National Polio Plan for Ireland

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AN ACUTE FLACCID PARALYSIS
AND POLIOMYELITIS RESPONSE
PLAN FOR IRELAND

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INTRODUCTION

The "Acute Flaccid Paralysis and Poliomyelitis Response Plan for Ireland" was finalised in 2011 by the Department of Health's working group. In April 2014, against a background of increased polio virus circulation in Israel and outbreaks in the Middle East (Syria) and in the Horn of Africa, the document was reviewed and updated in order to ensure compatibility with most recent developments and international recommendations. The European Centre for Disease Control and Prevention has recently completed a risk assessment reported on the risk.[1]

PURPOSE OF THIS DOCUMENT

This response plan has been prepared for use should one or more cases of poliovirus infection occur in Ireland and outlines the routine surveillance procedures currently in place to detect potential poliovirus infections.

The Department of Health has prepared this document as a guide for key stakeholders involved in disease surveillance and control, as part of Ireland's preparedness in addressing the potential public health, medico-legal, social, community, political, trade and international relations impact of a case of polio. The response plan is based on a risk management approach for biological emergencies recognises that:

- such an event will occur infrequently;
- the evidence base for decision making may be limited and evolving; and
- community concern may be disproportionate to the level of disease risk.

BACKGROUND

Poliovirus

Poliomyelitis (polio) is a highly infectious disease caused by poliovirus, a small, non-enveloped enterovirus of the family *Picornaviridae*. Poliovirus infection occurs principally person-to-person via the faecal-oral route. The virus is ingested and replicates in the gut, mostly without causing symptoms, and then is excreted in faeces. Poliovirus is readily shed from symptomatic and asymptomatic cases: it is detected in the nasopharynx for up to two weeks after infection and virus are shed in the faeces for up to 5–6 weeks or significantly longer in those individuals who are immunosuppressed. Vaccination may attenuate virus shedding. The incubation period is commonly 7-14 days for paralytic cases but can range from 3-possibly to 35 days. Cases are most infectious during the days before and after onset of symptoms and the period of communicability occurs for the period of time the virus is excreted. Transmission can be enhanced by poor sanitation. In less than 1% of cases (I in 200) the virus can invade the nervous system, causing acute flaccid paralysis (AFP), usually involving the legs. Bulbar paralysis, presenting with paralysis of the respiratory muscles results in a mortality of between 5% to 10%. Polio can strike at any age, although the World Health Organization (WHO) reports that over 50% of all cases are in children under the age of three.

[1] http://www.ecdc.europa.eu/en/publications/Publications/polio-detection-control-EU.pdf

However, as most cases are asymptomatic, poliovirus transmission can occur rapidly before a case of paralysis is seen.

There are three serotypes of poliovirus (serotypes 1, 2 and 3). Oral Polio Vaccine (OPV) and Inactivated Polio Vaccine (IPV) are trivalent vaccines designed to protect against all three serotypes.[2] Since 2001 the Trivalent IPV is used in the primary immunisation schedule in Ireland. The vaccination schedule and contraindications for use of the vaccines are outlined in the Royal College of Physicians Immunisation Guidelines for Ireland (available at http://www.immunisation.ie/en/HealthcareProfessionals/ImmunisationGuidelines/)

In recent years (licensed since 2005), monovalent OPV vaccines (mOPVs) against each of the attenuated types of polio virus (type 1, type 2 or type3) have been developed in collaboration with WHO. These vaccines (mOPV1, mOPV2, mOPV3) offer protection against the specific polio virus type. Monovalent OPVs against type-2 is not used but is stockpiled if it is required (as endemic circulation type 2 virus has been halted). A). A bivalent OPV vaccine, with attenuated Sabin type 1 and 3 polio virus (bOPV1&3) was licensed in 2009. Both mOPVs a (against type 1 and type 3 PV) and bOPVs have been used in non-European immunisation campaignscampaigns. [3]. Neither monovalent nor bivalent OPV vaccines are currently registered for use in Ireland or in Europe although produced in the European regionHowever, the company, Novartis, does hold marketing authorisation for four OPV products in Italy where the products are manufactured (source ECDC communication).

A vaccine derived poliovirus (VDPV) has by definition, ≥ 1% variation in the VP1 nucleotide sequence compared to the reference OPV strain. Genetic variation arises from long-term virus replication, in particular in those individuals with an immunodeficiency (iVDPV), or by person-to-person transmission in a location with low vaccine coverage and continued use of OPV (circulating or cVDPV). This variation may result in the poliovirus reverting to “wild type” with the potential for significant mortality and morbidity.

In 2013 Afghanistan, Pakistan and Nigeria continued to have endemic cases. Importation of WPV1 was reported in the Horn of Africa, Central Africa (Cameroon and Equatorial Guinea), Israel and Gaza Strip, Syria and most recently Iraq. As of 21/3/2014 Syria has notified 37 WPV1 cases since 2013. One case has been reported in Iraq.(Source http://www.who.int/csr/don/2014_3_21polio/en/. /). In Israel and the Gaza Strip although no polio cases have been reported but the virus WPV1 has also been isolated in environmental samples. [4] The recently reported outbreaks and importations, particularly in those areas where civil unrest is occurring are of particular concern and requires heightened vigilance in all countries.

In the ECDC Technical report (February 2014) -*Detection and control of poliovirus transmission in the European Union and European* [5]*Economic Area*- it was reported that *O*PV is not in routine use in the EU/EEA, with the exception of Poland. It is only licensed in those EU/EEA countries where it is produced for export (Belgium, France and Italy), and in Bulgaria and Poland where trivalent OPV is licensed. Lack of marketing authorisation in many EU/EEA countries limits accessibility to OPV unless regulatory provisions are made for emergency use. ECDC recommended that countries should take early action regarding licensing to ensure availability of OPV before they are faced with poliovirus introduction, and possible public resistance to an unauthorised product used under emergency

[2] http://www.who.int/biologicals/areas/vaccines/poliomyelitis/en/
[3]. mOPV & bOPV: Licensing,Clinical Trials, and Strategies
http://www.who.int/immunization_standards/vaccine_quality/5_sutter_mOPV_bOPV_licensing_cts.pdf
[4] http://www.polioeradication.org/Dataandmonitoring/Poliothisweek.aspx
[5] http://www.ecdc.europa.eu/en/publications/Publications/polio-detection-control-EU.pdf

provisions. The European Medicines Agency was identified as having a pivotal role in facilitating licensing options for OPV for those Member States currently with no licensed OPV product.

In the event of an outbreak in the European region, all EU/EEA Member States will have access to the global OPV stockpile managed by WHO and UNICEF for emergency use; OPV stockpiling for emergency use in the EU/EEA is not encouraged because of limited supply and shelf-life. [6]

WHO has recently updated its guidance on the use of polio vaccines [7] and further updated "*The Polio Eradication and Endgame Strategic Plan 2013–2018".* [8] This plan includes the introduction of at least one dose of inactivated polio vaccine (IPV) into routine immunization schedules as a strategy to mitigate the potential risk of re-emergence of type 2 polio following the withdrawal of Sabin type 2 strains from oral polio vaccine (OPV). The updated position paper on polio vaccines replaces the previous 2010 WHO position paper, and summarizes recent developments in the field. It integrates new information related to the addition of a dose of IPV for countries currently using exclusively OPV, in the context of the global switch from trivalent to bivalent OPV. Recommendations on the use of polio vaccines have been discussed on multiple occasions by SAGE, most recently in November 2013; evidence presented at these meetings can be accessed at: http://www.who.int/immunization/ sage/previous/en/index.html.[9]

Global Eradication

At the 1988 World Health Assembly, the ministers of health of all Member States of the WHO voted to launch a global goal to eradicate polio. The Global Polio Eradication Initiative is one of the largest public health efforts to date. Polio cases have decreased by over 99% since 1988, from an estimated 350 000 cases then, to 247reported cases in 2013 (as of 21/3/2014). The reduction is the result of the global effort to eradicate the disease. In 32013, only three countries in the world remained polio-endemic, down from more than 125 in 1988. These countries are Afghanistan, Nigeria and Pakistan.

Enormous progress has however been made in these countries, with just 140 cases reported in 2013 (as of 21/3/2014). Unfortunately, outbreaks and imported cases of WPV1 have been reported in non-endemic countries, in the Horn of Africa (Kenya Ethiopia, Somalia, Sudan), Cameroon, Equatorial Guinea and in the Middle East (Syrian Arab Republic and Iraq)[10]. Additionally WPV1 has been identified in Israel and the Gaza Strip in both environmental and human excretors (asymptomatic).[11]

The WHO European Region (51 countries including Ireland) was certified Polio free in June 2002. However, with sub-optimal vaccination levels and an increasing number of individuals living with significant immunosuppression, reintroduction of polio virus could results in onward transmission within Ireland. In 2010, the European Region suffered its first importation of polio after certification. In April 2010, a wild type poliovirus type 1 outbreak was confirmed in Tajikistan, representing the first importation of a wild type poliovirus into Europe since the Region was certified polio-free in 2002. By end-June, Tajikistan accounted for over 70% of all global polio cases reported in 2010. The outbreak response followed the international outbreak response guidelines adopted by the World Health Assembly in 2006 (Resolution WHA59.1). New approaches are being used to more rapidly and comprehensively build population immunity levels as part of the outbreak response. These include

[6] http://www.ecdc.europa.eu/en/publications/Publications/polio-detection-control-EU.pdf
[7] Polio vaccines: WHO position paper, January 2014 http://www.who.int/wer/2014/wer8909.pdf?ua=1
[8] Polio Eradication and Endgame Strategic Plan 2013–2018. Available at http://www/polioeradication.org/resourcelibrary/strategyandwork.aspx
[9] http://www.who.int/immunization/ sage/previous/en/index.html
[10] http://www.who.int/csr/don/2013_11_11polio/en/index.html
[11] http://www.who.int/csr/don/2013_10_01/en/index.html

the Short Interval Additional Dose (SIAD) tactic, to swiftly boost population immunity levels by administering sequential doses of mOPV1 at intervals of two weeks (rather than the traditional interval of six weeks with trivalent OPV). A broader age group is being targeted, incorporating children under the age of 15 years (as opposed to the usual target age group of children younger than five years). Intensive vaccination activities are currently ongoing to address the outbreak in Syria and neighboring countries as well as those in Africa and the endemic countries, .

Appendix A is an extract from the Global Polio Eradication Initiative website that specifies the steps to be taken to achieve global certification.

Irish Situation

Any importation of polio virus into Ireland, is considered a public health emergency. A single case of poliovirus infection in Ireland is considered an outbreak and would initiate activation of this response plan. As a certified polio free region Ireland has a responsibility to:

- Maintain WHO certification-standard surveillance for acute flaccid paralysis (AFP);
- Ensure access to a WHO-accredited polio reference laboratory; and
- Ensure containment of wild polioviruses and VDPVs.

Ireland has good sanitation and as of Quarter 3 2013 maintains a high polio immunisation rate of 92% for children at the age of 12 months and 96% IPV 3dose coverage for children at the age of 24 months . The HSE school programme provides a school based service to most areas the country, offering vaccine to approximately 76% of the children due the booster vaccine (4-in-1 vaccine). The most recent data from the HSE school booster programme (aged 4-5 years of age) reported an uptake of IPV of 90.4%. However the uptake among the children resident in those areas where GPs administered the vaccine was 67.6%. [12] for the 2012-2013 academic year the HSE school programme covered approximately 76% of the children due the booster (4 in 1 vaccine). HSE is move towards a universal HSE school programme in all areas. Once implemented the uptake of the 4-in1 vaccine booster is expected to increase in those areas currently lagging behind [13].

The risk of transmission from an imported case is higher in areas with low immunisation coverage, inadequate sanitation or a higher prevalence of immuno-compromised individuals. Low vaccine coverage may be a result of vaccine refusal, which has been documented in particular groups. Low coverage may also occur in disadvantaged groups such as Irish travellers or Roma population, and both groups have been associated with measles outbreaks in the recent past.

According to the National Immunisation Program Schedule (www.immunisation.ie), polio vaccination is recommended at 2, 4 and 6 months of age with a booster at 4-5 years of age. Inactivated poliomyelitis vaccine (IPV) was introduced to Ireland in 1957 and replaced by attenuated live oral polio vaccine (Sabin) in the early 1960s. Use of OPV can lead to vaccine associated paralytic poliomyelitis (VAPP), a rare condition in vaccine recipients and their contacts that has identical

[12] http://www.hpsc.ie/hpsc/A-Z/VaccinePreventable/Vaccination/ImmunisationUptakeStatistics/ImmunisationuptakestatisticsforJuniorInfants/File,14482,en.pdf

[13] http://www.hpsc.ie/hpsc/A-Z/VaccinePreventable/Vaccination/ImmunisationUptakeStatistics/ImmunisationuptakestatisticsforJuniorInfants/File,14482,en.pdf

clinical presentation to wild poliovirus infection. IPV, which cannot cause VAPP, was reintroduced into the primary immunisation schedule in 2001. IPV is now given in combination vaccines to reduce the number of injections received by each child. Unimmunized individuals travelling in countries that still use OPV are at risk of VAPP, as was reported for a United States citizen in March 2005.[14] Monovalent and bivalent OPV is available in some countries through the WHO to prevent infection with a particular serotype(s) circulating in that area. Neither monovalent nor bivalent vaccines are licensed for use in Ireland.

As part of routine surveillance and clinical investigation of acute flaccid paralysis cases, the National Virus Reference Laboratory (NVRL) investigates faecal samples for polio virus. Virological testing of faecal specimens can identify the serotype of virus infecting an individual, and using molecular methods distinguish between wild poliovirus, OPV strain or VDPV.

As a result of the switch from OPV to IPV in Ireland, OPV poliovirus strains including VDPVs are not expected to be present in Ireland, except in rare cases of individuals following recent immunisation with OPV prior to travel to Ireland (VDPVs have been identified among asylum seekers who participate in health screening activities in the reception centres). However, there is potential for long term virus shedding in immuno-compromised individuals. The Polio Outbreak Response Plan has been developed to provide a framework for containment activities required to manage the occurrence of either wild poliovirus or VDPV in Ireland.

Potential Scenarios for a Poliomyelitis Outbreak in Ireland

There are several possible presentation scenarios for a case of poliovirus infection in Ireland and the most likely are presented below.

Scenario 1- Importation of wild poliovirus from an endemic country or a country with recently imported poliovirus;

Scenario 2- Importation of VDPV from a country that has circulating VDPV;

Scenario 3- A case of VAPP, from a country that is still using OPV; or

Scenario 4- Acquisition of a poliovirus from a laboratory.

The presentation scenario will impact on the extent of the required health response. Any notification of poliovirus in Ireland will require epidemiological investigation to determine the likely source of infection. As stated previously, as poliovirus has been eradicated from Ireland, a single case of poliovirus infection would be considered an outbreak situation.

Surveillance of AFP and Poliomyelitis in Ireland

The maintenance of a surveillance system that is sensitive enough to detect a case of polio in Ireland is essential, particularly as clinicians will rarely have experience in diagnosis of polio. Although, in the context of good sanitation and high immunisation rates, AFP is unlikely to be polio related, active surveillance of AFP cases is vital to detect any cases that are due to infection with poliovirus.

[14] MMWR February 3, 2006 / 55(04);97-99.

To ensure the detection of a case of poliomyelitis due to one of the above presentation scenarios, further clinical, epidemiological and laboratory investigation is required in the following situations:

(1) All AFP cases in children less than 15 years of age to exclude poliomyelitis.

The WHO has set a performance indicator for AFP surveillance in children. In a polio non-endemic country, such as Ireland, the performance indicator is one case of non-polio AFP per 100,000 children aged less than 15 years of age, which in 2013, equated to 10 cases per year (8 cases were reported in 2013 giving an AFP rate of 0.82/100,000 population < 15 years of age). If insufficient cases of AFP are reported, the surveillance system is deemed not sensitive enough to detect a potential case of poliomyelitis. The differential diagnosis of an AFP case upon initial presentation may include poliomyelitis, Guillain-Barré syndrome , transverse myelitis, acute disseminated encephalopathy (ADEM), spinal cord ischaemia, cord tumour, peripheral neuropathy due to infection (diphtheria, borreliosis) or intoxication (tick paralysis, heavy metal or insecticide poisoning).

If reporting of AFP is delayed to exclude other causes, or if a case of AFP is not reported and no follow up laboratory investigation occurs, it is possible that a case of AFP due to polio could be missed and there is potential for onward viral transmission. Failure to report AFP cases, a lack of stool specimens or insufficient information in clinical questionnaires has meant that Ireland often does not reach the expected annual number of AFP cases, particularly with regard to virological investigations.

It is important to report all cases of AFP in children, even those that are later found not to be due to poliovirus infection based on clinical and laboratory investigation. As part of Ireland's commitment to the WHO polio eradication program, the Health Protection Surveillance Centre conducts active surveillance for AFP in collaboration with the WHO accredited National Polio Reference Laboratory based at the NVRL located in University College Dublin. The active surveillance system coordinated by HPSC and NVRL also regularly provides data to the WHO regional office to assess the surveillance system against the performance indicators for AFP reporting.

(2) All suspected cases of paralytic poliomyelitis regardless of age. It is imperative that any case with a clinical suspicion of poliomyelitis in a person of any age be fully investigated.

(3) All suspected cases of non-paralytic poliovirus infection regardless of age. It is estimated that 90% of poliovirus infections are asymptomatic. This includes close contacts of confirmed polio cases, immunocompromised individuals from whom a poliovirus was isolated and laboratory derived infections.

Clinical Reporting of AFP

AFP surveillance in Ireland follows the WHO criteria targeting children less than 15 years of age. The scheme requires clinicians to report and submit stool samples from any case of AFP in one or more limbs or acute onset of bulbar paralysis, even where poliovirus infection is considered a highly unlikely clinical diagnosis. The case definition for poliovirus infection, which includes a definition for AFP as part of the clinical evidence, is provided in Appendix B. The procedure and Laboratory Request Form for referring stool specimens to the NVRL is available in Appendix F.

The procedures to be followed by clinicians in (1) all cases of AFP in children and (2) in suspected cases of poliomyelitis in a person of any age are outlined below and a flow chart is available in Appendix C.

(1) REPORTING INSTRUCTIONS FOR AFP CASES IN CHILDREN

Telephone reporting: Report all cases, immediately by telephone to the NVRL 087 9806448 or 01 7161321/4440/ (www.nvrl.ie);

FAX: Fax completed AFP surveillance Form to NVRL and to HPSC

Irish paediatric Surveillance Unit (IPSU) reporting: For children under 15 years of age, in addition to the NVRL, report cases on the monthly INOPSU report card (who informs HPSC for follow-up);

Collection of stool specimens from cases of AFP for viral culture: Due to intermittent shedding, collect **2 stool specimens as soon as possible but least 24 hours apart, within 2 weeks of onset of paralysis** in a sterile container and send them to your local laboratory who will forward the specimens to **the NVRL** (the WHO accredited National Polio Reference Laboratory) in UCD as per Appendix F;

- On the laboratory testing request form the patient must be identified as having AFP. The NVRL request form is available at: http://www.ucd.ie/nvrl/pdfs/General_request_form.pdf

- The local laboratory should be informed that the **specimens must be forwarded urgently to the NVRL for exclusion of poliovirus;**

- Information regarding specimen transport can be obtained from the N VRL (017161319) during the working day --- or at the website http://www.ucd.ie/nvrl/nvrl_how_send.html;

-The NVRL will send the results to the referring clinician the local laboratory and the HPSC for collation to go for review by the AFP Expert Committee (PEC);

If poliomyelitis is considered a possible cause for a case of AFP or if an infection with poliovirus is confirmed as the cause of the AFP, the local medical officer of health should be informed immediately by telephone (Appendix K)

Follow-up of clinical information: A clinical questionnaire requesting further details will be sent by the NVRL to clinicians reporting a case of AFP or suspected poliomyelitis (Appendix I). A further follow-up questionnaire is sent to clinicians 60 days after the onset of paralysis to determine the outcome of the patient (Appendix J).

(2) REPORTING INSTRUCTIONS FOR SUSPECTED CASES OF POLIOMYELITIS IN A PERSON OF ANY AGE

Telephone reporting: Report all cases, irrespective of age, immediately by telephone to the local Medical Officer of Health (Appendix K). In addition, telephone the on call clinician in NVRL at 087 9806448 or 01 7161321/4440/ --- (www.nvrl.ie) to discuss collection of specimens;

Collection of stool specimens from cases of suspected poliomyelitis for viral culture: Due to intermittent shedding, **collect 2 stool specimens as soon as possible but at least 24 hours apart within 2 weeks of onset of paralysis** in a sterile container and send them to your local laboratory

who will forward the specimens to the NVRL (the WHO accredited National Polio Reference Laboratory) in UCD as per Appendix F;

- On the request form the patient **must be identified as having suspected poliomyelitis**;

- The local laboratory should be informed that the specimens must be forwarded to the NVRL for exclusion of poliovirus; information on other diagnostic specimens will be provided by NVRL – see laboratory section

- Information regarding specimen transport can be obtained from the NVRL (017161319) during the working day) or at the website http://www.ucd.ie/nvrl/nvrl_how_send.html
- The NVRL will send the results to the referring clinician, your local laboratory and the HPSC for collation for review by the PEC;

Follow-up of clinical information: A clinical questionnaire requesting further details will be sent by the NVRL to clinicians reporting a case of suspected poliomyelitis (Appendix I). A further follow-up questionnaire is sent to clinicians 60 days after the onset of paralysis to determine the outcome of the patient (Appendix J).

If poliomyelitis is suspected and/ or if poliovirus is isolated, the case should be immediately notified to the local MOH and the HPSC and this response plan will be activated. Key contact details for local MOH are included in Appendix K.

The adequate collection of stool specimens is the responsibility of clinicians and is essential for confirmation of poliovirus infection. Collection of adequate patient history by clinicians and public health physicians allows for a more accurate assessment of the risks to contacts. It is essential to collect as much information as possible about the patient's history and risks of exposure to wild poliovirus or OPV, including VDPV. For example,

- Age of patient, date of onset of paralysis;
- Residence or travel to a polio endemic country or a country that has recently reported poliovirus importations or VDPV;
- Vaccination status, including timeframes and the vaccine used (OPV or IPV);
- Contact with persons recently immunised with OPV or persons who have recently travelled to a polio endemic country, or a country that has recently reported importation of polio cases or VDPV, or a country that uses OPV;
- Potential for exposure to laboratory strains of poliovirus; and
- Immune status of patient and contacts.
- Nationality
- Ethnicity

Such information is critical when attempting to trace potential sources of infection both forward and back.

The current case investigation form is located here: http://www.hpsc.ie/hpsc/A-Z/VaccinePreventable/Polio/SurveillanceForms/

Laboratory Confirmation of Poliomyelitis in Ireland

Confirmation or exclusion of poliovirus infection is not possible without laboratory testing of stool specimens so it is important that stool specimens are collected as soon as possible from every case of AFP in children and cases with a clinical suspicion of poliomyelitis in persons of any age. Stool specimens from close contacts of confirmed polio cases should also be tested for poliovirus.

The isolation of a poliovirus from a specimen of an asymptomatic person would be regarded as a poliovirus infection that did not cause paralysis. Laboratories should ensure rapid investigation of all isolated polioviruses. Definitive diagnosis will establish the need for follow up actions to contain and prevent spread of a wild poliovirus or VDPV. As poliovirus can spread very quickly, rapid detection of cases is critical. Under WHO guidelines, stool specimens must be tested in a WHO accredited laboratory, which for Ireland is the NVRL at UCD.

Laboratories should request the following investigations in cases of suspected polio (see Appendix F):

- Viral culture of stool samples and CSF specimens (The cerebrospinal fluid usually contains an increased number of leukocytes, from 10 to 200 cells/mm3 (primarily lymphocytes) and a mildly elevated protein from 40 to 50 mg/100 ml. This finding is non-specific and may result from a variety of infectious and non-infectious conditions) information relating to the cell count , glucose and protein should accompany the CSF sample
- Enterovirus PCR on stool, CSF (information relating to the cell count, glucose and protein should accompany the CSF sample) or throat swabs / NPAs
- Viral culture and enterovirus PCR investigation of throat swabs / NPAs
- Viral culture/ enterovirus PCR investigation of stool from household contacts
- Enterovirus neutralisation tests to identify tissue culture isolates
- Intratypic poliovirus neutralisation tests
- Viral cultures are referred to the WHO reference laboratory in the UK for confirmation of poliovirus and differentiation through molecular sequence analysis of vaccine and wild-type poliovirus strains
- NVRL will report routine poliovirus investigations on specimens from cases with paralytic or other neurological symptoms as outlined above within one week of receipt.
- Laboratories should assist the local MOH/DPH and the HPSC with the public health response to suspected cases.

National Notification of Poliomyelitis

In Ireland public health legislation requires medical practitioners and pathology laboratories to notify the occurrence of specific communicable diseases to the local Medical Officer of Health in their respective Department of Public Health. Nationally, information on such cases is collated by the HPSC.

The Irish case definition for poliovirus infection (wild poliovirus, vaccine-associated and vaccine derived polioviruses), includes a definition for AFP as part of the clinical evidence (Appendix B). Except in the case of non-paralytic infection, a confirmed case of poliomyelitis requires both clinical evidence AND laboratory definitive evidence (from testing conducted by the NVRL). A poliovirus

infection that did not cause paralysis, such as in a close contact of a confirmed polio case, is verified by laboratory testing at the NVRL.

The procedures for notification of a suspected case of poliomyelitis are outlined in detail in the Outbreak Response Plan below and in Appendix C. In the event of a suspected case of poliovirus (See appendix H: level 1), the local MOH would coordinate a response with support from the HPSC. In the event of an outbreak of poliomyelitis (Appendix H: level 2 or higher) the HSE HPSC National Outbreak Team will co-ordinate the epidemiological investigation and response and the National Public Health Emergency Team will co-ordinate the overall national response. The HSE response will be led by the HSE Crisis Management team (See appendix E) The HPSC will set up a national incident room in the event of a national outbreak.

Clinical Confirmation of Poliomyelitis in Ireland

Clinical confirmation of cases of poliomyelitis is undertaken by the Polio Expert Committee (PEC). The NVRL send a questionnaire to all clinicians reporting AFP (if not already received), irrespective of the age of the patient, to collect adequate clinical data to enable the PEC to classify cases. It is essential that clinicians fill out these questionnaires and return them to NVRL in a timely manner, even if poliomyelitis is not suspected.

The PEC is made up of paediatricians, epidemiologists, and virologists who have expertise in AFP surveillance and reporting. All clinical and laboratory details of each case of AFP cases less than 15 years of age who have been reported are reviewed by the PEC 6-monthly, or as required. The decisions made by the PEC are reported to WHO after each meeting and are included in the WHO global AFP surveillance data. Cases are classified by the PEC according to the following:

i) Confirmed poliomyelitis due to wild poliovirus, VAPP or VDPV;

ii) Non-polio AFP;

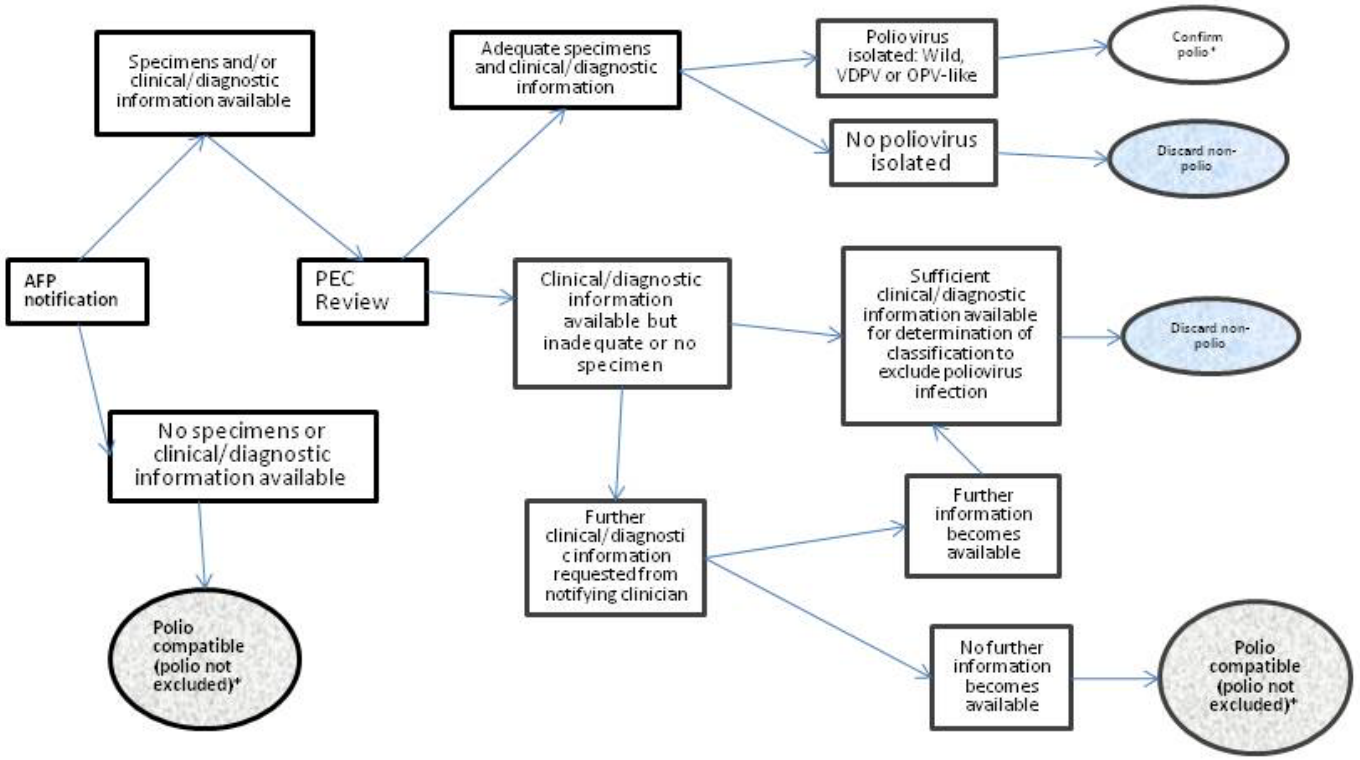
iii) Polio-compatible; or

iv) Non-AFP.

As these definitions are based on results of stool specimens it is important that stool specimens be collected from all patients, even when an alternative definitive diagnosis has been confirmed. A decision making tree used by the PEC is shown in Figure 1 where cases are either classified as confirmed polio, discarded as non-polio AFP or if there is not enough information to exclude polio, as polio-compatible. This data is reported to the WHO and so every effort is made to obtain enough information to enable a final classification of each AFP notification.

Laboratory and clinical confirmation of poliovirus infection would initiate activation of the response plan below. A joint meeting would be convened between the local (level 1) or national (level 2 or higher) outbreak teams and the PEC. There may be an emergency teleconference with the regional Medical Officers of Health and include the chair of PEC and other relevant experts such as representatives of NVRL. The WHO would be notified of a confirmed case of poliovirus infection in Ireland under the International Health Regulations (IHR) as a public health emergency of international concern, via the IHR Focal Point. The polio test results are also reported to WHO by NVRL. HPSC would inform the European Centres for Disease Control (ECDC) and send an Early Warning Response System (EWRS) alert to other EU member states

Figure 1 Investigation of AFP notifications by the Polio Expert Committee



*Note confirmed polio or any polio-compatible case where polio is suspected would activate this response plan and should be reported to the MOH/DPH and HPSC-HSE

POLIO OUTBREAK RESPONSE PLAN

The matrix for the investigation and response to a suspected case of poliomyelitis in Ireland is presented below and a brief flow chart of activities outlined in this plan is included in Appendix D. The matrix describes the likely diagnostic pathway and public health response to a case of suspected poliomyelitis in Ireland and identifies key steps in the investigation of a suspected case of polio based on a communicable disease outbreak investigation, identifying the sequence of actions, roles and responsibilities, timing of events and critical success factors. Actions are not intended to be strictly sequential; some will occur in parallel and the critical success factors may prove to be rate limiting steps.

The main response to a case of polio will be containment of potential spread, including:

- Isolation and testing of the index case;
- Tracing and management of contacts;
- Targeted vaccination campaign;
- Education on infection control measures such as hand washing; and
- Increased surveillance.

The critical factors affecting success of this containment will be:

- Uptake of vaccine by at risk populations;
- Timely recognition of AFP and reporting as part of active surveillance;
- Identification of the source of infection: and

Detailed epidemiological data and case history to identify cause, potential contacts and “at risk” populations.

It will be necessary to take stool specimens from close contacts of the index case. All clinicians will need to participate in intensified surveillance for AFP in all ages and hospital records may need to be checked for potential additional AFP cases.

MATRIX FOR THE INVESTIGATION AND RESPONSE TO A SUSPECTED CASE OF POLIOMYELITIES IN IRELAND

Action	By whom	What & How	When	Critical success factors
Case of AFP	➢ Paediatricians ➢ Neurologists ➢ Other Clinicians	Clinical presentation of AFP	Presentation at health care facility	➢ Inclusion of poliovirus infection in the differential diagnosis of AFP
Reporting to NVRL, local public health unit and HPSC	As above	Phone call to NVRL and HPSC (return AFP questionnaire to NVRL and anonymised copy to HPSC) If poliomyelitis is considered as possible phone local MOH	As soon as AFP is considered in the differential diagnosis (where polio is not excluded)	➢ Immediate notification to NVRL, and HPSC for AFP and local MOH if polio suspected ➢ Adequate stool specimen collection for diagnostic testing at the NVRL
Confirm the diagnosis	NVRL in collaboration with clinicians	➢ Diagnosis confirmed on the basis of clinical and laboratory findings ➢ Typing by molecular techniques	When stool specimens are available.	Availability of stool specimens. Collection of 2 stool specimens as soon as possible but within 14 days of onset of symptoms
Activation of this response plan	Regional DPH/ AND Health Protection/ HPSC on receipt of diagnosis from NVRL	➢ Activate response plan, including all steps from here down	As soon as poliovirus infection is confirmed by NVRL	Identification of poliovirus by NVRL
Notification of a suspected case to the AND health protection and to the CMO	Via a local public health unit OR NVRL, HPSC or clinicians directly	➢ Notification of a suspected case and the expected time to a confirmed diagnosis or rejection as a case of polio ➢ Initiation of case investigation protocol	Should occur as soon as possible after clinician referral and ideally within 24 hours	Agreed referral protocols
Refer case to PEC	NVRL/HPSC	➢ Arrange special teleconference of PEC	When polio is considered in the differential diagnosis	Adequate clinical and laboratory data provided to NVRL MOH and HPSC for consideration by PEC
Epidemiological investigation	MOH in collaboration with NVRL, and HPSC	Detailed case investigation to trace contacts and presentation scenario	Immediately after notification of a suspected case of polio	As above AND Availability of credible exposure history
Polio Outbreak Response Plan activated	And Health Protection CMO HPSC	➢ Information link to relevant Irish Government Ministers and WHO Focal Point ➢ Activate communication strategy	As soon as possible after initial epidemiological investigation identifies risk, AND/OR When the case becomes a probable case of polio	Strength of evidence supporting diagnosis of polio AND/OR Media interaction or response to public speculation
Continued next sheet		➢		➢

MATRIX FOR THE INVESTIGATION AND RESPONSE TO A SUSPECTED CASE OF POLIOMYELITIES IN IRELAND (continued)

Action	By whom	What & How	When	Critical success factors
Containment	MOH/DPH outbreak team + consider need for National outbreak response team	➢ Isolate infected patient(s) ➢ Targeted vaccination campaign ➢ Increased surveillance ➢ Management of contacts and collection of stool specimens for testing at NVRL	As soon as polio is confirmed.	➢ Uptake of vaccine ➢ Detailed investigation of potential contacts including collection of stool specimens from close contacts.
Patient support and family services	HSE	Examination of the availability, efficiency, effectiveness and acceptability of support services by family/carers/hospitals etc	As soon as diagnosis is suspected or confirmed	➢ Individual access to support services
Risk communication	CMO in collaboration with AND Health Protection, HPSC- IHR focal point and other relevant agencies depending on facts of case	➢ Detailed communication strategy developed in collaboration with Department of Health & Children media unit ➢ Notification to the WHO Focal Point under the International Health Regulations by IHR NFP (HPSC) ➢ Reporting of laboratory results to WHO by NVRL ➢ Communication to ECDC via EWRS	Management of media interaction at any stage of the investigation ➢ Notify the WHO Focal Point when diagnosis is confirmed	➢ Timing and nature of media releases dependant on the scenario encountered and whether there is an ongoing risk to the Irish community ➢ Timing of international notification dependent on confidentiality being maintained by those involved in diagnosis & case investigation
Debriefing and review of the polio response plan	Teams at local and national levels	➢ Identify strengths and weaknesses of response plans, including coordination ➢ Economic evaluation ➢ Applied research arising out of the investigation as appropriate	As required	Agency/partner participation

KEY STAKEHOLDERS INVOLVED IN A SUSPECTED CASE OF POLIOMYELITIS

The key stakeholders involved in an investigation of a suspected case of poliomyelitis are listed below and some key contact details are included in Appendix L:

- The index case, their family or carers and their primary health care provider;
- Contacts of the index case;
- Diagnostic networks of neurologists, neuropathologists, paediatricians;
- Hospitals and care facilities in the public and private sectors;
- General practitioners
- NVRL at UCD;
- The AND Health Protection , Director of Public Health/MOH in the affected jurisdiction, and later all Directors of Public Health/MOH
- THE CMO DOH
- The Health Protection Surveillance Centre, WHO IHR Focal Point
- The clinical Microbiology departments;
- The National Polio Expert Committee (PEC); ;
- The Department of Defence;
- The HSE National Immunisation Office (NIO)
- The WHO European Regional Office, Copenhagen;
- Counselling and patient support services;
- The Irish and international media; and
- The broader Irish and international community.

EPIDEMIOLOGICAL INVESTIGATION OF POLIOVIRUS INFECTION

The public health response to a confirmed case of polio will be coordinated by the MOH in the affected area with support from the HPSC (See level 1 Appendix H). Any diagnosis of polio in Ireland will be of international significance, so it will be imperative to ensure a nationally consistent approach to the release of information and an effective national response, as well as international reporting via the WHO IHR Focal Point. All cases of polio must be reported to the WHO as per the decision tree algorithm contained in Annex 2 of the WHO International Health Regulations.

A suspected case of poliomyelitis is considered a public health emergency. Response teams will be required at different levels of the public health system; certainly regional and national level teams will be required to work closely together. The primary response will be driven at the regional level with overarching coordination at a national level (level2 and above) by the HPSC National Incident Room as required. An epidemiologist from the HPSC and a representative from the NVRL would be included in the regional response team. Technical advice may be sought from the National Immunisation Advisory Committee of the RCPI. The major considerations include not only where the infection may have been acquired, but any potential for transmission within Ireland.

The response team will need to review the patient records and ensure that the following information has been collected for the index case:

- Age of patient, date of onset of paralysis;
- Residence or travel to a polio endemic country, or one that has recently reported imported cases or VDPV;
- Vaccination status, including timeframes and the vaccine used (OPV or IPV);
- Contact with persons recently immunised with OPV or persons who have recently travelled to a polio endemic country, or one that has recently reported imported cases or VDPV, or a country that uses OPV;
- Potential for further spread, health care workers and people who have contact with children, or are involved in food preparation have a greater chance of spreading infection to a larger number of people;
- Potential for exposure to laboratory strains of poliovirus; and
- Vaccination status of contacts.

The epidemiological investigation and collection of stool specimens may involve the local community, including childcare facilities, schools and other community groups.

The epidemiological investigation aims to establish where the infection was acquired and to where it may have spread. If the initial infected patient does not have a travel history that indicates they have acquired the infection overseas, or potential for laboratory exposure, the epidemiological investigation becomes extremely urgent to establish where the infection was acquired and to inform public health containment strategies. The short incubation period and ability for asymptomatic patients to shed virus may mean that many individuals are exposed to the virus before a case of AFP is detected.

Laboratory testing of stool specimens is required to confirm poliovirus infection and to determine whether a poliovirus is a wild or vaccine strain. All wild poliovirus isolations would necessitate an immediate public health response. The response to isolation of a vaccine strain of poliovirus may vary according to the perceived risk for further person-to-person transmission. Isolation of a VDPV would be considered a greater risk and should be treated the same as for isolation of a wild poliovirus, while the response to isolation of an OPV strain from a potential case of VAPP may not be as comprehensive. Since more specific laboratory tests are needed to differentiate a VDPV from an OPV strain of poliovirus, the initial public health response should assume isolation of a VDPV until laboratory results indicate otherwise.

CONTAINMENT STRATEGIES

The containment of a potential outbreak of poliovirus will include the following:

- Isolation of infected individuals;
- Tracing and management of potential contacts;
- Cleaning and disinfection;
- Immunisation; and
- Education and increased surveillance.

Isolation of infected individuals

Individuals identified as being infected with poliovirus should be isolated to minimise potential for transmission. Contact precautions should be implemented and, if hospitalised, the patient should have a single room. A stool specimen should be collected weekly for testing at the NVRL. Isolation should continue until two stool samples taken seven days apart are shown to be negative for poliovirus. Poliovirus infection is usually cleared within six weeks by an immunocompetent person but long term shedding may occur in immunocompromised individuals. Stool samples should be taken monthly in immunocompromised individuals until three stools are negative.

Families and carers of a patient infected with polio virus should observe good sanitation and hand washing. All health care workers, carers and family should have evidence of adequate immunisation against polio (see Tracing and management of potential contacts below). As most cases of AFP require hospitalisation, health care workers should refer to the Infection Control Guidelines for the prevention of transmission of infectious diseases in the health care setting for the correct infection control procedures (www.hpsc.ie).

Tracing and management of potential contacts

In order to contain the spread of poliovirus, which produces a large number of asymptomatic infections, contact tracing undertaken by the relevant jurisdiction(s) is important to identify potentially infected individuals. There are four major categories of people who may have had contact with the index patient and therefore may have been exposed to poliovirus:

- **Household contacts** (people who lived with the index patient and shared a toilet during the infectious period). These people represent the greatest risk as they may have had contact with the index patient prior to the appearance of symptoms;
- **Toilet contacts** (people who shared a toilet with the index patient during the infectious period, and
- **Health care workers** (people who cared for the index patient during the infectious period) and laboratory workers involved with testing the patient's specimens. It will be necessary to ensure that appropriate procedures are followed by laboratory workers during testing of suspect samples.
- **Public contacts**, including consumers, in the event that the case prepares food for others to eat.

Previous vaccination does not necessarily prevent infection and as most people infected with poliovirus are asymptomatic the following precautions are advised to prevent transmission by potentially infected contacts.

Management of infected individuals and potentially infected contacts

Individual or contact	Management action
Infected individuals	Isolate in hospital or quarantine in a dedicated room in their dwelling and use contact precautions. A stool specimen should be collected weekly for testing at the NVRL. Isolation should continue until two stool samples taken 7 days apart are shown to be negative for poliovirus.
Household contacts (people who lived with the index patient and shared a toilet during the infectious period)	Quarantine household contacts at home. Take stool samples > 3 days after the contact's first exposure to the index patient. Contacts can be released from quarantine when two stool samples taken 24-48 hours apart are shown to be negative for poliovirus.
Toilet contacts (people who shared a toilet with the index patient during the infectious period, i.e. within 30 days before the case's onset of illness or those who had contact with stools or faecal matter of the case within 30 days before the patients onset of illness, without using infection control precautions	Offer education on hygiene and vaccination. Offer vaccination with IPV. Assume Irish-born contacts have been vaccinated , offer a booster and consider need for full course; assume overseas-born may not have been fully vaccinated and offer a full course of IPV.
Health care workers (people who cared for the index patient during the infectious period) and laboratory workers involved with testing the patient's specimens	Offer a booster vaccination with IPV for anyone who has not had a booster within the previous 10 years. For health care workers in close contact with the index patient who have no recorded immunisation history, or are not completely vaccinated, take two stool samples, 24-48 hours apart, with the first being taken > 3 days after the contact's first exposure to the index patient and offer a course of vaccination with IPV (three doses a minimum of one month apart).
Public contacts (including consumers, in the event that the case prepares food for others to eat.)	Offer education on hygiene and vaccination. Offer vaccination with IPV. Assume Irish-born contacts have been vaccinated, offer a booster and consider need for full course; assume overseas-born may not have been fully vaccinated and offer a full course of IPV.

Summary information pertaining to the household transmission of polioviruses and non polio enteroviruses can be found in Fields Virology 4th Edition[15] which states that: "Household secondary attack rates in susceptible members may be greatest for the agents of acute hemorrhagic conjunctivitis (enterovirus type 70 and coxsackievirus A24 variant) and for the polioviruses, and of lesser magnitude for the coxsackieviruses and echoviruses. In some studies, secondary attack rates may be 90% or greater, although they are typically lower.

Tracing of toilet contacts (such as those sharing a section of an aeroplane, workplace or childcare centre with the infected patient) is important to reduce the risk of onward transmission of infection. For containment, the tracing of contacts needs to be more rapid than the spread of the virus. One of the most important reasons for tracing of contacts is to educate them on hygiene and vaccination.

Contact tracing may not prevent the contact becoming infected with poliovirus, particularly if they are not adequately immunised, but stool sampling of household and incompletely vaccinated health care worker contacts (as outlined in the table above) and increased surveillance for clinical symptoms such as AFP will identify spread of the virus and can prevent further transmission. Targeted tracing and immunisation of contacts such as health care workers, food handlers and child care workers, who have the potential to spread infection to a large number of people, should be prioritised.[16]. The Department of Defence may become involved in identification of contacts overseas should a defence member or dependant be exposed to poliovirus in the course of their duty abroad.

Confirmation of a polio outbreak would require one of the following conditions to be met: multiple detection of wild polioviruses or VDPV in the environment; detection of a number of genetically distinguishable wild polioviruses or VDPV; and cases of paralytic polio or isolation of wild poliovirus or VDPV from an infected person/persons.[17]

Cleaning and disinfection

Proper cleaning and disinfection of areas contacted by an infected individual is required to prevent onward transmission. Following the report of an imported case in Australia in 2007, cleaning and disinfection of the aeroplane and airport toilets, as well as the patient's home was performed. No evidence of transmission of polio on aeroplanes has been reported.

Survival of poliovirus is favoured by lower temperatures and high moisture content. Once excreted, the virus can survive outside the human body for weeks at room temperature.[18] Laboratory studies have shown that polio virus survival in the environment is enhanced at high relative humidity.[19] Typical relative humidity for aircraft is below 10% suggesting the virus may not survive for long

[15] Bernard N. Fields (Editor), David M. Knipe, David M. Knipe (Editor), Bernard Roizman (Editor), Diane E. Griffin, Malcolm A. Martin, M.D. (Editor), Robert A. Lamb, Ph.D. (Editor), Diane E. Griffin (Editor), Peter M. Howley, Peter M. Howley (Editor), Stephen E. Straus (Editor) (2001) Fields Virology, 4th Edition, Lippincott Williams & Wilkins

[16] Eames, KDT & Keeling MJ 2003 Contact tracing and disease control. Proceedings of the Royal Society of London 270, 2565-2571.

[17] www.polioeradication.org; News item 12 November 2007

[18] Minor PD and Bell EJ. Picorniaviridae (excluding rhinovirus). In: Topley & Wilson's principles of bacteriology, virology and immunity, 8th ed. London, Edward Arnold, 1990: 323-357. Cited in: Ghendon and Robertson 1994 Bulletin WHO 72(6) 973-983.

[19] Abad FX, Pinto RM & Bosch A (1997) Disinfection of human enteric viruses on fomites. FEMS Microbiology letters 156: 107-111.

periods in this environment.[20] Interpolating data from various studies, Dowdle and Birmingham estimated poliovirus infectivity to decrease by '90% every 20 days in winter and 1.5 days in summer, in sewage every 26 days at 23°C, in fresh water every 5.5 days at ambient temperatures, and in seawater every 2.5 days under the same conditions.'[21] Poliovirus survived on cotton fabric with minimal loss for 24-48 hours at ambient temperature and 35% relative humidity, with rapid loss after 48 hours. Poliovirus survived longer on woollen fabrics with recovery after 20 weeks at the same humidity.[22]

Active disinfection procedures should involve the use of cleaning practices to remove soiling that may harbour and protect viral particles. Common disinfectants such as 70% ethanol, lysol and quaternary ammonium compounds are not effective against poliovirus. The virus is also resistant to lipid solvents (such as Dettol®) and is stable in many detergents at room temperature, although temperatures above 60°C for prolonged periods will reduced the infective capability of poliovirus. Effective disinfectants are those which contain free chlorine, such as sodium hypochlorite or bleach, glutaraldehyde solutions, formaldehyde solutions and iodophores. Contact time is also important in inactivating the virus. Laundry should be soaked in chlorine bleach (diluted according to the manufacturer's instructions) for at least 15 minutes.

Immunisation

There is no published evidence on the role of polio vaccination as post-exposure prophylaxis against paralytic disease. Theoretically, as IPV induces IgG immunity in some people after a single dose, IPV provided during the incubation period to paralytic disease could protect the individual. However, it is more likely that the high immunisation rate in Ireland and an individual's previous immunisation will prevent further transmission throughout the community and potential paralysis in infected contacts. At present, immunisation with IPV in contacts and health care workers without a known immunisation history of receiving at least three previous doses of an appropriate poliovirus vaccine (e.g. IPV or OPV), or with incomplete immunisation history, is recommended in order to ensure that all possible harm minimisation measures are implemented. As there is an absence of evidence on the protective role of IPV vaccination after possible exposure, vaccinated contacts need to be informed that they may not be protected against polio infection in the immediate term and that they should still contact their public health department if they develop any of the symptoms outlined on a supplied fact sheet. Individuals offered immunisation should be reassured that IPV is not a live vaccine and will not cause polio infection. The health authority coordinating the response will decide the need for vaccinations of contacts depending on the time elapsed from their exposure to the infected individual.

IPV is currently the vaccine of choice for use in an outbreak response in Ireland and is the only polio vaccine readily available in Ireland or Europe. IPV will be administered to unvaccinated contacts, as above, whilst a full containment response is developed. The extent of the immunisation response will to some degree depend on the scenario by which the index case became infected with poliovirus. For example an importation of poliovirus in a person who has travelled to Ireland from an area where poliovirus infection is occurring may require a widespread vaccination and containment response and community involvement in surveillance for symptoms of poliomyelitis. Although the

[20] Hocking MB & Foster HD 2004 Common cold transmission in commercial aircraft: industry and passenger implications. Journal of environmental health research 3 (1): 7-12.
[21] Dowdle WR and Birmingham ME. The biologic principles of poliovirus eradication. 1997 Journal of Infectious Diseases 175 (suppl 1) S286-292.
[22] Dowdle W et al. 2006 Containment of polioviruses after eradication and OPV cessation: characterizing risks to improve management. Risk Analysis, 26 (6) 1449-69.

national immunisation rate for polio is high, there may be pockets of unvaccinated individuals within which transmission will be possible. Large vaccination or re-vaccination campaigns may need to be implemented, depending on the time that has elapsed since the onset of paralysis in the index case and the population involved.

In support of polio eradication and the development by WHO of post-eradication immunisation policies, the United Nations Children's Fund (UNICEF) together with other partners is working on developing a polio vaccine stockpile to support the post-eradication period (www.unicef.org). This stockpile will include monovalent OPV (mOPV) and bivalent OPV (bOPV) to be used in targeted vaccination of contacts once the serotype of a polio case is confirmed and will be available for use in all countries, including Ireland, should it be required. Neither mOPV nor bOPV is currently available in Ireland but is used in some countries as part of targeted campaigns. The Irish Medicines Board would need to regulate special import of these monovalent bivalent vaccines for use in an outbreak situation only, should the outbreak response require them. It is recommended that stool specimens be collected prior to immunisation with mOPV to avoid the inadvertent isolation of vaccine strains of poliovirus during the subsequent laboratory testing. mOPV should not be used in immunocompromised individuals.

Education and increased surveillance

As part of the containment strategy, education will be essential as poliovirus infection is a very rare occurrence in Ireland. Health care workers need to be educated on appropriate contact precautions, testing and immunisation. Cleaning staff will need to be educated on appropriate cleaning agents and contact times. Potential contacts need to be educated on testing and immunisation and symptoms of which they should be aware. In order to ensure that any further transmission is detected, clinicians and testing laboratories need to ensure that all suspected cases of polio infection and cases of AFP have appropriate stool sampling and are referred to NVRL for testing. Ireland's freedom from poliovirus infection can only be demonstrated by maintaining the WHO performance indicators for AFP surveillance, including appropriate stool sampling.

ENVIRONMENTAL SURVEILLANCE

Individuals excrete poliovirus for several weeks after infection, and it is estimated that poliovirus can survive in sewage with a 90% loss of infectivity every 26 days at 23^{o}C.[23] WHO estimates the theoretical maximum sample sensitivity of environmental surveillance at detection of one individual infected with poliovirus among 10,000 uninfected ones.[24]

While environmental surveillance has been important in polio endemic countries such as Egypt and India, polio-free countries have also used this system. A wild poliovirus was isolated from sewage in Geneva, Switzerland, from a sample collected in August 2007. Nucleotide sequencing determined the virus to be closely related to ongoing polio transmission in Chad.[15] WHO recommended the Swiss authorities to alert physicians, perform enhanced surveillance for AFP cases for 6 months, continue sampling of sewage at the same site for 6 months, ensure all enterovirus isolations from cases of

[23] Dowdle WR and Birmingham ME. The biologic principles of Poliovirus eradication. 1997 Journal of Infectious Diseases; 175 (suppl1): S286-292

[24] World Health Organization. 2003 Guidelines for environmental surveillance of poliovirus circulation. WHO/V&B/03.03.

aseptic meningitis were typed and to assess vaccine coverage for gaps, especially in at risk groups (An Acute flaccid paralysis and poliomyelitis response plan for Australia [25]).

BIOSAFETY AND BIOTERRORISM

As a part of the Certification of Global Polio Eradication process, Ireland has contacted laboratories that potentially hold poliovirus or specimens that may contain poliovirus such as stool specimens, throat swabs, and cerebrospinal fluid specimens. A database of laboratories that hold vaccine strains of poliovirus, or specimens that contain untyped enteroviruses is held by the HPSC. As of 2013, the NVRL is the only laboratory in Ireland with polio tissue culture isolates and samples from which poliovirus has been isolated. Laboratory workers should be fully vaccinated and must use BL2 procedures and facilities when handling poliovirus or specimens that may contain poliovirus.

In the event of a laboratory acquired case of poliovirus infection, the regional department of public health would be involved in investigation of the incident and contact tracing, along with the AND Health Protection.

Poliovirus is a potential bioterrorism threat as it is relatively available in laboratories throughout the world from live vaccine stocks and isolation from clinical specimens. In 2002, infectious poliovirus particles were chemically synthesised from standard laboratory reagents. Poliovirus is highly contagious, relatively resistant to inactivation, is easily released into food or water supplies, and may produce a large number of asymptomatic infections before a case of AFP is detected. In an area with high vaccination coverage such as Ireland, release of poliovirus would likely cause localised spread in susceptible populations prior to detection and may affect Ireland's polio-free status. Any poliovirus picked up by routine environmental monitoring would be cause for further investigation.

MEDIA RESPONSE TO A CASE OF POLIOVIRUS INFECTION IN IRELAND

One of the most important elements of a public health response will be the communication strategy to ensure that accurate information is provided to the media and the community, as release of inaccurate or premature information may have serious repercussions for the affected individual, their family, carers and their community. The media may also be important in education of the public on the importance of sanitation, hand washing and immunisation in the containment phase.

It is important that the media are presented with up to date and factual information in order to minimise speculation and public concern. It is important for key stakeholders to have agreed on a national notification and communication strategy. The HSE will formulate the key messages in conjunction with the Department of Health. HSE will co-ordinate the media response to a single case. In the event of an outbreak the National Public Health Emergency Team will co-ordinate the media response. The Department of Health website will have up to date information and media releases and HSE HPSC will also provide information on the HPSC website.

CONCLUSION

Ireland continues to be free of endemic polio. The following principles underpin a coordinated national approach in the event of a case of polio diagnosed in Ireland.

[25] Accessed April 2011 http://www.health.gov.au/internet/main/publishing.nsf/Content/polio-plan.htm

- Preparedness in the event of a rare biological emergency.
- Coordination of policy and operational arms at a regional and national level, including agreement on roles and responsibilities.
- Regular communication between key policy and operational stakeholders. These lines of communication should be established now and have the ability to deal with interactions with the media.

Acknowledgements

An Acute Flaccid Paralysis and Poliomyelitis Response Plan for Australia[26]

Surveillance of Polio in the UK - Public Health England document[27]

[26] http://www.health.gov.au/internet/main/publishing.nsf/Content/polio-plan.htm

[27] http://www.hpa.org.uk/ProductsServices/MicrobiologyPathology/UKStandardsForMicrobiologyInvestigations/TermsOfUseForSMIs/AccessToUKSMIs/SMIUKProtocols/smiP01SurveillanceofPoliointheUK/

APPENDICES

Appendix A – Extract from www.polioeradication.org. Achieving Certification of Global Polio Eradication

Appendix B - Case definition for poliovirus infection (including a definition of AFP as part of the clinical evidence)

Appendix C - Procedure for notification of a case of AFP or suspected poliomyelitis

Appendix D – Flow diagram of key points in the outbreak response plan

Appendix E – Reporting Structure in the event of National Polio outbreak

Appendix F – Referral of stool specimens to the NVRL for viral testing

Appendix G—Letter to clinicians

Appendix H – Public Health Response to potential Poliovirus Infection

Appendix I – Surveillance Questionnaire for reporting AFP
Appendix J –AFP 60 day follow up questionnaire

Appendix K – Key contact details

Appendix L - List of acronyms

Appendix A- Achieving Certification of Global Polio Eradication (www.polioeradication.org)

In 1997, the Global Commission for the Certification of the Eradication of Poliomyelitis (GCC) finalized the criteria for certifying whether the goal of polio eradication is achieved. Certification is conducted on a regional basis. Each region (there are 6 WHO regions - the Americas, the Western Pacific region, the European Region, the Eastern Mediterranean Region and Southeast Asian Region and the African Region) can consider certification only when all countries in the area demonstrate the absence of wild poliovirus transmission for at least three consecutive years in the presence of excellent surveillance.

In addition to achieve the certification of global polio eradication, all facilities holding wild poliovirus infectious and potentially infectious materials must have implemented bio-containment measures. The Global Action Plan for Laboratory Containment of Wild Poliovirus (2nd edition 20043[28]) outlines the activities to minimize the risk of the reintroduction of wild poliovirus from laboratories to the community.

What is required to achieve global certification?

1. Achieving certification-standard surveillance

In endemic regions:

- Achieve and sustain certification standard surveillance for acute flaccid paralysis (AFP) at the national level.
- Identify and close any gaps in surveillance performance at the sub-national level in all countries.
- Increase the speed of surveillance and virologic data analysis to ensure timely emergency response.

In certified polio-free regions:

• Maintain certification-standard surveillance for acute flaccid paralysis
• Ensure highest possible immunity levels against wild poliovirus
• Develop action plans for responding rapidly to importations of wild poliovirus
• Integrate AFP reporting into national surveillance mechanisms to respond to other important diseases.

2. Ensuring access to a WHO-accredited laboratory

- Reduce the time required for intra-typic differentiation (ITD) results to be available from endemic areas;
- ITD capacity established in all polio reservoir countries

[28] WHO global action plan for laboratory containment of wild polioviruses . Second edition. 2004. http://www.polioeradication.org/content/publications/WHO-VB-03-729.pdf

- Sustain the international capacity to process all specimens from AFP cases in WHO-accredited laboratories through global certification and OPV cessation

3. Ensuring containment of wild polioviruses and Vaccine Derived Poliovirus (VDPVs)

- Further dissemination and national implementation of activities outlined in the Global Action Plan for Laboratory Containment of Wild Polioviruses 2003 Second edition.*
- Complete laboratory survey and inventory activities in all polio-free countries.
- Prepare for implementation of phase II laboratory containment activities prior to global certification.
- Initiate phase II containment activities in all countries by the end of 2005.
- Complete BSL-3/polio containment in facilities producing IPV from wild poliovirus.

4. Completing the certification process

- Regional Certification Commissions (RCC) in the remaining three polio-endemic regions to train National Certification Commissions (NCC)
- NCCs to collect review and decide on the national documentation through consultations.

By the end of 2005,the GCC will have finalised: the data requirements for global certification from the three certified polio-free regions (end of 2002); the role of environmental surveillance as a supplemental strategy; and mechanisms for reviewing and verifying documentation on the containment of laboratory stocks and IPV production.

What is certification standard surveillance?

- the ability to detect at least one case of non-polio acute flaccid paralysis (AFP) for every 100 000 children under 15 years of age
- two adequate specimens collected from at least 80% of cases of acute flaccid paralysis
- all specimens should be processed at a WHO accredited laboratory

Appendix B - Case definition for Acute Flaccid Paralysis, acute anterior poliomyelitis (Irish case definition) and for Paralytic Poliomyelitis [29]

1. Case definition for Acute Flaccid Paralysis

Acute onset of focal weakness or paralysis characterised as flaccid (reduced tone) without other obvious cause (e.g., trauma) in children less than 15 years old. Transient weakness (e.g., post-ictal weakness) should not be reported.

2. Case definition for Acute anterior poliomyelitis (HPSC, 2012)

(Polio virus)

Clinical criteria
Any person <15 years of age with acute flaccid paralysis (AFP)
OR
Any person in whom polio is suspected by a physician

Laboratory criteria
At least one of the following three:
- Isolation of a polio virus and intratypic differentiation– Wild polio virus (WPV)
- Vaccine derived poliovirus (VDPV) (for the VDPV at least 85% similarity with vaccine virus in the nucleotide sequences in the VP1 section)
- Sabin-like poliovirus: intratypic differentiation performed by a WHO-accredited polio laboratory (for the VDPV a >1% up to 15% VP1 sequence difference compared with vaccine virus of the same serotype)

Epidemiological criteria
At least one of the following two epidemiological links:
- Human to human transmission
- A history of travel to a polio-endemic area or an area with suspected or confirmed circulation of poliovirus

Case classification

A. **Possible case**

Any person meeting the clinical criteria (in the absence of any alternative diagnosis)

B. **Probable case**

Any person meeting the clinical criteria and with an epidemiological link

C. **Confirmed case**

Any person meeting the clinical and the laboratory criteria

3. Definition of a case of paralytic poliomyelitis (WHO)

A patient with clinical features compatible with paralytic poliomyelitis from whom wild, VDPV or vaccine poliovirus has been isolated from a clinical specimen.

Clinical features compatible with paralytic poliomyelitis
• Acute flaccid paralysis
• Decreased or absent tendon reflexes in affected limbs

[29] Case Definitions for notifiable diseases version 1.2. published 19 December 2013 available at http://www.hpsc.ie/hpsc/NotifiableDiseases/CaseDefinitions/

• No sensory or cognitive loss
• No other cause identified despite laboratory investigation
• Neurological deficit present 60 days after onset of symptoms unless the patient has died

Categories of cases
1. Vaccine Recipient
2. Vaccine Contact
3. Wild Indigenous
4. Wild Imported
5. Other

Definitions of categories of cases

1. Vaccine recipient (Va R)#

• Clinical features compatible with paralytic poliomyelitis, and
• No laboratory evidence of wild-type virus*, and
• Paralysis onset between 4 and 30 days after patient received oral polio vaccine†

vaccinated abroad or in a patient with underlying immunodeficiency previously vaccinated with OPV
* confirmation by isolation of vaccine virus
† for immunocompromised individuals these periods can be considerably longer

2. Vaccine contact (Va C)

• Clinical features compatible with paralytic poliomyelitis, and
• No laboratory evidence of wild-type virus*, and
• Contact with a vaccinee, and
• Paralysis onset between 4 and 75 days after vaccinee received oral polio vaccine†

* confirmation by isolation of vaccine virus
† for immunocompromised individuals these periods can be considerably longer

3. Wild indigenous

• Clinical features compatible with paralytic poliomyelitis, and
Wild-type virus isolation, and
• No travel to, and no contact with anyone who has travelled to or resided in, a country where wild poliovirus is known to circulate within 30 days before symptom onset

4. Wild imported

• Clinical features compatible with paralytic poliomyelitis, and
• Wild-type virus isolation, and
• Travel to or residence in a country where wild poliovirus is known to circulate within 30 days before symptom onset (see 5)

5. Other categories

5.1 Wild virus - import related

• Clinical features compatible with paralytic poliomyelitis, and
• Wild-type virus isolation, and
• Contact with anyone who has travelled to or resided in a country where wild poliovirus is known to circulate within 30 days before symptom onset, or contact with anyone who has acute poliomyelitis thought to have travelled to or resided in a country where wild poliovirus is known to circulate within 30 days before symptom onset

5.2 Vaccine associated case - possible or no known contact

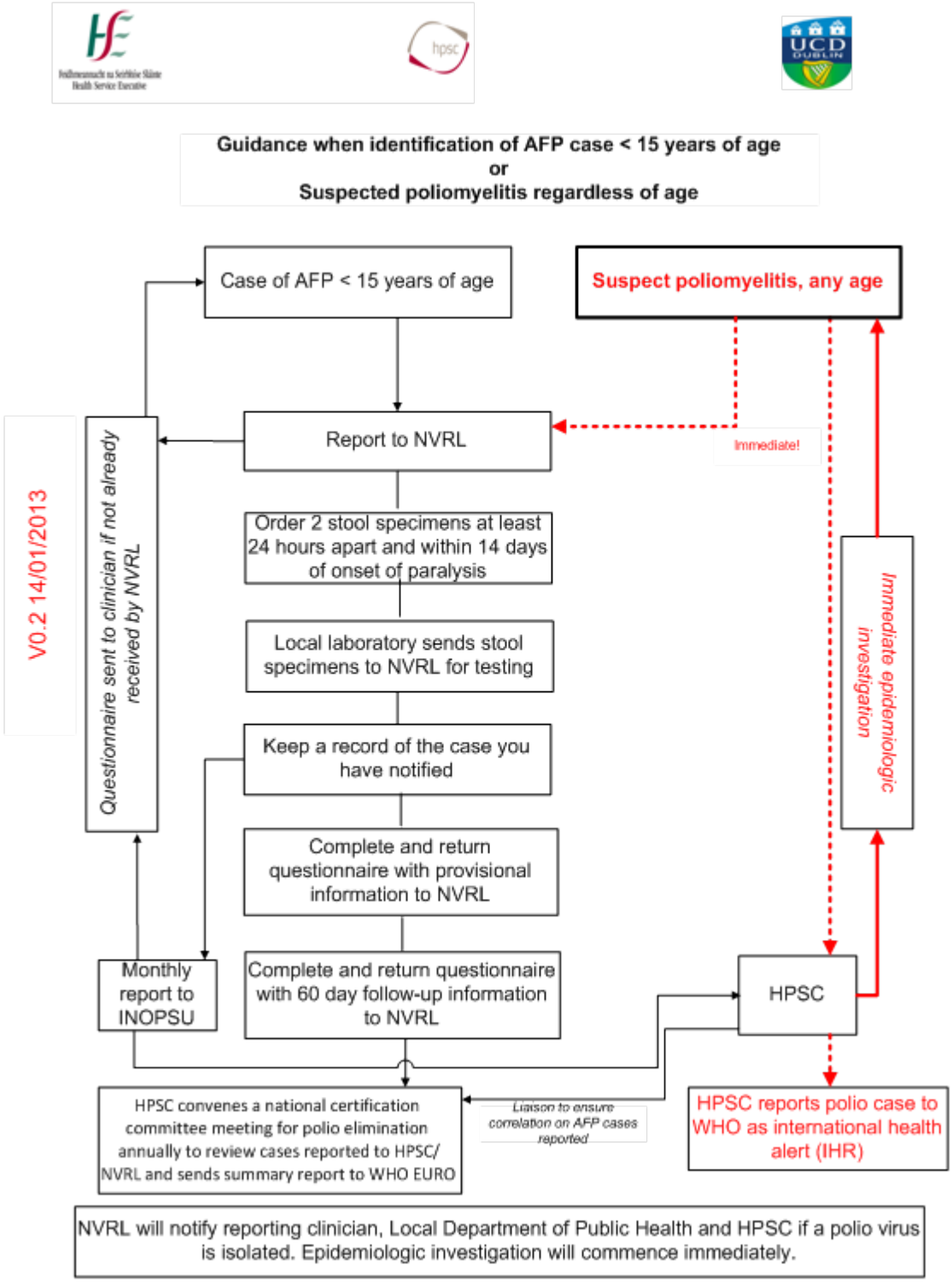
• Clinical features compatible with paralytic poliomyelitis, and
• Vaccine virus isolation but no known direct contact with a vaccinee and no history of the patient receiving oral polio vaccine

5.3 Compatible case*

• Clinical features compatible with paralytic poliomyelitis, and
• No poliovirus isolation from clinical specimens, and
• With or without serological evidence of recent poliovirus infection, and
• No evidence for infection with other neurotropic viruses

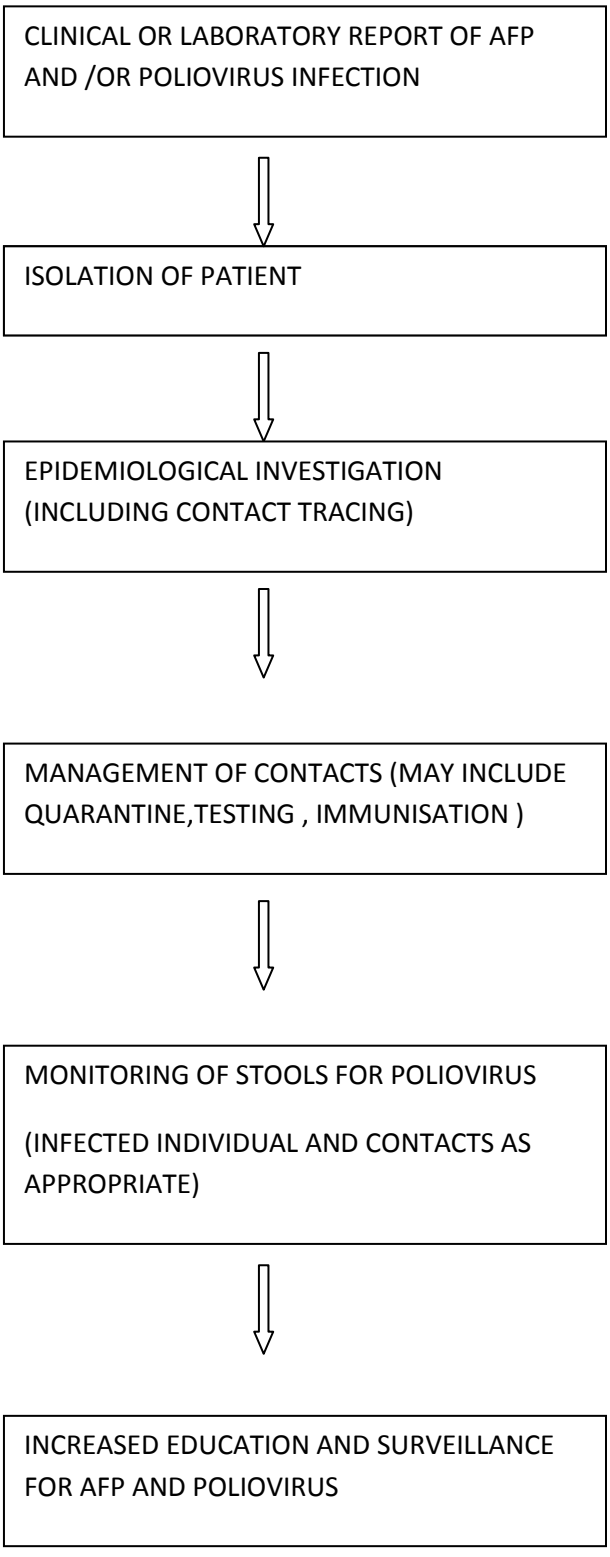
* these cases are referred for expert review and subsequent categorisation

Appendix C - Procedure for clinicians for notification of a case of AFP or suspected poliomyelitis regardless of age

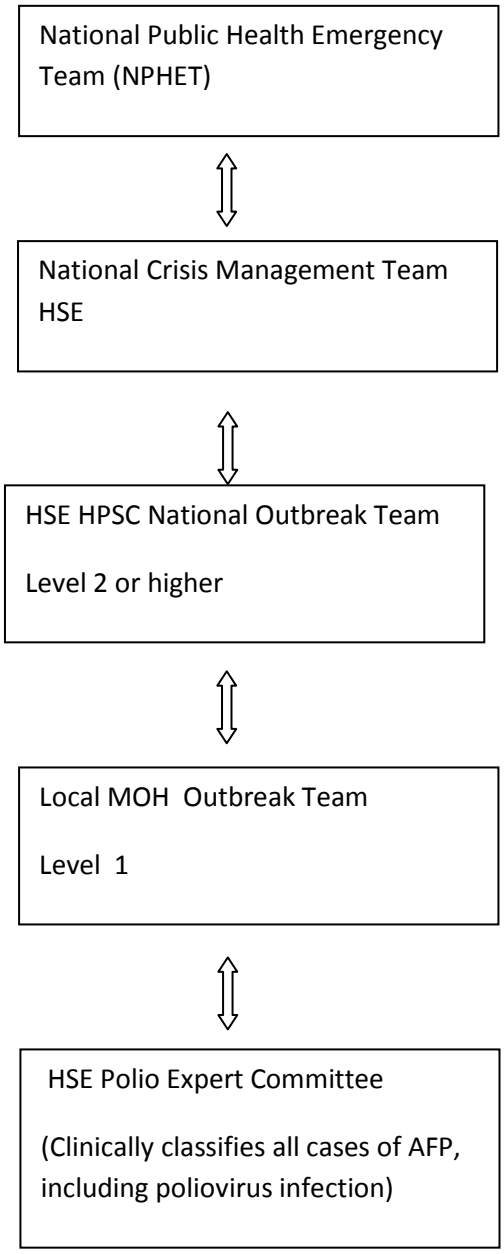


Appendix D - Flow diagram of key points in the outbreak response plan

Flowchart:



Appendix E –Reporting Structure in the event of National Polio outbreak



Appendix F - Referral of specimens to the National Virus Reference Laboratory

1. Collect two stool specimens as soon as possible, at least 24 hours apart, and within 14 days of onset of paralysis, in sterile containers. Each specimen should be approximately five grams. Two specimens are requested due to intermittent virus shedding.
2. Store the specimens at 4^{o}C until ready to send. If the shipment cannot be sent for more than 72 hours, freeze the specimens.
3. Complete the AFP specimen laboratory request form and include with the shipment.
4. Send the specimens to the National Virus Reference Laboratory. If poliovirus infection is suspected please contact Dr. Jeff Connell 7161321 or phone 7161236/1240/1349 at the NVRL or 087 9806448 outside normal working hours before sending the samples.

Currently, the transport of dangerous goods in Ireland by any mode of transport is regulated by EU directive 94/55/EC (road and rail transport) and the International Civil Aviation Organisation (ICAO)/International Air Transport Association (IATA) regulations (air travel) both of which use the United Nations Model Regulations system. This system is standardised almost worldwide. Within the UN system dangerous goods are classified into 9 different groups, of which, Class 6, division 6.2 (Infectious substances) is relevant here. Within division 6.2, infectious substances are divided into two categories:

Category A – UN2814(infectious substances affecting humans); packing instruction 602
UN2900 (infectious substances affecting animals); packing instruction 602

Category B – UN3373 (Diagnostic specimens); packing instruction 650.

Category A Infectious Substances are defined as infectious substances in a form that, when exposure occurs, is capable of causing permanent disability, life-threatening or fatal disease in otherwise healthy humans or animals. If there is any doubt as to whether or not a pathogen falls within this category it must be transported as a Category A Infectious Substance.

Category B Infectious Substances are infectious substances that do not meet the criteria for inclusion in Category A.

Packaging of samples

All infectious substances must be transported in triple packaging system.

1) Primary containers must be leak-proof and a water-proof, leak-proof seal must be used.
2) The secondary packaging must also be leak-proof and contain sufficient absorbent material to absorb the entire contents of the primary container. If multiple primary containers are packaged together they must be individually wrapped to prevent contact.
3) The outer shipping packaging can be boxes, cans or drums and must be of sufficient strength for its capacity, weight and intended use. An itemised list of the contents must be enclosed between the secondary and outer packaging.

Specimen data forms, letters etc should be taped to the secondary container. The primary or secondary container must be able to withstand, without leakage, an internal pressure producing a pressure differential of not less than 95kPa and temperatures –40^{o}C to +55^{o}C.

Appendix G: Information letter to clinicians regarding AFP surveillance

Polio eradication

Dear Dr _____
Re: Case name / identifier: _____
_____ Reported on/by: _____

As you may know, the World Health Organization is working hard to eradicate wild poliovirus. As part of this process each year all countries are requested to report to WHO regarding status of poliovirus infection in the country and the quality of surveillance to identify any case should it occur in a timely fashion. The criteria that will be used will be extremely stringent and, in particular, that there is no evidence that poliovirus infection was the cause of a case of paralysis.

The WHO has established a gold standard that **all** suspected cases of acute flaccid paralysis (AFP) should be investigated by the submission of stool samples for virological investigation. In Ireland, however, where the diagnosis of paralytic polio is considered extremely unlikely, many such cases are excluded by clinical or other criteria.

We are asking all hospital clinicians to report the clinical findings and investigations in all suspected AFP cases < 15 years of age and to ensure that two faecal samples are taken as soon as possible at least 24 hours apart, but within two weeks of onset of symptoms, to outrule poliovirus infection.

A National Expert Committee for Polio certification has been established and includes a consultant in neurology, virology, microbiology and public health who will review the data on all AFP cases. The committee will submit a report to WHO-EURO annually. .

With many thanks for your help with this important initiative.

Appendix H: Public Health response to potential poliovirus infection

Level one:

- **single case of poliovirus in healthy person**

Defined as: Poliovirus (non-drifted variant) isolated from healthy person with:
EITHER recent oral polio vaccination or history of travel to area using OPV
OR contact with family member with recent history of OPV vaccination or recent travel to an area using OPV
OR no recent vaccination or travel history and no family or vaccination history

1. Ensure appropriate investigations (see Appendix F) are initiated in cases and contacts (faeces from contacts).
2. Resample faeces) case and all household contacts and test at 4 weekly intervals. Report to HPSC who will report to the National Expert Committee on AFP 3. Repeat sampling until two negative samples 48 hours apart
4. Ensure close family contacts are fully vaccinated with IPV-containing vaccine.
5. Need to discuss further management and contact tracing urgently with HPSC if no clear risk factor

- **single case of poliovirus in immunosuppressed person**

Defined as: Poliovirus (non-drifted variant) isolated from immunosuppressed person with or without symptoms of paralysis
1. Ensure appropriate investigations (see Appendix F) are initiated in case and contacts. Report to HPSC. Inform DH.
2. Refer case to clinician/immunologist
3. Advise adequate personal hygiene and exclusion from food handling work
4. Recheck stools monthly for continued excretion until three stools negative for polio at monthly intervals -> then review with HPSC
5. Specialist advice should be sought before travel (regarding possible use of IVI or polio immunisation)
6. Ensure close family contacts are screened and vaccinated with IPV-containing vaccine regardless of vaccination status

- **single case of suspected vaccine associated paralytic polio**

Defined as: Compatible illness in recent oral polio vaccine recipient or (with or without poliovirus isolate)
1. Ensure appropriate laboratory investigations (see Appendix F) are initiated in case and contacts.
Report to the HPSC. Inform DH. Report to IMB
2. Offer IPV vaccine to unvaccinated close (household / health carers) contacts

3. Encourage opportunistic IPV vaccination of unvaccinated persons in school / locality.

Level two: possible single case of wild poliovirus

Defined as: Poliovirus isolate from a person with paralytic symptoms who has no history of recent vaccination or contact with a vaccinee
Poliovirus isolate from a person returning from a possible endemic area (any country other than Western Europe, North America, or Australasia)
Poliovirus isolate from a child in an Irish Traveller family
Poliovirus isolate from a child in a community which may refuse vaccination (e.g. anti-vaccine groups/communities)

1. Consider need for stool collections prior to the use of OPV to avoid inadvertent isolation of vaccine strains of poliovirus. OPV should not be used in immunocompromised individuals.
2. Initiate appropriate investigations (see Appendix F) of case and contacts immediately.
   Report immediately to the AND Health Protection and HPSC. Contact HSE to obtain supply of IPV (or possibly OPV or mOPV in certain situations) – (consult with national outbreak control team).
3. Ensure all close family contacts are vaccinated with IPV immediately - regardless of vaccination status.
   Consider need for further dose of OPV.
4. Immediately investigate vaccination coverage in population at risk (e.g. school, residential community, locality). If vaccine coverage in local childhood population is suspected to be below 85% consider a mop up campaign involving:
   • A single dose of IPV to persons of all ages if case occurs in a well defined community (regardless of vaccine history). Consider need for further dose of OPV
   OR
   • A single dose of IPV in all children of pre-school and school-age in locality (regardless of vaccine history). Consider need for further doses of OPV
   AND
   • Encourage opportunistic IPV vaccination (completion of vaccine course in all unvaccinated and partially vaccinated persons in locality)
5. If the target population (defined in 3) refuses vaccine
   • Consider giving a single dose of vaccine to persons in adjacent communities
   • Institute active surveillance for paralytic and non-paralytic polio infection in Locality

Level three: confirmed single case of wild poliovirus

Defined as: Poliovirus isolate confirmed as wildtype by intratypic differentiation at NVRL and the UK reference laboratory

1. Collect stool samples from household contacts. Consider collection of stool samples from wider population

2. Report immediately to the AND Health Protection and HPSC. DH, WHO and EWRS will be informed

3. Institute active surveillance for paralytic and non-paralytic infection in locality.
• Advise local laboratories and clinicians
• Encourage stool samples in all acute neurological illnesses
• Consider stool survey in healthy contacts

4. If the infection appears to be imported immediately investigate vaccination coverage in Population at risk (e.g. school, residential community, locality). If vaccine coverage in local childhood population is suspected to be below 85% consider a mop up campaign involving:
• A single dose of IPV to persons of all ages if case occurs in a well defined community (regardless of vaccine history). Consider need for further doses of OPV
OR
• A single dose of IPV in all children of pre-school and school-age in locality (regardless of vaccine history). Consider need for further doses of OPV.
AND
• Opportunistic IPV vaccination (encourage completion of vaccine course in all unvaccinated and partially vaccinated persons in the locality)

5. If the infection appears to be indigenous perform retrospective case-finding

• Contact local laboratories to obtain any recent enterovirus isolates
• Perform stool survey in health persons at risk

6. If infection is thought to be indigenous, conduct a mop up campaign involving:
• A single dose of IPV to persons of all ages if case occurs in a well defined community (regardless of vaccine history). Consider need for further doses of OPV
OR
• A single dose of IPV in all children of pre-school and school-age in locality (regardless of vaccine history). Consider need for further doses of OPV
AND
• Opportunistic IPV vaccination (encourage completion of vaccine course in all unvaccinated and partially vaccinated persons in the locality)

7. If the target population (defined in 4 or 6) refuses vaccine
• Consider giving a single dose of vaccine to person in adjacent communities

8. Consider a mop-up campaign in other age groups / populations depending on the epidemiological circumstances

Level 3: confirmed single c-VDPV* case

Defined as: Poliovirus isolate confirmed as cVDPV drifted variant on sequencing at NVRL from a person with or without paralytic symptoms

Public health management as level 3 wild polio-virus incident
* Vaccine-derived polioviruses (VDPV) are defined as live, attenuated strains of the virus contained in the oral polio vaccine (OPV) which have changed and reverted to a form that can cause paralysis in humans and with capacity for sustained circulation. These are identified as drift variants by intratypic differentiation.
1. cVDPVs (circulating vaccine-derived polioviruses) that are associated with sustained person-to person transmission and considered to be circulating in the environment;
2. iVDPVs (immunodeficiency related vaccine-derived poliovirus) isolated from Immunodeficient patients who have prolonged infections after exposure to OPV.

Level four: epidemiologically linked cases of paralytic polio

Defined as: Compatible illness occurring in two or more people in the same locality within an eight week period where two or more individuals have no history of recent vaccination or contact with a recipient (with or without poliovirus isolates).

1. Initiate appropriate investigations of case and contacts immediately. Report immediately to the AND Health Protection and to HPSC. Inform DOHC.
2. Ensure close family contacts are vaccinated with IPV immediately - regardless of vaccination status. Consider need for further doses of OPV.

3. Institute active surveillance and retrospective case-finding for paralytic and nonparalytic infection in locality.
• Advise local laboratories and clinicians
• Encourage stool samples in all acute neurological illnesses
• Perform stool survey in healthy contacts

4. Conduct a mop up campaign involving:
• A single dose of IPV to persons of all ages if case occurs in a well defined community (regardless of vaccine history) . Consider need for further doses of OPV
OR
• A single dose of IPV in all children of pre-school and school-age in locality (regardless of vaccine history). Consider need for further doses of OPV
AND
• Opportunistic vaccination (completion of all unvaccinated persons in locality)

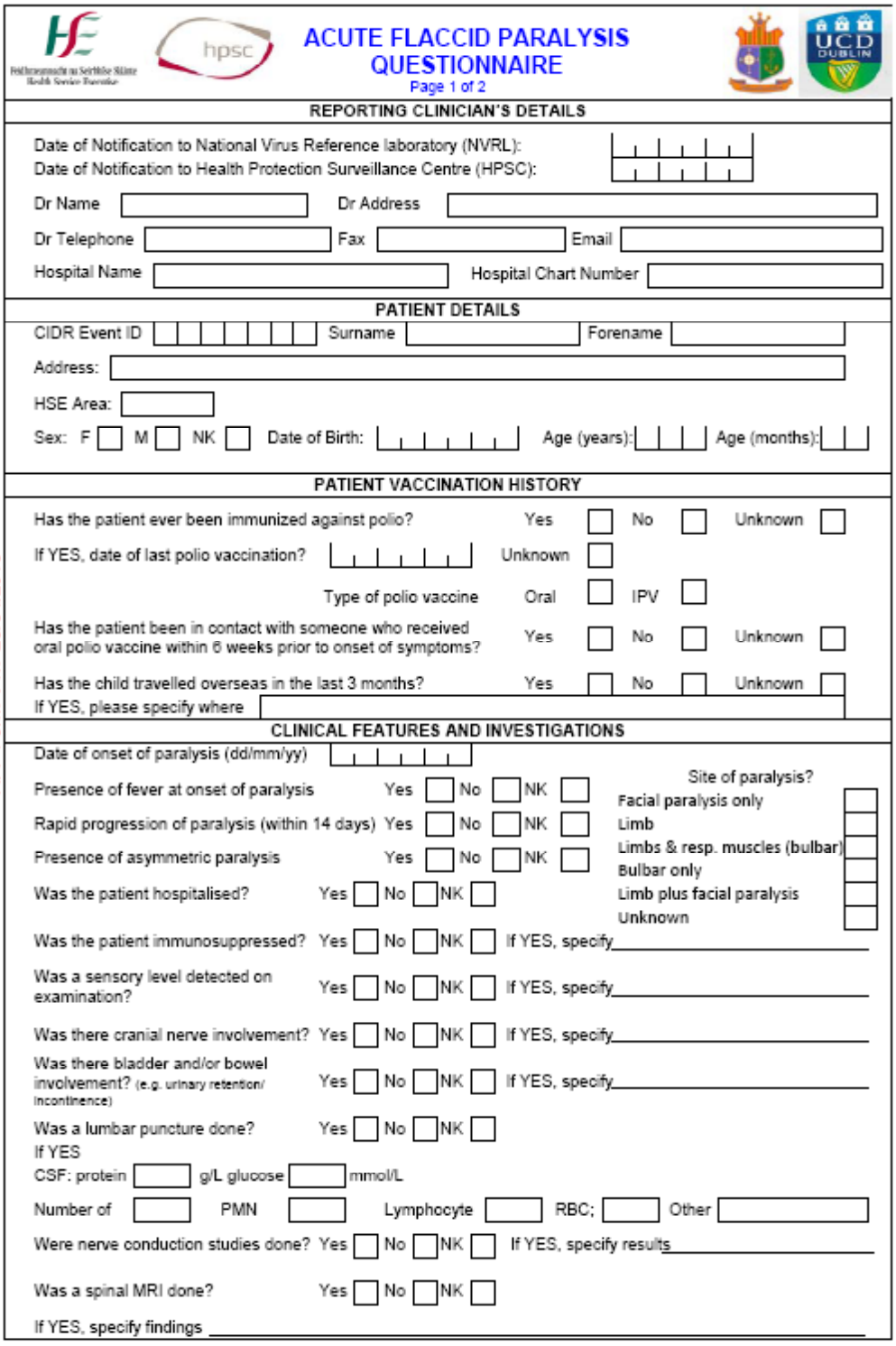
5. Consider a mop-up campaign in other age groups / populations depending on the epidemiological circumstances.

Level 4: Epidemiologically linked cases of c-VDPV

Defined as: Two or more poliovirus isolates from persons in the same locality presenting with paralytic/non-paralytic/or no symptoms and confirmed as cVDPV on sequencing at VRD

Public health management as level 4 wild type polio-virus incident

Appendix I – Acute Flaccid Paralysis Questionnaire



ACUTE FLACCID PARALYSIS QUESTIONNAIRE

Page 1 of 2

AFP Form V1.7 23/04/2013

REPORTING CLINICIAN'S DETAILS

Date of Notification to National Virus Reference laboratory (NVRL):
Date of Notification to Health Protection Surveillance Centre (HPSC):

Dr Name | Dr Address

Dr Telephone | Fax | Email

Hospital Name | Hospital Chart Number

PATIENT DETAILS

CIDR Event ID | Surname | Forename

Address:

HSE Area:

Sex: F M NK | Date of Birth: | Age (years): | Age (months):

PATIENT VACCINATION HISTORY

Has the patient ever been immunized against polio? Yes No Unknown

If YES, date of last polio vaccination? Unknown

Type of polio vaccine Oral IPV

Has the patient been in contact with someone who received oral polio vaccine within 6 weeks prior to onset of symptoms? Yes No Unknown

Has the child travelled overseas in the last 3 months? Yes No Unknown

If YES, please specify where

CLINICAL FEATURES AND INVESTIGATIONS

Date of onset of paralysis (dd/mm/yy)

Presence of fever at onset of paralysis Yes No NK

Rapid progression of paralysis (within 14 days) Yes No NK

Presence of asymmetric paralysis Yes No NK

Was the patient hospitalised? Yes No NK

Site of paralysis?
- Facial paralysis only
- Limb
- Limbs & resp. muscles (bulbar)
- Bulbar only
- Limb plus facial paralysis
- Unknown

Was the patient immunosuppressed? Yes No NK If YES, specify

Was a sensory level detected on examination? Yes No NK If YES, specify

Was there cranial nerve involvement? Yes No NK If YES, specify

Was there bladder and/or bowel involvement? (e.g. urinary retention/ incontinence) Yes No NK If YES, specify

Was a lumbar puncture done? Yes No NK

If YES

CSF: protein g/L glucose mmol/L

Number of PMN Lymphocyte RBC; Other

Were nerve conduction studies done? Yes No NK If YES, specify results

Was a spinal MRI done? Yes No NK

If YES, specify findings

ACUTE FLACCID PARALYSIS QUESTIONNAIRE

CLINICAL FEATURES AND INVESTIGATIONS contd.

Was an EMG performed? Yes ☐ No ☐ NK ☐

If YES, specify findings _____

How many faecal specimens were sent for viral culture? None ☐ One ☐ Two ☐ Unknown ☐

Date 1st faecal specimen |_|_|_|_|_|_| Date 2nd faecal specimen |_|_|_|_|_|_| >=24 hours after first

DIAGNOSIS

In light of currently available evidence, what is the patient's diagnosis? (Please indicate on list below)

Peripheral neuropathy

☐ Guillain-Barre syndrome (acute post-infectious polyneuropathy)

Acute myelopathy

☐ Transverse myelitis
☐ Acute disseminated encephalomyelitis (ADEM)
☐ Spinal cord ischaemia
☐ Spinal cord injury including trauma
☐ Peri-operative complication
☐ Other (specify) ☐

Anterior horn cell disease

☐ Acute poliomyelitis
☐ Vaccine-associated poliomyelitis
☐ Other neurotropic viruses
☐ Hopkins' syndrome

Muscle disorders

☐ Periodic paralyses
☐ Mitochondrial diseases (infantile type)
☐ Viral myositis
☐ Drug-induced paralysis (specify) ☐

Systemic disease

☐ Acute porphyria
☐ Critical illness neuropathy/myopathy
☐ Conversion disorder

Disorders of neuromuscular transmission

☐ Botulism
☐ Insecticide e.g. *organophosphate poisoning*
☐ Tick bite paralysis
☐ Other (specify) ☐

OUTCOME

Did the patient survive the illness? Yes ☐ No ☐ NK ☐

If NO, please give the number of days between onset of paralysis and death ☐

Does the patient have any residual paralysis? Yes ☐ No ☐ NK ☐

If NO, duration of paralysis? ☐ days If YES, specify level Sensory ☐ Motor ☐

Is there residual sphincter dysfunction? Yes ☐ No ☐ NK ☐ Date of Follow-up |_|_|_|_|_|_|

PLEASE USE THE BACK OF THIS QUESTIONNAIRE IF YOU HAVE ANY FURTHER INFORMATION THAT MAY HELP US

Thank you for contributing to AFP surveillance and the WHO polio eradication program

Form completed by:_____

Contact telephone number:_____ Date of Completion |_|_|_|_|_|_|

Please Fax form to Alison Kelly, NVRL at Fax No. 01 2897811 ANS (anonymised) to Dr. Suzanne Cotter, HPSC at Fax No. 01 8661299

AFP Form V1.7 23/04/2013

Appendix J – Acute Flaccid Paralysis 60 Day Follow-Up Questionnaire

ACUTE FLACCID PARALYSIS
60 Day Follow-Up Questionnaire

REPORTING CLINICIAN'S DETAILS

Date of Notification to National Virus Reference laboratory (NVRL): ☐☐☐☐☐☐

Date of Notification to Health Protection Surveillance Centre (HPSC): ☐☐☐☐☐☐

Dr Name ☐ Dr Address ☐

Dr Telephone ☐ Fax ☐ Email ☐

Hospital Name ☐ Hospital Chart Number ☐

PATIENT DETAILS

CIDR Event ID ☐☐☐☐☐☐ Surname ☐ Forename ☐

Address: ☐

HSE Area: ☐

Sex: F ☐ M ☐ NK ☐ Date of Birth: ☐☐☐☐☐☐ Age (years): ☐☐ Age (months): ☐☐

60 DAY OUTCOME

Did the patient survive the illness? Yes ☐ No ☐ NK ☐

If NO, please give the number of days between onset of analysis and death ☐ days

Does the patient have any residual paralysis at 60 days after onset of paralysis? Yes ☐ No ☐ NK ☐

If NO, what was the total duration of paralysis? ☐ days

Is there residual sphincter dysfunction? Yes ☐ No ☐ NK ☐

Has your diagnosis changed since you originally notified this case? Yes ☐ No ☐

Date of Follow-up ☐☐☐☐☐☐

If yes, please indicate the final diagnosis (below) and the clinical features and investigation findings that support the revised diagnosis:

_____

_____

AFP Follow-up Form v1.2 31/05/2013

FINAL DIAGNOSIS

In light of currently available evidence, what is the patient's diagnosis? (Please indicate on list below)

Peripheral neuropathy

☐ Guillain-Barre syndrome (acute post-infectious polyneuropathy)

Acute myelopathy

☐ Transverse myelitis
☐ Acute disseminated encephalomyelitis (ADEM)
☐ Spinal cord ischaemia
☐ Spinal cord injury including trauma
☐ Peri-operative complication
☐ Other (specify) ☐

Anterior horn cell disease

☐ Acute poliomyelitis
☐ Vaccine-associated poliomyelitis
☐ Other neurotropic viruses
☐ Hopkins' syndrome

Continued on next page

ACUTE FLACCID PARALYSIS QUESTIONNAIRE

FINAL DIAGNOSIS contd. From page 1

Muscle disorders

- ☐ Periodic paralyses
- ☐ Mitochondrial diseases (infantile type)
- ☐ Viral myositis
- ☐ Drug-induced paralysis (specify) ☐

Systemic disease

- ☐ Acute porphyria
- ☐ Critical illness neuropathy/myopathy
- ☐ Conversion disorder

Disorders of neuromuscular transmission

- ☐ Botulism
- ☐ Insecticide *e.g. organophosphate poisoning*
- ☐ Tick bite paralysis
- ☐ Other (specify) ☐

Do you have any other comments on this case?

AFP Follow-UP Form V1.2 31/05/2013

Thank you for contributing to AFP surveillance and the WHO polio eradication program

Form completed by:_____

Contact telephone number:_____ Date of Completion ☐☐/☐☐/☐☐

Please Fax form to Alison Kelly, NVRL at Fax No. 01 2697611 AND (anonymised) to Dr. Suzanne Cotter, HPSC at Fax No. 01 8561299

Appendix K – Key Contacts

The National Virus Reference Laboratory (www.NVRL.ie)
University College Dublin, Belfield
NVRL clinician on call -087 9806448.
Website: http://nvrl.ucd.ie/

The Health Protection Surveillance Centre HSE
25-27 Middle Gardiner St, Dublin 1
Contact medical officer on call
Telephone: 01 876 5300 (reception)
Website: www.hpsc.ie

Department of Health
Hawkins House, Dublin 2
www.health.gov.ie

WHO IHR Focal Point
Health Protection Surveillance Centre
Telephone: (+35) 1 8765300
Fax: (+35) 1 8561299

Key Regional Department of Public Health Contacts - Directors of Public Health/ Medical Officers of Health

All cases of suspect poliomyelitis should be reported immediately to the local health Authority. During office hours contact the Department of Public Health and ask to speak to the Director of Public Health or the Medical Officer on call. Out of hours, contact the regional Ambulance service who will contact the on call medical officer 24/7

East
Counties Dublin, Kildare and Wicklow
Dr Margaret Fitzgerald
Medical Officer of Health,
Department of Public Health,
Room G29,
Dr Steevens' Hospital,
Dublin 8.
Phone: 01 6352145
Fax: 01 6352103

Midlands
Counties Laois, Offaly, Longford and Westmeath
Dr Phil Jennings
Medical Officer of Health,
Department of Public Health,
Area Office,
Arden Road,
Tullamore,
Co. Offaly.
Phone: 057 9359891
Fax: 057 9359907

Mid West
Counties Clare, Limerick and North Tipperary
Director of Public Health
Medical Officer of Health,
Department of Public Health,
Mount Kennett House,
Henry Street,
Limerick.
Phone: 061 483337
Fax: 061 464205

North East
Counties Cavan, Louth, Meath and Monaghan
Dr Patrick O'Sullivan
Medical Officer of Health,
Department of Public
Health,
Railway Street, Navan,
Co. Meath.
Phone: 046 9076412
Fax: 046 9072325

North West
County Donegal
Dr Peter Wright
Medical Officer of Health,
Department of Public Health,
Iona House,
Upper Main Street,
Ballyshannon,
Co. Donegal.
Phone: 071 9852900
Fax: 071 9852901

Counties Sligo and Leitrim
Dr Peter Wright
Medical Officer of Health,
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Bridgewater House,
Rockwood Parade,
Sligo.
Phone: 071 9174750
Fax: 071 9138335

South
County Cork
Dr Elizabeth Keane
Medical Officer of Health,
Department of Public Health,
Floor 2,
Block 8,
St Finbarr's Hospital,
Douglas Road,
Cork.
Phone: 021 4927601
Fax: 021 4923257

County Kerry
Dr Elizabeth Keane
Medical Officer of Health,
Department of Public Health,
Rathass,
Tralee, Co. Kerry.
Phone: 066 7184548
Fax: 066 7184542

South East
Counties Carlow, Kilkenny, South Tipperary, Waterford and Wexford
Dr Orlaith O'Reilly
Medical Officer of Health,
Department of Public Health,
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Appendix L - List of acronyms

AFP	Acute Flaccid Paralysis
AND Health Protection	Assistant National Director Health Protection
CMO	Chief Medical Officer
c-VDPV	circulating vaccine derived polio virus
DO	Department of Health
ELISA	Enzyme-Linked Immunosorbent Assay
HSE HPSC	HSE Health Protection Surveillance Centre
IHR	International Health Regulations
IPV	Inactivated Polio Vaccine
NPA	Nasopharyngeal aspirate
NVRL	National Polio Reference Laboratory
OPV	Oral Polio Vaccine
PC2	Physical Containment Level 2
NEC	National Expert Committee for AFP
VAPP	Vaccine Associated Paralytic Polio
VDPV	Vaccine Derived Poliovirus
UNICEF	United Nations Children's Fund
WHO	World Health Organization