# Summary of Product Characteristics

## 1 NAME OF THE MEDICINAL PRODUCT

IPV-Boostrix– Suspension for injection in a pre-filled syringeDiphtheria, tetanus, pertussis (acellular, component) and poliomyelitis (inactivated) vaccine (adsorbed, reduced antigen(s) content)

## 2 QUALITATIVE AND QUANTITATIVE COMPOSITION

1 dose (0.5ml) contains:
Diphtheria toxoid[1] not less than 2 International Units (IU) (2.5 Lf)
Tetanus toxoid[1] not less than 20 International Units (IU) (5 Lf)
*Bordetella pertussis* antigens
Pertussis toxoid[1] 8 micrograms
Filamentous Haemagglutinin[1] 8 micrograms
Pertactin[1] 2.5 micrograms
Inactivated poliovirus
type 1 (Mahoney strain)[2] 40 D-antigen unit
type 2 (MEF-1 strain)[2] 8 D-antigen unit
type 3 (Saukett strain)[2] 32 D-antigen unit

[1]adsorbed on aluminium hydroxide, hydrated ($Al(OH)_3$) 0.3 milligrams Al
and aluminium phosphate ($AlPO_4$) 0.2 milligrams Al
[2] propagated in VERO cells

The vaccine may contain traces of formaldehyde, neomycin and polymyxin which are used during the manufacturing process (see section 4.3).

Excipients with known effect
The vaccine contains para-aminobenzoic acid < 0.07 nanograms per dose and phenylalanine 0.0298 micrograms per dose (see section 4.4).
For the full list of excipients, see section 6.1

## 3 PHARMACEUTICAL FORM

Suspension for injection in pre-filled syringe
IPV- Boostrix is a turbid white suspension.

## 4 CLINICAL PARTICULARS

### 4.1 Therapeutic Indications

IPV-Boostrix is indicated for booster vaccination against diphtheria, tetanus, pertussis and poliomyelitis of individuals from the age of three years onwards (see section 4.2).

IPV-Boostrix is also indicated for passive protection against pertussis in early infancy following maternal immunisation during pregnancy (see sections 4.2, 4.6 and 5.1).

The administration of IPV-Boostrix should be based on official recommendations.

### 4.2 Posology and method of administration

**Posology**

A single 0.5 ml dose of the vaccine is recommended.

IPV-Boostrix may be administered from the age of three years onwards.

IPV-Boostrix contains reduced content of diphtheria, tetanus and pertussis antigens in combination with poliomyelitis antigens. Therefore, IPV-Boostrix should be administered in accordance with official recommendations and/or local practice.

IPV-Boostrix can be administered to pregnant women during the second or the third trimester in accordance with official recommendations (see sections 4.1, 4.6 and 5.1).

IPV-Boostrix may also be administered to adolescents and adults with unknown vaccination status or incomplete vaccination against diphtheria, tetanus and pertussis as part of an immunisation series against diphtheria, tetanus, pertussis and poliomyelitis. Based on data in adults, two additional doses of a diphtheria and tetanus containing vaccine are recommended one and six months after the first dose to maximize the vaccine response against diphtheria and tetanus (see section 5.1).

IPV-Boostrix can be used in the management of tetanus prone injuries in persons who have previously received a primary vaccination series of tetanus toxoid vaccine and for whom a booster against diphtheria, pertussis and poliomyelitis is indicated. Tetanus immunoglobulin should be administered concomitantly in accordance with official recommendations.

Repeat vaccination against diphtheria, tetanus, pertussis and poliomyelitis should be performed at intervals as per official recommendations.

*Paediatric population*
The safety and efficacy of IPV-Boostrix in children below 3 years of age have not been established.

**Method of administration**

IPV-Boostrix is for deep intramuscular injection preferably in the deltoid region (see section 4.4).

**4.3 Contraindications**

Hypersensitivity to the active substances or to any of the excipients listed in section 6.1 or neomycin, polymyxin or formaldehyde.

Hypersensitivity after previous administration of diphtheria, tetanus, pertussis or poliomyelitis vaccines.

IPV-Boostrix is contraindicated if the subject has experienced an encephalopathy of unknown aetiology, occurring within 7 days following previous vaccination with pertussis-containing vaccine. In these circumstances, pertussis vaccination should be discontinued and the vaccination course should be continued with diphtheria, tetanus and poliomyelitis vaccines.

IPV-Boostrix should not be administered to subjects who have experienced transient thrombocytopenia or neurological complications (for convulsions or hypotonic-hyporesponsive episodes, see section 4.4) following an earlier immunisation against diphtheria and/or tetanus.

As with other vaccines, administration of IPV-Boostrix should be postponed in subjects suffering from acute severe febrile illness. The presence of a minor infection is not a contraindication.

**4.4 Special warnings and precautions for use**

Vaccination should be preceded by a review of the medical history (especially with regard to previous vaccination and possible occurrence of undesirable events).

If any of the following events are known to have occurred in temporal relation to receipt of pertussis-containing vaccine, the decision to give doses of pertussis-containing vaccines should be carefully considered:

- Temperature of ≥ 40.0°C within 48 hours of vaccination, not due to another identifiable cause.
- Collapse or shock-like state (hypotonic-hyporesponsiveness episode) within 48 hours of vaccination.
- Persistent, inconsolable crying lasting ≥ 3 hours, occurring within 48 hours of vaccination.
- Convulsions with or without fever, occurring within 3 days of vaccination.

There may be circumstances, such as a high incidence of pertussis, when the potential benefits outweigh possible risks.

As for any vaccination, the risk-benefit of immunising with IPV-Boostrix or deferring this vaccination should be weighed carefully in a child suffering from a new onset or progression of a severe neurological disorder.

As with all injectable vaccines, appropriate medical treatment and supervision should always be readily available in case of a rare anaphylactic reaction following the administration of the vaccine.

IPV-Boostrix should be administered with caution to subjects with thrombocytopenia (see section 4.3) or a bleeding disorder since bleeding may occur following an intramuscular administration to these subjects. If in accordance with official recommendations, the vaccine may be administered subcutaneously to these subjects. With both routes of administration, firm pressure should be applied to the injection site (without rubbing) for at least two minutes.

IPV-Boostrix should in no circumstances be administered intravascularly.

A history of febrile convulsions, a family history of convulsions and a family history of an adverse event following DTP vaccination do not constitute contraindications.

Human Immunodeficiency Virus (HIV) infection is not considered as a contraindication. The expected immunological response may not be obtained after vaccination of immunosuppressed patients.

Syncope (fainting) can occur following, or even before, any vaccination especially in adolescents as a psychogenic response to the needle injection. This can be accompanied by several neurological signs such as transient visual disturbance, paraesthesia and tonic-clonic limb movements during recovery. It is important that procedures are in place to avoid injury from faints.

As with any vaccine, a protective immune response may not be elicited in all vaccinees.

Excipients with known effect

IPV-Boostrix contains para-aminobenzoic acid. It may cause allergic reactions (possibly delayed), and exceptionally, bronchospasm.
This medicine contains 0.0298 micrograms phenylalanine in each dose. Phenylalanine may be harmful if you have phenylketonuria (PKU), a rare genetic disorder in which phenylalanine builds up because the body cannot remove it properly.

This medicine contains less than 1 mmol sodium (23 mg) per dose, that is to say essentially 'sodium-free'.
This medicine contains potassium, less than 1 mmol (39 mg) per dose, i.e. essentially 'potassium- free'.

*Traceability*

In order to improve the traceability of biological medicinal products, the name and the batch number of the administered product should be clearly recorded.

**4.5 Interaction with other medicinal products and other forms of interactions**

Use with other vaccines or immunoglobulins

IPV-Boostrix may be administered concomitantly with any of the following monovalent or combination vaccines: measles, mumps, rubella, varicella (MMR/V) and human papilloma virus (HPV) vaccine with no clinically relevant interference with antibody response to any of the components of either vaccine (see section 4.8).
Concomitant administration of IPV-Boostrix and other vaccines or with immunoglobulins has not been studied.
It is unlikely that co-administration will result in interference with the immune responses.

According to generally accepted vaccine practices and recommendations, if concomitant administration of IPV-Boostrix with other vaccines or immunoglobulins is considered necessary, the products should be given at separate sites.

Use with immunosuppressive treatment

As with other vaccines, patients receiving immunosuppressive therapy may not achieve an adequate response.

**4.6 Fertility, pregnancy and lactation**

Pregnancy

IPV-Boostrix can be used during the second or third trimester of pregnancy in accordance with official recommendations.

For data relating to the prevention of pertussis disease in infants born to women vaccinated during pregnancy, see section 5.1.

Safety data from a randomised controlled clinical trial (341 pregnancy outcomes) and from a prospective observational study (793 pregnancy outcomes), where Boostrix (dTpa component of IPV-Boostrix) was administered to pregnant women during the third trimester, have shown no vaccine related adverse effect on pregnancy or on the health of the foetus/newborn child.

Safety data from prospective clinical studies on the use of IPV-Boostrix or Boostrix during the first and second trimester of pregnancy are not available.

Data from passive surveillance where pregnant women were exposed to IPV-Boostrix or to Boostrix in the 3rd or 2nd trimester have shown no vaccine-related adverse effect on pregnancy or on the health of the foetus/newborn child.

As with other inactivated vaccines, it is not expected that vaccination with IPV-Boostrix harms the foetus at any trimester of pregnancy.

Animal studies do not indicate direct or indirect harmful effects with respect to pregnancy, embryonal/foetal development, parturition or post-natal development (see section 5.3).

Breastfeeding
The effect of administration of IPV-Boostrix during lactation has not been assessed. Nevertheless, as IPV-Boostrix contains toxoids or inactivated antigens, no risk to the breastfed infant should be expected. The benefits versus the risk of administering IPV-Boostrix to breastfeeding women should carefully be evaluated by the healthcare providers.

Fertility
No human data from prospective clinical studies are available. Animal studies do not indicate direct or indirect harmful effects with respect to female fertility (see section 5.3).

**4.7 Effects on ability to drive and use machines**

The vaccine is unlikely to produce an effect on the ability to drive and use machines.

**4.8 Undesirable effects**

Summary of the safety profile
The safety profile presented in Table 1 is based on data from clinical trials where IPV-Boostrix was administered to 908 children (from 4 to 8 years of age) and 955 adults, adolescents and children (from 10 to 93 years of age).

The most common events occurring after IPV-Boostrix administration in both groups were local injection site reactions (pain, redness and swelling) reported by 31.3 – 82.3% of subjects overall. These usually had their onset within the first 48 hours after vaccination. All resolved without sequelae.

Tabulated list of adverse reactions
Adverse reactions reported are listed according to the following frequency:
Very common: (≥1/10)
Common: (≥ 1/100 to < 1/10)
Uncommon: (≥ 1/1,000 to < 1/100)
Rare: (≥ 1/10,000 to < 1/1,000)
Very rare: (< 1/10,000)

- **Clinical trials**

**Table 1:** Adverse reactions reported in clinical trials with IPV-Boostrix

| ***System Organ Class*** | ***Frequency*** | ***Adverse reactions*** | |
|---|---|---|---|
| | | ***Subjects aged 4 - 8 years (N=908)*** | ***Subjects aged 10 - 93 years (N = 955)*** |
| ***Infections and*** | Uncommon | | oral herpes |

| | | | |
|---|---|---|---|
| ***infestations*** | | | |
| ***Blood and lymphatic system disorders*** | Uncommon | lymphadenopathy | lymphadenopathy |
| ***Metabolism and nutrition disorders*** | Common | anorexia | |
| | Uncommon | | decreased appetite |
| ***Psychiatric disorders*** | Common | irritability | |
| | Uncommon | sleep disorder, apathy | |
| ***Nervous system disorders*** | Very common | somnolence | headache |
| | Common | headache | |
| | Uncommon | | paraesthesia, somnolence, dizziness |
| ***Respiratory, thoracic and mediastinal disorders*** | Uncommon | dry throat | asthma |
| ***Gastrointestinal disorders*** | Common | | gastrointestinal disorders (such as vomiting, abdominal pain, nausea) |
| | Uncommon | diarrhoea, vomiting, abdominal pain, nausea | |
| ***Skin and subcutaneous tissue disorders*** | Uncommon | | pruritus |
| ***Musculoskeletal and connective tissue disorders*** | Uncommon | | arthralgia, myalgia |
| ***General disorders and administration site conditions*** | Very common | injection site reactions (such as redness and/or swelling), injection site pain | injection site reactions (such as redness and/or swelling), fatigue, injection site pain |
| | Common | pyrexia (fever ≥ 37.5°C, including fever > 39°C), extensive swelling of vaccinated limb (sometimes involving the adjacent joint), injection site reactions (such as haemorrhage, pruritus and induration) | pyrexia (fever ≥ 37.5°C), injection site reactions (such as haematoma, pruritus, induration and warmth numbness) |
| | Uncommon | fatigue | extensive swelling of vaccinated limb (sometimes involving the adjacent joint), pyrexia (fever > 39.0°C), chills, pain |

*Coadministration with MMR/V vaccines in children aged 3-6 years*

IPV-Boostrix was coadministered with MMR/V vaccines in 2 clinical studies with 406 children aged 3-6 years. In these studies, upper respiratory tract infection and rash were commonly reported. Fever, irritability, fatigue, loss of appetite and gastrointestinal disorders (including diarrhoea and vomiting) were reported with a higher frequency (very common) when compared to Table 1 while all other adverse reactions occurred at the same or lower frequency.

Adverse reactions additionally reported during clinical studies with Boostrix (dTpa component of IPV-Boostrix), administered to 839 children (from 4 to 8 years of age) and 1931 adults, adolescents and children (from 10 to 76 years of age), are listed in Table 2.

**Table 2**: Adverse reactions reported in clinical trials with Boostrix

| ***System Organ Class*** | ***Frequency*** | ***Adverse reactions*** | |
|---|---|---|---|
| | | ***Subjects aged 4 - 8 years (N=839)*** | ***Subjects aged 10 - 76 years (N = 1931)*** |
| ***Infections and infestations*** | Uncommon | | upper respiratory tract infection, pharyngitis |
| ***Nervous system disorders*** | Uncommon | disturbances in attention | syncope |
| ***Eye disorders*** | Uncommon | conjunctivitis | |
| ***Respiratory, thoracic and mediastinal disorders*** | Uncommon | | cough |
| ***Gastrointestinal disorders*** | Uncommon | | diarrhoea |
| ***Skin and subcutaneous tissue disorders*** | Uncommon | | hyperhidrosis, rash |
| ***Musculoskeletal and connective tissue disorders*** | Uncommon | | joint stiffness, musculoskeletal stiffness |
| ***General disorders and administration site conditions*** | Very common | | malaise |
| | Common | | injection site reactions (such as injection site mass and injection site abscess sterile) |
| | Uncommon | pain | influenza like illness |

*Reactogenicity after repeat dose*
Data suggest that in subjects primed with DTP in childhood a second booster dose might give an increase of local reactogenicity.

Subjects aged 15 years onwards without recent vaccination for diphtheria, tetanus, pertussis and poliomyelitis, who received a dose of IPV-Boostrix or another reduced-antigen content vaccine, followed by an additional dose of IPV-Boostrix 10 years after, showed no increased reactogenicity after this second dose compared to the first one.

- **Post-marketing surveillance**

Because these events were reported spontaneously, it is not possible to reliably estimate their frequency.

**Table 3:** Adverse reactions reported with IPV-Boostrix during post-marketing surveillance

| ***System Organ Class*** | ***Frequency*** | ***Adverse reactions*** |
|---|---|---|
| ***Immune system disorders*** | unknown | allergic reactions, including anaphylactic and anaphylactoid reactions |
| ***Nervous system disorders*** | unknown | hypotonic-hyporesponsiveness episodes, convulsions (with or without fever) |
| ***Skin and subcutaneous tissue disorders*** | unknown | urticaria, angioedema |
| ***General disorders and administration site conditions*** | unknown | asthenia |

Following administration of tetanus toxoid containing vaccines, there have been very rare reports of adverse reactions on the central or peripheral nervous systems, including ascending paralysis or even respiratory paralysis (e.g. Guillain-Barré syndrome).

Reporting of suspected adverse reactions
Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via HPRA Pharmacovigilance, Website: www.hpra.ie.

**4.9 Overdose**

Cases of overdose have been reported during post-marketing surveillance. Adverse events following overdosage, when reported, were similar to those reported with normal vaccine administration.

**5 PHARMACOLOGICAL PROPERTIES**

**5.1 Pharmacodynamic properties**

Pharmacotherapeutic group: Bacterial and viral vaccines combined, ATC code J07CA02

Immune response
The immune responses to IPV-Boostrix were evaluated in clinical trials carried out in subjects of different ages having different vaccination histories (see section 4.8).

The following immune responses were observed across studies one month post vaccination with IPV-Boostrix in children, adolescents and adults (Table 4).
**Table 4**: Immune response in children, adolescents and adults

| **Antigen** | **Response** | **Children aged 3 to 8 years N=1195** | **Adults, adolescents and children aged from 10 years onwards N=923** |
|---|---|---|---|
| | | (% vaccinees) | (% vaccinees) |
| **Diphtheria** | ≥ 0.1 IU/ml | 100% | 82.2 – 100% |
| | ≥ 0.016 IU/ml [(1)] | NA | 87.7 – 100% [(2)] |
| **Tetanus** | ≥ 0.1 IU/ml | 99.9 – 100% | 99.6 – 100% |
| **Pertussis** | Booster response [(3)] | | |
| Pertussis toxoid | | 84.6 – 90.6% | 79.8 – 94.0% |
| Filamentous haemagglutinin | | 90.1 – 98.8% | 90.7 – 97.2% |
| Pertactin | | 94.2 – 96.6% | 90.0 – 96.7% |
| **Inactivated poliovirus** | ≥8 ED50 | | |
| type 1 | | 98.8 – 100% | 99.6 – 100% |
| type 2 | | 99.2 – 100% | 99.6 – 100% |
| type 3 | | 99.4 – 100% | 99.1 – 100% |

N=number of subjects
[(1)] Percentage of subjects with antibody concentrations associated with protection against disease ($^3$ 0.1 IU/ml by ELISA assay or $^3$ 0.016 IU/ml by an in-vitro Vero-cell neutralisation assay).
[(2)] This assay was not performed in study HPV-042.
[(3)] Booster response defined as:
- for initially seronegative subjects, antibody concentrations at least four times the cut-off (post-vaccination concentration ≥ 20 El.U/ml);
- for initially seropositive subjects with Pre booster vaccination concentration ≥ 5 El.U/ml and < 20 El.U/ml: an increase in antibody concentrations of at least four times the Pre booster vaccination concentration.
- for initially seropositive subjects with Pre booster vaccination concentration ≥ 20 El.U/ml: an increase in antibody concentrations of at least two times the Pre booster vaccination concentration

As with other adult-type Td vaccines, IPV-Boostrix induces higher seroprotection rates and higher titres of both anti-D and anti-T antibodies in children and adolescents as compared to adults.

Persistence of the immune response

The following seroprotection/seropositivity rates were observed five years after vaccination with IPV-Boostrix in children and 10 years after vaccination with IPV-Boostrix in adolescents and adults (Table 5).

**Table 5**: Persistence of immune response in children, adolescents and adults

| **Antigen** | **Seroprotection/ seropositivity** | **Percentages meeting criteria 5 years after vaccination of children (aged 4-8 years) (N=344)** | **Percentages meeting criteria 10 years after vaccination of adolescents and adults (aged 15 years onwards) (N=63)** |
|---|---|---|---|
| | | (% vaccinees) | (% vaccinees) |
| **Diphtheria** | ≥ 0.1 IU/ml | 89.4%* | 81.0%** |
| **Tetanus** | ≥ 0.1 IU/ml | 98.5% | 98.4% |
| **Pertussis** | ≥ 5 EL.U/ml | | |
| Pertussis toxoid | | 40.9% | 78.7% |
| Filamentous haemagglutinin | | 99.7% | 100% |
| Pertactin | | 97.1% | 88.7% |
| **Inactivated poliovirus** | ≥ 8 ED50 | | |
| type 1 | | 98.8% | 100% |
| type 2 | | 99.7% | 100% |
| type 3 | | 97.1% | 98.3% |

*98.2% of subjects with antibody concentrations associated with protection against disease ≥ 0.016 IU/ml by an *in-vitro* Vero-cell neutralisation assay.
**92.1% of subjects with antibody concentrations associated with protection against disease ≥ 0.01 IU/ml by an *in-vitro* Vero-cell neutralisation assay.

Immune response after a repeat dose

The immunogenicity of IPV-Boostrix, administered 5 years after a first booster dose of IPV-Boostrix at 4 to 8 years of age, has been evaluated. One month post vaccination, > 99 % of subjects were seropositive against pertussis and seroprotected against diphtheria, tetanus and all three poliovirus types.

In adults, one dose of IPV-Boostrix administered 10 years after the previous dose, elicited a protective immune response in > 96.8% of the subjects (for the diphtheria antigen) and in 100% of the subjects (for the tetanus and polio antigens). The booster response against the pertussis antigens was between 74.2 and 98.4%.

Immune response in subjects without prior or with unknown vaccination history

After administration of one dose of Boostrix (dTpa component of IPV-Boostrix) to 83 adolescents aged from 11 to 18 years, without previous pertussis vaccination and no vaccination against diphtheria and tetanus in the previous 5 years, all subjects were seroprotected against tetanus and diphtheria. The seropositivity rate after one dose varied between 87% and 100% for the different pertussis antigens.

After administration of one dose of IPV-Boostrix to 140 adults ≥ 40 years of age (including those who have never been vaccinated or whose vaccination status was unknown), that had not received any diphtheria and tetanus containing vaccine in the past 20 years, more than 96.4% of adults were seropositive for all three pertussis antigens and 77.7% and 95.7% were seroprotected against diphtheria and tetanus respectively.

Efficacy in protecting against pertussis

The pertussis antigens contained in IPV-Boostrix are an integral part of the paediatric acellular pertussis combination vaccine (Infanrix), for which efficacy after primary vaccination has been demonstrated in a household contact efficacy study. The antibody titres to all three pertussis components following vaccination with IPV-Boostrix are at least as high or higher than those observed during the household contact efficacy trial. Based on these comparisons, IPV-Boostrix would provide protection against pertussis, however the degree and duration of protection afforded by the vaccine are undetermined.

Passive protection against pertussis in infants (below 3 months of age) born to mothers vaccinated during pregnancy

In a randomised, cross-over, placebo-controlled study, higher pertussis antibody concentrations were demonstrated at delivery in the cord blood of babies born to mothers vaccinated with Boostrix (dTpa group; N=291) versus placebo (control group; N=292) at 27-36 weeks of pregnancy. The cord blood geometric mean concentrations of antibodies against the pertussis antigens PT, FHA and PRN were 46.9, 366.1 and 301.8 IU/ml in the dTpa group, and 5.5, 22.7 and 14.6 IU/ml in the control

group. This corresponds to antibody titres that are 8, 16 and 21 times higher in the cord blood of babies born to vaccinated mothers versus controls. These antibody titres may provide passive protection against pertussis as shown by observational effectiveness studies.

Immunogenicity in infants and toddlers born to mothers vaccinated during pregnancy
The immunogenicity of Infanrix hexa (diphtheria, tetanus, pertussis, hepatitis B, inactivated poliovirus, Haemophilus influenzae type b conjugate vaccine) in infants and toddlers born to healthy mothers vaccinated with Boostrix at 27-36 weeks of pregnancy was evaluated in two clinical studies.
Infanrix hexa was co-administered with a 13-valent pneumococcal conjugate vaccine to infants for primary vaccination (n=268); and to the same infants/toddlers from 11 to 18 months as booster dose (n=229).

Post-primary and post-booster vaccination, immunological data did not show clinically relevant interference of maternal vaccination with Boostrix on the infant's and toddler's responses to diphtheria, tetanus, hepatitis B, inactivated poliovirus, Haemophilus influenzae type b or pneumococcal antigens.

Lower antibody concentrations against pertussis antigens post-primary (PT, FHA and PRN) and post-booster (PT, FHA) vaccination were observed in infants and toddlers born to mothers vaccinated with Boostrix during pregnancy. The fold-increases of anti-pertussis antibody concentrations from the pre-booster to the 1-month post-booster time point were in the same range for infants and toddlers born to mothers vaccinated with Boostrix or with placebo, demonstrating effective priming of the immune system. In the absence of correlates of protection for pertussis, the clinical relevance of these observations remains to be fully understood. However, current epidemiological data on pertussis disease following the implementation of dTpa maternal immunisation do not suggest any clinical relevance of this immune interference.

Effectiveness in the protection against pertussis disease in infants born to women vaccinated during pregnancy
Boostrix or IPV-Boostrix vaccine effectiveness (VE) was evaluated in three observational studies, in UK, Spain and Australia. The vaccine was used during the third trimester of pregnancy to protect infants below 3 months of age against pertussis disease, as part of a maternal vaccination programme.

Details of each study design and results are provided in Table 6.

**Table 6:** VE against pertussis disease for infants below 3 months of age born to mothers vaccinated during the third trimester of pregnancy with Boostrix/IPV-Boostrix

| Study location | Vaccine | Study design | Vaccination Effectiveness |
|---|---|---|---|
| **UK** | *IPV-Boostrix* | Retrospective, screening method | 88% (95% CI: 79, 93) |
| **Spain** | *Boostrix* | Prospective, matched case-control | 90.9% (95% CI: 56.6, 98.1) |
| **Australia** | *Boostrix* | Prospective, matched case-control | 69% (95% CI: 13, 89) |

CI: confidence interval

If maternal vaccination occurs within two weeks before delivery, vaccine effectiveness in the infant may be lower than the figures in the table.

**5.2 Pharmacokinetic properties**

Evaluation of pharmacokinetic properties is not required for vaccines.

**5.3 Preclinical safety data**

Reproductive toxicology

*Fertility*

Non-clinical data obtained with IPV-Boostrix reveal no specific hazard for humans based on conventional studies of female fertility in rats and rabbits.

*Pregnancy*

Non-clinical data obtained with IPV-Boostrix reveal no specific hazard for humans based on conventional studies of embryo-foetal development in rats and rabbits, and also of parturition and postnatal toxicity in rats (up to the end of the lactation period).

Animal toxicology and/or pharmacology

Preclinical data reveal no special hazard for humans based on conventional studies of safety and of toxicity.

## 6 PHARMACEUTICAL PARTICULARS

### 6.1 List of excipients

Medium 199 (as stabilizer containing amino acids (including phenylalanine), mineral salts (including sodium and potassium), vitamins (including para-aminobenzoic acid) and other substances)
Sodium chloride
Water for injections
For adjuvants, see section 2.

### 6.2 Incompatibilities

In the absence of compatibility studies, this medicinal product must not be mixed with other medicinal products.

### 6.3 Shelf life

3 years.

### 6.4 Special precautions for storage

Store in a refrigerator (2°C – 8°C).

Upon removal from the refrigerator, the vaccine is stable for 8 hours at 21°C. Discard the vaccine if it was not used during this period. This information is intended to guide healthcare professionals in case of temporary temperature excursion only.

**Do not freeze.**
Store in the original package in order to protect from light.

### 6.5 Nature and contents of container

0.5 ml of suspension in pre-filled syringe (Type I glass) with stopper (butyl rubber) with or without needles in pack sizes of 1 or 10.

Not all pack sizes may be marketed.

### 6.6 Special precautions for disposal and other handling

Prior to use, the vaccine should be at room temperature, and well shaken in order to obtain a homogeneous turbid white suspension. Prior to administration, the vaccine should be visually inspected for any foreign particulate matter and/or variation of physical aspect. In the event of either being observed, do not administer the vaccine.

Any unused medicinal product or waste material should be disposed of in accordance with local requirements.

## 7 MARKETING AUTHORISATION HOLDER

GlaxoSmithKline (Ireland) Limited
12 Riverwalk
Citywest Business Campus
Dublin 24
Ireland

## 8 MARKETING AUTHORISATION NUMBER

## 9 DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION

Date of first authorisation: 10 December 2004
Date of last renewal: 16 December 2008

## 10 DATE OF REVISION OF THE TEXT

April 2022