Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

hpsc

PROTOCOL FOR THE ENHANCED SURVEILLANCE OF INVASIVE PNEUMOCOCCAL DISEASE (IPD) IN IRELAND

VERSION 2.2

Updated January 2016

IPD Enhanced Surveillance was implemented in September 2008

HSE- Health Protection Surveillance Centre (HSE-HPSC)

Changes since version 1.0	**Date issued December 2014**
Version 2.0- updated to reflect new NIAC on use of PCV13 vaccine	Updated August 2011
Version 2.1 – updated to reflect changes contact details of IPD reference laboratory, NIAC guidance 2013 updates; enhanced surveillance for older children /adults	Updated 8th December 2014
Version 2.2 – updated to reflect changes in NIAC guidance , epidemiology, change in case definition, enhanced surveillance in all cases	Updated 19th January 2016

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Abbreviations

HPSC	Health Protection Surveillance Centre
HSE	Health Service Executive
IPD	Invasive Pneumococcal Disease
NIO	National Immunisation Office
PCV 7	Pneumococcal Conjugate Vaccine, includes seven serotypes 4, 6B, 9V, 14, 18C, 19F, 23F
PCV 13	Pneumococcal Conjugate Vaccine, includes thirteen serotypes 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19 A, 19F, 23F
PPV	Pneumococcal Polysaccharide Vaccine (PPV) includes 23 serotypes 1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19F, 19A, 20, 22F, 23F, 33F
SPHM	Specialist in Public Health Medicine

1. Introduction

The Health Service Executive (HSE) National Immunisation Office (NIO) commenced implementation of the new childhood immunisation programme in September 2008, this new schedule included the routine use of PCV vaccine for children.[1,2]

The following section outlines the use of PCV vaccine in the Irish population:

- Since October 2002 (NIAC guidelines 2002) PCV7 vaccination has routinely been recommended for all children at increased risk of pneumococcal disease.
- In June 2008 NIAC guidelines[1] recommended PCV7 vaccination for all infants.
    - All children born from 1st July 2008 became eligible for 7-valent pneumococcal conjugate vaccine (PCV7).
    - A PCV7 catch-up programme was extended to all children less than 2 years of age on 1st September 2008.
- In December 2010 PCV13 vaccine replaced PCV7 in the Irish childhood immunisation programme. PCV13 includes antigens from the seven serotypes contained in PCV7 plus six additional serotypes which cause IPD.
- In January 2014 NIAC guidelines (2013) were updated [1]
    - Categorization of clinical risk groups according to high risk or medium risk (children and adults) and specification of vaccines (PCV13 and/or PPV) and number doses/schedule detailed depending on risk conditions
    - In June 2014 Down Syndrome was added to the list of clinical risk conditions
- In August 2015 NIAC guidelines 2013 were updated [2] to include
  All children under 5 years of age who have had IPD, even if not in a clinical risk group, should receive a dose of PCV irrespective of vaccine history followed by a dose of PPV23 2 months later (at or after 2 years of age). Children under 12 months who developed IPD were also advised to receive further doses after completion of the primary schedule, followed by an additional dose of PCV 2 months after their 12 month dose and a dose of PPV23 at 2 years of age.
- Since the introduction of the PCV vaccine for children there has been a number of cases of IPD due to the PCV7 serotypes had declined by 100% in children aged <5 years and a decrease in the additional 6 serotypes in the PCV13 by 78% in children < 5 years of age (HPSC Annual report 2014). [3]

Specific details on the PCV /PPV immunisation programme schedule can be found in Appendix 1.

[1] http://www.hse.ie/eng/health/immunisation/hcpinfo/guidelines/immunisationguidelines.html

[2] http://www.hse.ie/eng/health/immunisation/hcpinfo/guidelines/changes25082015.pdf

[3] http://www.hpsc.ie/A-Z/VaccinePreventable/PneumococcalDisease/Publications/AnnualReportsonInvasivePneumococcalDisease/File,15281,en.pdf

2. Surveillance of Invasive Pneumococcal Disease (IPD) and vaccine failures

Integral to the introduction of a vaccine was implementation of enhanced surveillance to monitor the impact of the vaccine programme. Enhanced surveillance of IPD started on September 1st 2008 and was done in all HSE areas in collaboration with HPSC. The initial focus of the surveillance was the paediatric population. Robust surveillance has enabled detailed analysis of the epidemiology of paediatric IPD following routine use of this vaccine, identification of vaccine failures (and associated serotypes), risk factors for infection and the identification of the emergence of non-vaccine serotypes. Information on serotype distribution has informed vaccination policy and will continue to inform recommendations when new vaccines become available.

The enhanced surveillance and follow-up includes the following components:

- Notification of all IPD events meeting the case definition to the Medical Officer of Health (in Department of Public Health)
- Identification of vaccine failures among all children
- Serotyping of all IPD isolates in RCSI/Beaumont
- Collection of enhanced clinical surveillance data using a standard form for all notifications. Priority is given to children < 15 years of age but is strongly recommended for all age groups. The current version of the IPD enhanced surveillance form is available at http://www.hpsc.ie/A-Z/VaccinePreventable/PneumococcalDisease/SurveillanceForms/
- Clinical investigation of paediatric vaccine failures is recommended and data should be collected at local level
- Analysis, reporting and feedback at 6-monthly intervals
- Provision of case- based surveillance data back to clinicians to guide case management (vaccination) by Departments of Public Health

2.1 Notification of all IPD events

Notification of IPD events meeting the case definition should be made to the Medical Officer of Health (Department of Public Health). All medical practitioners and clinical directors of diagnostic laboratories should notify IPD cases.

In July 2015 the case definition of *S. pneumoniae* (invasive) was amended and only those cases of IPD with meeting the laboratory criteria for laboratory confirmed were notifiable. Since July 2015, urinary antigen detection (and classification as possible case) is no longer notifiable.

IPD Case Definition (updated July 2015)

Only cases meeting the case definition (below) should be notified.

The IPD case definition July 2015 updates the previously used case definition[4]

***Streptococcus pneumoniae* infection (invasive)**
(*Streptococcus pneumoniae* (blood, CSF or other normally sterile site))

Clinical criteria
Not relevant for surveillance purposes

Laboratory criteria for a confirmed case
At least one of the following three:
- Isolation of *S. pneumoniae* from a normally sterile site
- Detection of *S. pneumoniae* nucleic acid from a normally sterile site
- Detection of *S. pneumoniae* antigen from a normally sterile site

Epidemiological criteria
NA

Case classification
A. **Possible case**
NA
B. **Probable case**
NA
C. **Confirmed case**
Any person meeting the laboratory criteria for a confirmed case

Please note:

1. Since enhanced surveillance commenced in 2008 only cases meeting the laboratory criteria (confirmed) have been included in the enhanced surveillance.
2. Non-invasive pneumococcal disease (e.g. Urinary antigen detection is no longer notifiable since July 2015. When considering sterile sites the middle ear is excluded.
3. Pneumonia, without bacteraemia, is not notifiable as IPD.

3. Definitions relating to vaccination

3.1 Primary and booster vaccination

Completion of primary vaccination is determined by the age of the child and the number of doses the child has received at the time of review (see Table 1).

Primary vaccination completed

- A child who has received at least 2 doses of PCV in the first 12 months of life
  OR
- A child who has received 0 or 1 dose PCV in the first 12 months of life with 1 dose after 12 months

[4] http://www.hpsc.ie/NotifiableDiseases/CaseDefinitions/File,823,en.pdf

Booster vaccination completed

- A child who has received 2 doses PCV in the first 12 months of life and 1 dose after 12 months

3.2 What are considered "vaccine failures" and "not vaccine failures"?

Determining whether a child is a vaccine failure depends on:

1. Vaccination status of child
2. Serotype associated with IPD
3. Age of child at time of IPD
4. Interval between last PCV dose and onset of IPD

See Appendix 2 for flow diagram used to assess whether the case is a vaccine failure or not.

3.2.1 Vaccine failures

Post-primary vaccine failure*:*

- IPD due to a PCV serotype in a child with at least 2 doses of PCV before 12 months of age but no subsequent booster and with onset more than 14 days after the second dose
- IPD due to a PCV serotype in a child who had received at least one dose after 12 months of age (with either 0 or 1 doses in the first 12 months) and with onset more than 14 days after the last dose

Post-booster vaccine failure*:*

- IPD due to a PCV serotype in a child with at least 2 doses in the first year of life and a booster dose after 12 months of age and with onset more than 7 days after the booster dose

3.2.2 Not vaccine failures

Vaccinated cases with vaccine-type IPD not meeting definition of vaccine failure

- IPD due to a PCV serotype in a child/adult who has received only one dose in the first year of life and no subsequent booster will not be considered a vaccine failure.
  OR
- IPD due to a PCV serotype in a child/adult who developed disease within 14 or 7 days of the relevant dose (primary or booster dose respectively), will not be considered a vaccine failure.

Vaccinated cases with non-vaccine-type IPD

- IPD due to a non- PCV serotype in a child/adult does not meet the definition of vaccine failure.

Children who have received no doses of vaccine

- IPD due to any serotype in a child/adult who received no doses of PCV vaccine does not meet the definition of a vaccine failure.

3.2.3 Unknown Vaccine failure status

- IPD due to an undetermined serotype does not meet the definition of a vaccine failure.

3.2.4 PPV vaccine failure

Only those IPD cases caused by serotypes included in the PPV will be reported as PPV vaccination failures (note; estimated VE of PPV 60-70%[5]).

4. Serotype identification

All invasive *S. pneumoniae* isolates (regardless of the patient's age) isolated in source laboratories should be sent to Dr Mary Corcoran, Post Doctoral Scientist, Epidemiology and Molecular Biology Unit, Children's University Hospital(CUH), Temple Street, Dublin 1, for typing.

Prof. Hilary Humphreys RCSI/Beaumont is the clinical lead running the National Pneumococcal Reference Laboratory (NPRL).
Isolates will be typed using serological methods and multiplex PCR.
Serotypes covered by PCV7: 4, 6B, 9V, 14, 18C, 19F, 23F
Serotypes covered by PCV13: 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 23F
Serotypes covered by PPV23: 1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19A, 19F, 20, 22F, 23F and 33F

[5] CDC. Epidemiology and Prevention of vaccine-preventable Diseases (Pink Book). 12th Edition

4.1 Specific information for Laboratories

All isolates recovered from **sterile sites** (e.g. blood, CSF or less commonly joint, pleural or pericardial fluid) should be forwarded on a chocolate blood agar slope for serotyping to:

Dr Mary Corcoran, Post Doctoral Scientist National Pneumococcal Reference Laboratory,
Epidemiology and Molecular Biology Unit/Pneumococcal typing project
Children's University Hospital,
Temple Street, Dublin 1, Ireland.

Isolates should be forwarded as soon as possible after isolation due to the labile nature of *S. pneumoniae* and thus ensuring that the data are as up-to-date as possible. This will also speed up the reporting back of the serotyping results. A copy of the EARSS or Whonet form should be included with the isolate.

Queries regarding serotyping of isolates

Any queries regarding the serotyping project should be made to:

Contact person	Telephone	Email	Address
Professor Hilary Humphreys, Consultant Microbiologist	01-8093708 01-8093710	hhumphreys@rcsi.ie	Dept. Clinical Microbiology RCSI Education and Research Centre, Smurfit Building, Beaumont Hospital, PO Box 9063, Dublin 9.
Dr Mary Corcoran, Medical Scientist Dr Robert Cunney, Consultant Microbiologist	01-8784857	mary.corcoran@cuh.ie Rob.cunney@cuh.ie	Epidemiology and Molecular Biology Unit/Pneumococcal typing project, Children's University Hospital, Temple St., Dublin 1.

5. Collection of enhanced IPD surveillance data

HPSC in collaboration with its partners has developed a standard form which, when completed, will provide detailed information relating to IPD cases notified. The data elements include basic demographic data, information on clinical presentation, complications and risk factor information for IPD, as well as vaccination history of the individual (number and dates of administration of doses). This enhanced IPD form is available on the HPSC website.

Population groups and priority for collection of enhanced surveillance data are as follows:

5.1 Enhanced surveillance of all children born during or since 2000

- All cases of IPD occurring among children born during or since 2000 **are** included in the enhanced surveillance programme. This group is of particular interest because

children in this age group may have been vaccinated with PCV7 after it was licensed in Ireland in February 2001 and NIAC recommended it for at risk children in 2002.

- The enhanced form should be completed (by Public Health in consultation with clinician) and data entered into the national Computerised Infectious Disease Reporting System (CIDR).
- As part of follow up discussion with GP and/ or practice nurse on vaccination status and appropriate advice re vaccine, if indicated.

5.2 Enhanced Surveillance for older children or adults born before 2000

- It is strongly recommended that enhanced surveillance of all cases (regardless of age and vaccination status) should also be undertaken. Such surveillance will be used to describe changing trends in clinical presentation associated with serotypes.
- As part of follow up discussion with GP and/ or practice nurse on vaccination status and appropriate advice re vaccine, if indicated.
- It is recognized that implementation of enhanced surveillance for this population group may be resource dependent.
- HPSC will provide assistance where possible to those Departments of Public Health who need assistance in collecting enhanced data. If HPSC assistance is requested the relevant Departments of Public Health (Director of Public Health) will communicate directly with hospital CEOs indicating that this authority is being given to nominated HPSC staff. HPSC surveillance staff will then liaise with the hospital (clinician/medical records) in order to collect the data. Once collected the data will be sent to the Departments of Public Health for information and inputting into CIDR. In some areas HPSC may be requested to enter the data on their behalf (prior authorisation required). All clinical information obtained by public health is confidential and held in accordance with data protection legislation.

6. Public health follow-up of IPD cases in children eligible for routine or catch-up PCV13

The aim of the enhanced surveillance is to identify IPD occurrence in a population group that should be protected against IPD following the implementation of the PCV immunisation programme. Public Health physicians/nurses will inform clinicians/paediatricians of vaccination status of paediatric cases, and this, together with serotype results will inform subsequent clinical management.

The recommended Public Health management of children with IPD will depend on

- Their vaccination status prior to disease onset,
- The serotype of the *S. pneumoniae* isolate
- Whether they are identified as being at increased risk of IPD following clinical Evaluation (see NIAC guidance http://www.hse.ie/eng/health/immunisation/hcpinfo/guidelines/immunisationguidelines.html

6.1 Follow up IPD cases

Following the reporting of a case of IPD in a child or an individual with risk factors for IPD**,** Departments of Public Health should:

1. Determine serotype information:
   Contact the laboratory that reported the case and request that the isolate be sent to the reference laboratory for serotyping (if not already done). The National Pneumococcal Reference Laboratory will send serotype data back to primary diagnostic laboratory and to the relevant Department of Public Health as soon as results are available

2. Obtain immunisation information:
   Obtain details on vaccine doses administered, dates of administration and batch numbers from local immunisation office or the patient's GP.

3. Complete the enhanced surveillance form:
   - Clinical information is obtained from the hospital clinician/medical records/ hospital information system (where Public health can access directly)
   - Information will be sought on clinical risk group and presentation (see template for clinicians for use if appropriate).
   - Microbiology details should be obtained from the laboratory, including antimicrobial resistance.

4. Communicate to clinician

- Once serotype and vaccination data available send a letter (see Appendix 3 for template letter that can be used) to hospital clinician and GP informing them of this information and NIAC recommendations as appropriate for each case - (Appendix 4 – *"Recommendations for investigation and management of children/adults diagnosed with invasive Pneumococcal Disease (IPD) "*

5. Following IPD in a child under 5 years of age, full blood count, immunoglobulin levels (including IgG sub classes) and complement levels should be checked.

Table 2 Recommended vaccination and investigation for children diagnosed with IPD*

	Age when IPD event occurs					
	< 13 months			≥13 months - < 5 years		
Vaccination status	**Unvaccinated**	**Incomplete primary**	**Complete primary**	**Complete primary +booster**	**Incomplete primary**	**Never vaccinated**
Vaccination recommendation	Complete immunisation schedule as per NIAC guidelines + additional dose of PCV 2 months after their 12 month dose, and a dose of PPV23 at 2 years of age			additional dose PCV13 regardless of PCV vaccination history + PPV23 2 months later at or after 2 years of age		
Serotype specific antibody (SSAb) testing (when serotype covered by PCV)	Not routinely required			Convalescent sample for SSAb + after dose 1 mth)	Not routinely required	
Clinical † evaluation for risk factors +/- additional immunologic test	Assess (FBC, immunoglobulin levels (including IgG sub classes) and complement levels			Assess (FBC, immunoglobulin levels (including IgG sub classes) and complement levels		
Additional PCV or PPV23 vaccination recommendations‡	Dependent on risk factors			Dependent on risk factors‡		

‡ as immunisation guidance may be updated please check most recent NIAC guidance for details on clinical risk groups (high, medium) and specific vaccination recommendations http://www.hse.ie/eng/health/immunisation/hcpinfo/guidelines/chapter16.pdf

6.2 All enhanced surveillance data should be forwarded to HPSC

All data should be inputted into CIDR.

7. Clinical investigation of paediatric vaccine failures

NIAC has recommended that clinicians/paediatricians should evaluate these children for risk factors predisposing them to IPD (detailed in Appendix 4).

In August 2015 NIAC recommended that when IPD occurs in a child under 5 years of age, full blood count, immunoglobulin levels (including IgG sub classes) and complement levels should be checked routinely.

The decision to undertake immunological testing of patients (complement deficiency, immunosuppressive conditions, serotype specific pneumococcal antibody) is encouraged for all children who are considered vaccine failures.

Immunological testing of other children/adults who develop IPD may be considered if clinically appropriate.

Immunological testing is not routinely undertaken in all hospitals as it requires particular expertise as found in Departments of Immunology (e.g. St James' Hospital, Dublin has previously provided advice and testing). Clinicians are recommended to contact their local laboratory for advice when considering immunological tests on their patients. Consultation with the Immunology service in St James's Hospital is also available at

Phone: (01) 416 2928 or (01) 416 2034
Postal address: Immunology Department, Central Pathology Laboratory, St James's Hospital, Dublin 8

Additional vaccine doses with pneumococcal vaccines are recommended as per NIAC guidance. Check most recent guidance for current updates

8. Enhanced surveillance of older children and adults

From mid-2014 Departments of Public Health have implemented enhanced surveillance of all cases of IPD (regardless of age) where possible. Data variables are similar to that obtained for the paediatric cases (demographic details, clinical presentation, outcome, vaccination status and risk factors for infection).

Due to resource constraints in those areas where Departments of Public Health are not in a position to collect this data nominated HPSC surveillance staff will assist in data collection and will be given authority by the Director of Public Health for this purpose. The objectives of enhanced surveillance in older individuals is to assess vaccine effectiveness in this population, disease morbidity and complications and identify vaccination status of all IPD cases and make recommendations to GPs relating to vaccination for their patients at risk.

Following a pilot period (12 months 2015) a number of Departments Public Health collected enhanced data on older patients in their catchment areas. In November 2015 all remaining Departments of Public Health agreed to implement enhanced surveillance in their areas where possible with local resources permitted. It was acknowledged that timeliness of follow up may be delayed in some areas.

9. Analysis, reporting and feedback

HPSC collates data on IPD in Ireland based on notification data and data provided by the IPD reference laboratory. Analysis will include an analysis of vaccines failures. HPSC, in collaboration with the IPD reference laboratory, prepares reports every six- months which are distributed to Departments of Public Health, laboratories and clinicians wishing to receive such information. Additionally, these reports are posted on the HPSC website and slide sets summarizing the data are made available for teaching and information dissemination.

10. Authorship acknowledgements

This protocol was adapted from a similar protocol developed by the Health Protection Agency (UK) by HPSC.[5] The amendments made in 2011,2014,2016 were made in collaboration with input from SPHMs in Public Health Medicine reflecting updated NIAC recommendations on investigation, vaccination doses and dosing intervals.[,2]

11. References

1. Immunisation Guidelines for Ireland (2008). Royal College of Physicians of Ireland. National Immunisation Advisory Committee. http://www.rcpi.ie/collegestructure/Pages/Immunisation%20Guidelines%20for%20Ireland%202008.aspx

2. Immunisation Guidelines for Ireland (2013). Royal College of Physicians of Ireland. National Immunisation Advisory Committee. http://www.hse.ie/eng/health/immunisation/hcpinfo/guidelines/immunisationguidelines.html

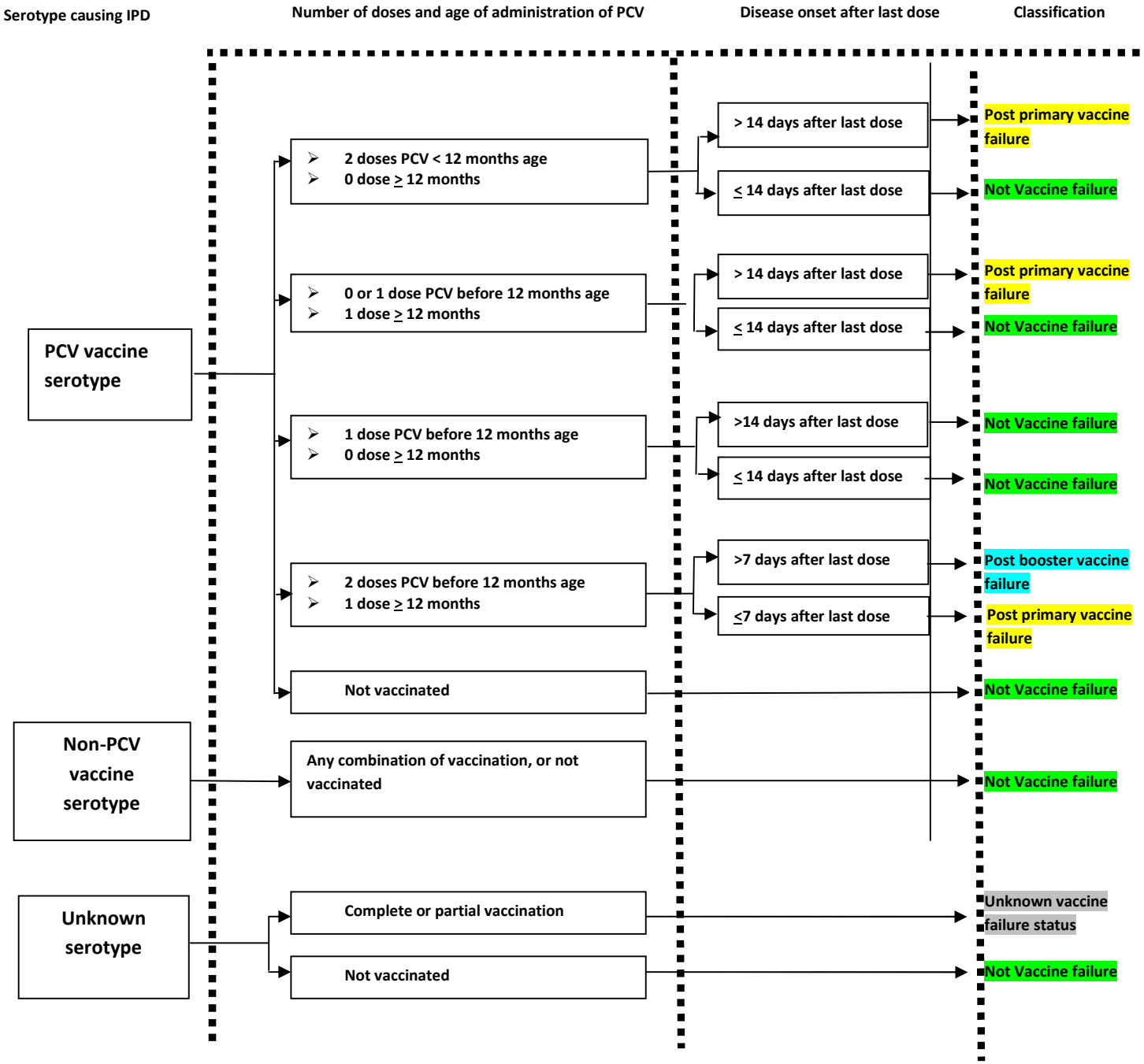
3. Invasive Pneumococcal Disease in Ireland. Annual report 2014. http://www.hpsc.ie/A-Z/VaccinePreventable/PneumococcalDisease/Publications/AnnualReportsonInvasivePneumococcalDisease/File,15281,en.pdf

4. HSE-HPSC. Case definitions for Notifiable Diseases. Infectious Diseases (Amendment) (No. 3) Regulations 2003 (SI No. 707 of 2003) version 1.3. Publication Date: 1 July 2015 http://www.hpsc.ie/NotifiableDiseases/CaseDefinitions/

5. Miller E, Kaye P, George R, Slack M, Borrow R, Helbert M. HPA Protocol For The Clinical Management Of Cases Of Invasive Pneumococcal Disease (IPD) In Children Targeted For Routine Or Catch-Up Vaccination With Pneumococcal Conjugate Vaccine (Prevenar). Clinical Management Protocol version 4: September 2008. Document no longer available on the Public Health England Website

Appendix 1. Decision tree to determine vaccine failure status- for children (all children born since 2008 are PCV eligible)

Determining whether a child with IPD is a vaccine failure



Appendix 2. Template for letter to be sent by PH to clinician of IPD case (optional) when collecting enhanced data

Subject: Enhanced surveillance for invasive pneumococcal disease (IPD)

Regarding your patient

Name: Date of birth

Address

Notification of Invasive *Streptococcus pneumonia (IPD)*

Date of notification: *Source of notification:*

CIDR event ID XXXXX. *Known vaccination history:*

Category: as appropriate - post primary vaccine failure/post booster vaccine failure/ partially vaccinated but not considered vaccine failure

Dear Doctor(normally Hospital clinician)

Your patient's disease was notified to the Director of Public Health in the Department of Public Health, HSE XX on dd/mm/yyyy as required under Infectious Disease Regulations for notifiable diseases;

The HSE routinely investigates all invasive pneumococcal disease as part of infectious disease surveillance. Such surveillance is necessary to identify risk factors for disease, vaccine failures, reasons for vaccine failures and to monitor potential emergence non-vaccine serotypes.

Enhanced surveillance- data request

Please find attached national enhanced surveillance form that is used to follow up on all cases of IPD. Please complete this form (highlighted sections on clinical details, risk factor) and return to the Department of Public Health in the envelope provided.

Vaccination should be recommended in accordance with National Immunisation guidance *. The vaccine is normally provided by the patient's GP, with vaccine supplied by the HSE**.**

Please contact me if you have any queries.

Yours sincerely,

_____

Specialist in Public Health Medicine

*** http://www.hse.ie/eng/health/immunisation/hcpinfo/guidelines/chapter16.pdf**

Appendix 4. Template for letter to be sent by PH to GP regarding vaccination of IPD case (optional)

Dr X

<DATE>

Re: Pneumococcal vaccination status of your patient with invasive pneumococcal disease (IPD)

Patient name: Date of birth:

Dear Dr <X>

The above named patient was admitted to <X> hospital on <DATE> with invasive pneumococcal disease (IPD). We have received the notification and clinical data on this patient from the hospital. However, the hospital was unable to provide us with information relating to pneumococcal vaccination, needed to assess vaccine effectiveness.

I would appreciate if you could provide us with any information you have on file relating to pneumococcal vaccination for the above named patient. There are two vaccine types that are of relevance, as detailed below,

- Pneumococcal Polysaccharide Vaccine, 23 serotypes, PPV23 (known as PNEUMOVAX 23)
- Pneumococcal Conjugate Vaccines (PCV7 or PCV13), also known as PREVENAR 7 (or 13)

Please indicate in the boxes below the vaccination status of your patient. Thank you.

PPV23 vaccination status (√ as appropriate)

Vaccinated (1 dose) ☐ Vaccinated (>1dose) ☐ Unvaccinated ☐ Unknown ☐

	Date administered	Brand and Batch number
Most recent vaccination	__/___/_____	_____
Previous vaccination	__/___/_____	_____

PCV vaccination status if vaccinated, (√ as appropriate)

Vaccinated ☐ Incompletely vaccinated ☐ Unvaccinated ☐ Unknown ☐

	Date vaccinated	Name/Brand	Batch Number
1st Dose	___/___/_____	_____	_____
2nd Dose	___/___/_____	_____	_____
3rd Dose	___/___/_____	_____	_____
4th Dose	___/___/_____	_____	_____

I would be grateful if you could provide the above information. Please do not hesitate to contact me if you have any queries.

Recommendations

If your patient is at ongoing risk of invasive pneumococcal disease, please follow the National Immunisation Advisory Committee guidance on pneumococcal vaccination for individuals at risk. The information is located
http://www.hse.ie/eng/health/immunisation/hcpinfo/guidelines/chapter16.pdf

Yours sincerely,

Dr. Public Health

Department of Public Health

Appendix 4. Investigation and management of individuals diagnosed with Invasive Pneumococcal Disease

1. Vaccine failures (paediatric)

Children who had IPD caused by a PCV-serotype who have completed a PCV immunisation course appropriate for their age (i.e. vaccine failures) – Appendix 2

1. *Assess underlying risk factors for infection*
   The child's paediatrician should investigate underlying reasons for vaccine failure (identified risk groups) including:

Table A4.1 (taken from NIAC guidance 2013, http://www.hse.ie/eng/health/immunisation/hcpinfo/guidelines/chapter16.pdf)

Group A Those at high risk	Group B Children at medium risk	Group C Adults at medium risk
• Asplenia, hyposplenia (including splenectomy, sickle cell disease, haemoglobinopathies, and coeliac disease)[1] • Complement deficiency (particularly C1-C4) • Immunosuppressive conditions (e.g. some B- and T-cell disorders, HIV infection, leukaemia, lymphoma,) and those receiving immunosuppressive therapies[2] • CSF leaks (congenital or complicating skull fracture or neurosurgery) • Intracranial shunt • Candidates for, or recipients of, a cochlear implant • Post haematopoietic stem-cell transplant • Solid organ transplant	• Chronic renal disease or nephrotic syndrome • Chronic heart, lung, or liver disease • Diabetes mellitus requiring insulin or oral hypoglycaemic drugs • Down syndrome • Children under 5 years of age following invasive pneumococcal disease	• Chronic renal disease or nephrotic syndrome • Chronic heart, lung, or liver disease • Diabetes mellitus requiring insulin or oral hypoglycaemic drugs • Smokers and alcoholics • Individuals with occupational exposure to metal fumes (i.e. welders)

[1] require 2 doses of PCV 2 months apart
[2] individuals with primary immunodeficiency may have a suboptimal response to all vaccines. Pneumococcal vaccines are unlikely to be immunogenic in children with primary immune deficiencies involving significant B cell compromise who are receiving regular IVIG replacement therapy. However vaccination should be given as it may have some effect.

2. *Following IPD in a child < 5 years of age, full blood count, immunoglobulin levels (including IgG sub classes) and complement levels should be checked.*
3. *Assess serotype specific pneumococcal antibodies*
   Take convalescent blood sample 4 weeks after acute infection, to test for

serotype-specific pneumococcal antibodies (and other immunological tests if clinically indicated).

4. *Offer additional dose of PCV, plus PPV23 if appropriate*
   If the child is found to fall into one of the identified risk groups, as per NIAC guidelines, they should, in addition, receive pneumococcal polysaccharide vaccine at least 2 months after the last dose of PCV when they reach 2 years of age.

2. Children not considered as vaccine failures

5. These are children with IPD caused by a non-PCV-serotype who have completed a PCV immunisation course appropriate for their age
   OR
6. Children in whom the infecting serotype is not determined
   OR
7. Children who develop IPD too soon after completion of a PCV immunisation course appropriate for their age for full protection to have occurred, irrespective of serotype.

For all 3 of the above categories the child's paediatrician should undertake risk assessment to determine if there is an underlying risk factor. Vaccination recommendations are based on risk assessment and categorization or risk (table above taken from NIAC guidance August 2015).

Management of older children /adults with IPD

- Assess vaccination status and risk factors for all individuals notified with IPD
- If Individuals with IPD are identified as having a risk factor for IPD (high or medium risk, as detailed in NIAC guidance) should be offered PCV and PPV (high risk) OR PPV only (medium risk). One booster dose may be indicated for individuals previously vaccinated with PPV < 65 years of age at time of first PPV dose if five years have elapsed since first dose.

Indications for pneumococcal vaccination (clinical risk groups) see Table A4.1

3.1 Children

2 -<5 years
Risk group A: PCV and PPV23
Risk group B: PCV and PPV23

5 - <18 years
Risk group A: PCV and PPV23
Risk group B: PPV23

3.2 Adults
Risk group A: PCV and PPV23
Risk group C: PPV23