively to enforce compliance with containment requirements.
 - Full involvement of all subnational authorities in implementation of the national containment plan where authority has been devolved to subnational administrations.
 - Multisectoral involvement a broad basis of involvement in containment was established
2. National plan of action, with the following key features:
 - Comprehensive, well written, nationally supported
 - Realistic timeframe for activities, with achievement milestones

- Appropriate personnel and funding resource allocation
 - Multisectoral involvement of all appropriate sectors
 - Full involvement of all national and all regional authorities, with evidence that activities at the regional level (subnational) are well monitored.
3. National containment coordinator. He/she should possess:
- Sufficient political or administrative stature and authority within the country to make decisions, and demand compliance
 - High level of competence, as well as access to sufficient technical ability and resources
 - Sufficient time and administrative support to carry out the work required, with the workload appropriately managed.
4. National laboratory list. The required activities for best practice outcome of this component include:
- Process of establishing the list should result in the creation of a comprehensive National Laboratory list in an appropriate and thorough manner
 - Completeness of the list, where all appropriate laboratories are included
 - Management of the list should ensure that the data are current, well managed and appropriately maintained.
5. The laboratory survey. Efforts should be made to ensure:
- Thoroughness of the survey, where all appropriate laboratories on the list are surveyed. Reasons for exclusions should be documented
 - Completeness of the responses, where a high level of response to the survey should be obtained, the goal should be 100%
 - Quality of the survey; evidence should indicate that results of the survey were analysed and findings of the analysis acted upon
 - Management of the survey data; evidence should indicate that the generated data are well managed and maintained, in a format allowing rapid analysis and updating.
6. The national laboratory inventory. The key features for best practice outcome of this component include:
- Thoroughness of the inventory, where all laboratories with wild poliovirus materials are on the National Inventory
 - Quality of responses, whereby all laboratories on the inventory should provide detailed information on the materials held, and appropriate documentation of destroyed WPV materials
 - Management of data, activities should indicate that the generated data is well managed
 - Maintenance of the inventory; evidence that inventory remains current and accurate should be ensured.

The quality assessment tool should be used at the end, when the survey is complete, inventory in place, and the coordinator is still on duty for assessment of the quality of implementation. It could also be used at the beginning, when it could serve as a guide to establish and implement quality containment plans.

The quality assessment tool may be used at the national level by the national containment coordinators to facilitate self-evaluation, and by the National Certification Committee to assess implemented containment requirements, prior to endorsement and forwarding the documentation to the RCC.

The tool may be used at the regional level by the Regional Office for assessment of the quality of implementation of containment requirements. The Regional Office can send a reviewer, who can utilize the interviewer checklist for assessment. It should also be used by the Regional Certification Commission, for which the quality assessment guidelines can provide a framework within which Regional Certification Commissions can assess containment documentation submitted by countries. The assessment can be carried by the RCC, a containment sub-committee assigned by the RCC (reviewer checklist), or the Regional Office containment reviewer can present the review results to the RCC.

The quality assessment guidelines will provide a systematic framework for producing a written description of the process used to implement laboratory containment requirements, which when presented with numerical data can provide the necessary evidence on the quality of implementation of the national laboratory survey and national inventory phase requirements. The containment quality assessment guidelines can thereby verify and document that certification standard containment requirements were appropriately implemented.

13. GROUP SESSIONS FOR QUALITY ASSESSMENT GUIDELINES

Country representatives were assigned into 3 working groups according to the state of implementation of their national containment plans, to discuss the quality assessment guidelines:

- Working Group 1 included countries that completed phase I: Bahrain, Cyprus, Djibouti, Lebanon, Oman, Qatar, Saudi Arabia, United Arab Emirates.
- Working Group 2 included countries that are implementing phase I: Jordan, Kuwait, Morocco, Syrian Arab Republic, Tunisia, Egypt, Islamic Republic of Iran, and Iraq.
- Working Group 3 comprised countries that are starting phase I activities: Libyan Arab Republic, Sudan, Yemen, Pakistan, Palestine.

Working Group 1 noted that the use of the guidelines for self assessment, and for the review of already submitted report, will provide an objective evaluation on the quality and

accuracy of the containment activity. Further, the group acknowledged the use of the tool for providing a format for reporting implemented phase I containment requirements.

The main points identified by Working Group 2 for best practice results were political support and advocacy. It was proposed that EMRO issue a letter to the National Certification Committees to ensure their commitment to support the containment Committee, through provision of necessary support to overcome the identified obstacles impeding completion of phase 1 activities. The need for an Access database was also identified.

All country representatives of Working Group 3 agreed that a high level of political commitment is required to carry out the containment requirements. WHO can sensitize governments to provide the required support. No need was identified for enacting new legislation, yet if need is identified action should be taken promptly. Multisectoral involvement and effective well monitored de-centralization of containment activities is crucial. WHO should guide countries in drafting and revising the national containment plans. Sufficient human and financial resources should be allocated. Securing these resources is the responsibility of each country. WHO should provide technical support and guidance. The National Containment Coordinator should have sufficient stature and authority, as well as competence and knowledge in the field of laboratory biosafety, polio eradication, and enough time. Appropriate technical and administrative assistance should be provided to the National Coordinator. Regarding countries where there is no registration or licensing system for laboratories, efforts should be made to ensure that all laboratories with freezing capacity are on the national laboratory list.

14. THE CONTAINMENT DATABASE

14.1 Overview

Dr H. Safwat, WHO/EMRO

The wild poliovirus containment database now has an easy friendly setup, backup functions, new reporting forms, and a manual. The application can be used to:

- Create a national database of biomedical laboratories
- Create address mailing labels for materials to be sent to laboratories
- Record responses to laboratory surveys
- Generate a list of laboratories with storage space (freezers)
- Generate a list of laboratories not responding to surveys
- Record details of wild poliovirus infectious or potentially infectious materials stored in laboratories
- Create a national inventory of all laboratories storing wild poliovirus infectious or potential infectious materials.

It was recommended that countries that have no database and those that have a database but are not satisfied with its application should use the EMRO database. For countries that have developed their own databases and are satisfied with the outcome, the countries are

encouraged to move their data to the new application. In case any difficulties are encountered, countries should send to EMRO:

- A copy of their data
- The forms used for data collection
- The codes used

EMRO would provide necessary support by accommodating the database for country use and transforming the data.

14.2 Syrian experience

Dr Hala Saba, National Containment Coordinator

Attempts were made to introduce the new database provided by the Regional Office. Difficulties were faced in installing the database in the computer. This was later done with the assistance of a WHO consultant. Problems related to missing information, the need to change names from Arabic to English were other obstacles. Some forms did not have complete contact information. Lists of laboratories from different ministries are kept as hard copies. Other problems encountered included the following:

- The process of entering data is time consuming.
- The program has no back up function.
- There is no clear information about analysis of data.

15. DOCUMENTATION FOR LABORATORY CONTAINMENT

Mr C.Wolff, WHO/HQ

The Global Commission for the Certification of Polio Eradication stated in its third meeting (1998) that completion of all Phase 1 and Phase 2 containment activities by all countries of the world is a requirement for the Global Certification of Polio Eradication. As global certification approaches, increasing focus is being given to developing the process for evaluation of the global status of containment. The April 2003 meeting of the Global Polio Technical Consultative Group recommended that, due to the unique technical nature of the laboratory containment activities, the GCC should consider establishing a "sub-group" on containment to advise them for global certification. It is proposed that the sub-group would be composed of experts in biosafety and virology as well as representatives from WHO Regions. Countries will be expected to maintain all data on their containment activities and submit a subset of that data for the certification process. Countries should maintain complete reports of the Phase I and II activities, the national inventory, national database, survey results, among other documents. This information will be reviewed by National Certification Committees and then forwarded to Regional Certification Commissions (RCC) for review and approval. Finally, RCCs will forward their reports to the GCC for the final evaluation before global certification of polio eradication.

16. CONCLUSIONS

Countries of the WHO Eastern Mediterranean Region continue to make significant progress towards achieving the goal of laboratory containment of wild polioviruses. It is anticipated that all polio non-endemic countries of the Region should be able to complete the laboratory survey and inventory activities (Phase I) by the end of 2004. The guidelines for documenting the quality of Phase I wild poliovirus laboratory containment activities are now available for countries to conduct a self assessment of the quality of the activities. For countries that have completed the Phase I activities, the guidelines also serve as the basis for creating a national report on Phase I containment activities to be submitted to the National Certification Committee and the Regional Certification Commission for their review and acceptance.

17. RECOMMENDATIONS

Countries that have completed the laboratory survey and inventory

1. All countries that have completed the laboratory survey and inventory activities should conduct the quality assessment exercise, produce a written report, and submit this report along with the national inventory to the NCC for review and subsequent submission to the Eastern Mediterranean RCC as part of the basic documentation or with the annual update.

Countries in process

2. Countries currently finishing the laboratory survey and inventory activities (Iraq, Jordan, Kuwait, Morocco, Syrian Arab Republic and Tunisia,) should create a plan of action for overcoming obstacles to the successful completion of all activities by end of 2004. This plan should be submitted to the Regional Office with an indication of areas where WHO assistance is required.
3. National containment coordinators in countries with a large number of non-responding laboratories should consider the following:
 - 3.1. Conduct a risk assessment of the non responding laboratories evaluating the function of the laboratory and its ability to store poliovirus materials. Non responding laboratories identified as “low risk” due to these reasons could be excluded from the survey as long as justification for their exclusion is provided.
 - 3.2. Identify persons or groups having political authority over the non responding laboratories and advocate for their assistance in obtaining the results.
4. WHO/EMRO Regional Director is requested to send a letter to Ministers of Health in countries currently working to finish the laboratory survey re-emphasizing the need for their support for the completion of the Phase I containment activities.
5. Countries currently conducting the national laboratory survey should review the guidelines for documenting the quality of Phase I wild poliovirus laboratory containment activities to ensure that no areas of the containment process are overlooked.

Countries beginning the survey

6. Countries that have recently begun the national laboratory survey process (Libyan Arab Jamahiriya, Palestine, Sudan, Republic of Yemen) should consult the guidelines for documenting the quality of Phase I wild poliovirus laboratory containment activities to ensure that the survey and inventory process is thorough and that completion is achievable by the end 2004.

Polio endemic countries

7. Current polio endemic countries that anticipate significant challenges to implementing containment (Egypt and Pakistan) are recommended to begin preparations for the national survey and inventory through activities such as compiling a comprehensive national list of laboratories.

All countries

8. As recommended in the global action plan for laboratory containment of wild polioviruses (second edition), national containment coordinators should ensure that laboratories that work with poliovirus, enterovirus or rhinovirus, or that have worked with these viruses in the past, identify all virus stocks, reference strains, and derivatives of such viruses grown in poliovirus permissive cell cultures and replace stocks of uncertain histories or multiple passages with stocks documented to be authentic by the investigators or by an international culture collection, confirm the identities of remaining virus stocks by use of appropriate reference techniques, replace wild poliovirus diagnostic reference strains with authenticated Sabin strains (WHO may be contacted for information on sources), and destroy all remaining virus materials no longer of programmatic value. Laboratories should be encouraged to destroy all poliovirus materials. If Sabin strains are needed, the laboratory should request authenticated Sabin strains that are available from WHO.
9. All countries should maintain the information generated from the national survey and inventory process in an electronic database for future reference and analysis. WHO EMRO can provide countries with a model database on request.
10. National containment coordinators, after completion of the Phase I activities and acceptance of the official report, should ensure the long-term maintenance of the containment data and reports within the governmental structure.
11. Due to the nature of polio eradication and the responsibilities of laboratory containment, all national governments should ensure that the long-term responsibility for laboratory containment of wild polioviruses is formally instituted into the government structure.

Annex 1**PROGRAMME****Wednesday, 27 August 2003**

- 08:00–08:30 Registration
- 08:30–09:00 Opening session
Address by H.E. Dr Hakem Al Qadi, Minister of Health, Jordan
Message from Dr Hussein A. Gezairy, WHO Regional Director for the Eastern Mediterranean Region
Election of Chairman and nomination of the Rapporteur
Status of implementation of the recommendations of the last meeting/Dr S. Hafez, WHO/EMRO
- Session 1 Status of polio eradication
- 09:00–09:20 Global status of polio eradication/Dr E. De Gourville, WHO/HQ
- 09:20–09:40 Regional status of polio eradication/Dr F. Kamel, WHO/EMRO
- 09:40–10:00 Discussion
- Session 2 Update on progress in laboratory containment
- 10:00–10:30 Global progress/Mr C. Wolff, WHO/HQ
- 10:30–11:30 Regional progress: summary presentation of countries that completed the implementation of Phase I activities (Bahrain, Cyprus, Djibouti, Oman, Qatar, Saudi Arabia, United Arab Emirates)/Dr S. Hafez, WHO/EMRO
- 11:30–14:30 Country presentations on progress of implementation of Phase I activities (10 minutes each)
- 14:30–15:00 Discussion
- Session 3 Update on technical issues related to containment
- 15:00–15:15 Polio type 2 MEF-1 detection in India/Dr W. Dowdle, WHO/EMRO
- 15:15–15:30 Containment risks posed by reference standards and non-poliostocks grown in poliovirus permissive cell lines/Dr T. Hovi, WHO/EMRO
- 15:30–15:45 Investigation and follow up of laboratory workers suspected of wild poliovirus exposure: an example from the Netherlands/Dr H. Avoort, WHO/EMRO
- 15:45–16:00 Update on VDPVs risks for their occurrence and possible implications for containment/Dr O. Kew, WHO/EMRO
- 16:00–16:30 Discussion
- Session 4 Assessment of the quality of implementation of laboratory survey and inventory phase requirements
- 16:30–16:45 Using the quality assessment guidelines for the national survey and inventory phase/Dr S. Hafez, WHO/EMRO

- 16:45–17:45 Working group for quality assessment guidelines
 Working group 1: Countries that completed phase 1: Bahrain, Cyprus, Djibouti, Lebanon, Oman, Qatar, Saudi Arabia, UAE
Moderators: Dr W. Dowdle, Dr O. Kew, Dr F. Kamel
 Working group 2: Countries that are implementing phase 1: Jordan, Kuwait, Morocco, Syrian Arab Republic, Tunisia, Egypt, Islamic Republic of Iran and Iraq
Moderators: Dr E. de Gourville, Dr T. Hovi, Dr H. Asghar
 Working group 3: Countries that are implementing phase 1: Libyan Arab Jamahiriya, Sudan, Yemen, Pakistan, Palestine
Moderators: Mr C Wolff, Dr H. Van der Avoort, Dr S. Hafez

Thursday, 28 August 2003

- Session 4 Assessment of the quality of implementation of laboratory survey and inventory
 (cont'd) phase requirements (cont'd)
 8:30–09:15 Presentation of group work on quality assurance process
- Session 5 Update on containment database progress and experience
 9:15–9:45 Introduction and demonstration of the database/Dr H. Safwat, WHO/EMRO
 9:45–10:00 Country experience: Syrian Arab Republic/Dr Hala Saba
 10:00–10:15 Morocco/Ms Amal Allah
 10:15–11:15 Discussion
- Session 6 Global certification and containment
 11:15–11:35 Roles, responsibilities, and expected process for global and regional certification of containment/Dr W. Dowdle, WHO/EMRO
 11:35–11:55 Documentation requirements for global certification/Mr C. Wolff, WHO/HQ
 11:55–12:15 Discussion
 12:15–12:30 Distribution of recommendations
 12:30–13:30 Discussion on conclusions and recommendations
 13:30 Closing session

Annex 2

LIST OF PARTICIPANTS

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