ANNEX I

SUMMARY OF PRODUCT CHARACTERISTICS

1. NAME OF THE VETERINARY MEDICINAL PRODUCT

Improvac solution for injection for pigs

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

One dose (2 ml) contains:

Active substance:
Gonadotropin releasing factor (GnRF) analogue-protein conjugate min. 300 µg.
(a synthetic peptide analogue of GnRF conjugated to diphtheria toxoid)

Adjuvant:
Diethylaminoethyl (DEAE)-Dextran, an aqueous, non-mineral oil-based adjuvant 300 mg.

Excipient:
Chlorocresol 2.0 mg.

For the full list of excipients, see section 6.1.

3. PHARMACEUTICAL FORM

Solution for injection.

4. CLINICAL PARTICULARS

4.1 Target species

Male pigs (from 8 weeks of age).

4.2 Indications for use, specifying the target species

Induction of antibodies against GnRF to produce a temporary immunological suppression of testicular function. For use as an alternative to physical castration for the reduction of boar taint caused by the key boar taint compound androstenone, in entire male pigs following the onset of puberty.
Another key contributor to boar taint, skatole, may also be reduced as an indirect effect. Aggressive and sexual (mounting) behaviours are also reduced.

The onset of immunity (induction of anti-GnRF antibodies) can be expected within 1 week post second vaccination. Reduction of androstenone and skatole levels has been demonstrated from 4 to 6 weeks post second vaccination. This reflects the time needed for clearance of boar taint compounds already present at the time of vaccination as well as the variability of response between individual animals. Reduction of aggressive and sexual (mounting) behaviours can expected from 1 to 2 weeks post second vaccination.

4.3 Contraindications

Do not use in female pigs. Do not use in male pigs intended for breeding.

4.4 Special warnings for each target species

Accidental vaccination of male breeding stock may affect subsequent fertility.

4.5 Special precautions for use

Special precautions for use in animals

Only healthy animals should be immunised.
Improvac has been shown to be safe in male pigs from 8 weeks of age onwards. The recommended time for slaughter is 4 to 6 weeks after the final injection. If pigs cannot be slaughtered within this recommended period the available trial data support that pigs may still be sent for slaughter up to 10 weeks after the final injection with minimal risk of boar taint. An increasing proportion will return to normal function after this time.
As skatole levels are not fully dependent on sexual status, both dietary and hygiene management procedures to reduce skatole levels are also important.

Special precautions to be taken by the person administering the veterinary medicinal product to animals

Accidental self-injection may produce similar effects in people to those seen in pigs. These may include a temporary reduction in sexual hormones and reproductive functions in both men and women and an adverse effect on pregnancy. The risk of these effects occurring is greater after a second or subsequent accidental injection than after a first injection.

Special care should be taken to avoid accidental self-injection and needle stick injury when administering the veterinary medicinal product. The veterinary medicinal product must only be used with a safety vaccinator, which has a dual safety system providing both a needle guard and a mechanism to prevent accidental operation of the trigger.

The veterinary medicinal product must not be administered by pregnant women or those who may be pregnant. In case of eye contact, rinse immediately with copious amounts of water. In case of skin contact, wash immediately with soap and water.

Advice to the user in the event of accidental self-injection:
Accidental injection/self-injection may result in severe pain and swelling, particularly if injected into a joint or finger, and in rare cases could result in the loss of the affected finger if prompt medical attention is not given.
In the event of accidental self-injection, wash the injury thoroughly with clean running water. Seek prompt medical advice even if only a very small amount is injected and take the package leaflet with you. If pain persists for more than 12 hours after medical examination, seek medical advice again. Do not administer the veterinary medicinal product in the future.

Advice to the physician:
Accidental self-injection could temporarily affect reproductive physiology of both men and women and may adversely affect pregnancy. If self-injection with Improvac is suspected, reproductive physiology should be monitored by assay of testosterone or oestrogen levels (as appropriate). The risk of a physiological effect is greater after a second or subsequent accidental injection than after a first injection. Clinically meaningful suppression of gonadal function should be managed with supportive endocrine replacement therapy until normal function returns. The patient should be advised not to administer Improvac and/or any other veterinary medicinal products with similar action in the future. Even if small amounts have been injected, accidental injection with this product can cause intense swelling, which may, for example, result in ischaemic necrosis and even the loss of a digit. Expert, PROMPT, surgical attention is required and may necessitate early incision and irrigation of the injected area, especially where there is involvement of finger pulp or tendon.

4.6 Adverse reactions (frequency and seriousness)

When administered to pigs at the youngest recommended age (8 weeks), injection site swellings of up to 4 x 8 cm are very commonly observed. A gradual resolution of the local reactions occurs, but in 20–30% of the animals these may persist for more than 42 days. A transient increase in rectal temperature (post-vaccination hyperthermia) of around 0.5 °C is very commonly observed during the 24-hours period post vaccination.
When administered to older pigs (14–23 weeks of age) injection site swellings ranging from 2 cm to 5 cm in diameter are commonly observed, and injection site reactions at slaughter are commonly observed if the second vaccination is given only 4 weeks before slaughter.
In very rare cases anaphylactoid type reactions (dyspnoea, collapse, cyanosis and hyper salivation associated with or without muscle twitching or emesis) have been observed within a few minutes after the first vaccination with duration up to 30 minutes. In a small number of animals death occurred following the reaction, however most animals recovered without treatment and did not appear to react to subsequent vaccinations.

The frequency of adverse reactions is defined using the following convention:
- very common (more than 1 in 10 animals treated displaying adverse reaction(s))
- common (more than 1 but less than 10 animals in 100 animals treated)
- uncommon (more than 1 but less than 10 animals in 1,000 animals treated)
- rare (more than 1 but less than 10 animals in 10,000 animals treated)
- very rare (less than 1 animal in 10,000 animals treated, including isolated reports).

4.7 Use during pregnancy, lactation or lay

Do not use in female or male breeding pigs.

4.8 Interaction with other medicinal products and other forms of interaction

No information is available on the safety and efficacy of this vaccine when used with any other veterinary medicinal product. A decision to use this vaccine before or after any other veterinary medicinal product therefore needs to be made on a case by case basis.

4.9 Amounts to be administered and administration route

Subcutaneous use.

Entire male pigs from 8 weeks of age onwards should be vaccinated with 2 doses of 2 ml at least 4 weeks apart, with the second dose normally given 4 to 6 weeks prior to slaughter. If slaughter is intended to be later than 10 weeks after the second dose a third dose should be given 4 to 6 weeks before the planned slaughter date. In case of suspected misdosing, the animal should be revaccinated immediately.

Administer by subcutaneous injection in the neck, immediately behind the ear, using a safety vaccinator. As a guide, use a short needle to give 12 to 15 mm penetration. To avoid intramuscular deposition and lesions, it is recommended to use a shorter needle to give 5 mm to 9 mm penetration in undersized pigs and pigs younger than 16 weeks of age. Note that when using a safety vaccinator part of the needle will be covered by the needle guard and will not penetrate the pig. Depending on the type of safety vaccinator, pressure may also be put on the skin and push the needle a few millimetres deeper into the tissue. These circumstances should be taken into account when choosing an appropriate needle length. The needle should be directed perpendicular to the skin surface. Avoid introduction of contamination. Avoid injecting pigs that are wet and dirty.

4.10 Overdose (symptoms, emergency procedures, antidotes), if necessary

Administration of a double dose of Improvac (4 ml) to 8 week old piglets very commonly resulted in palpable injection site reactions. The largest reactions were seen around 7 days post administration when the maximum size was 13 x 7 cm. By two weeks post administration the maximum size had decreased to 8 x 4 cm, showing a gradual resolution of the local reactions. A transient increase in body temperature of 0.2 to 1.7°C was observed during the 24 hours after administration, returning to normal after two days. The general health of the animals was not affected.

4.11 Withdrawal period(s)

Zero days.

5. IMMUNOLOGICAL PROPERTIES

Pharmacotherapeutic group: Gonadotropin releasing factor analogue, conjugated.
ATCvet code: QG03XA91.

Immunisation with Improvac induces an immune response against endogenous gonadotrophin releasing factor (GnRF), a factor that controls testicular function via the gonadotropic hormones LH and FSH. The active ingredient in this immunological is a synthetically produced analogue of GnRF, which is conjugated with an immunogenic carrier protein. The conjugate is adjuvanted to increase the level and duration of effect.
The effects of immunisation derive from the reduction in testicular function resulting from reduced GnRF activity. This leads to reduced production and concentration of testosterone and other testicular steroids, including androstenone, one of the main substances responsible for boar taint. A reduction of typical male behaviour such as mounting and aggressiveness when mixed with non-penmates can be expected after the second vaccination.

Boars given an initial dose of Improvac are immunologically primed but retain their full testicular function until they receive the second dose, which induces a strong immune response to GnRF and causes temporary immunological suppression of testicular function. This directly controls the production of androstenone and, by removing the inhibitory effect of testicular steroids on hepatic metabolism, indirectly reduces levels of skatole.
This effect is apparent within one week of treatment but it may take up to 3 weeks for any existing concentrations of boar taint compounds to be reduced to insignificant levels.

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipient(s)

DEAE-Dextran
Chlorocresol
Urea
Water for injections

6.2 Major incompatibilities

Do not mix with any other veterinary medicinal product.

6.3 Shelf life

Shelf life of the veterinary medicinal product as packaged for sale: 3 years.
Shelf life after first opening: 28 days at 2–8 °C. After first broaching with a sterile needle, the container should be returned to the refrigerator. The container can be broached once more only during the next 28 days, then discarded immediately after use.

6.4 Special precautions for storage

Store and transport refrigerated (2 ℃ – 8 ℃).
Do not freeze. Protect from light.

6.5 Nature and composition of immediate packaging

Immediate packaging:
Polyethylene (HDPE) bottle of, 100 ml (50 doses) or 250 ml (125 doses) sealed with a rubber closure and secured with an aluminium cap.

Outer packaging:
Cardboard box with 1 bottle of 100 ml.
Cardboard box with 10 bottles of 100 ml.

Cardboard box with 1 bottle of 250 ml.
Cardboard box with 4 bottles of 250 ml.

Not all pack sizes may be marketed.

6.6 Special precautions for the disposal of unused veterinary medicinal product or waste materials derived from the use of such products

Any unused veterinary medicinal product or waste materials derived from such veterinary medicinal product should be disposed of in accordance with local requirements.

7. MARKETING AUTHORISATION HOLDER

Zoetis Belgium SA
Rue Laid Burniat 1
1348 Louvain-la-Neuve
BELGIUM

8. MARKETING AUTHORISATION NUMBER(S)

EU/2/09/095/002 - 100 ml x 10
EU/2/09/095/003 - 250 ml x 4
EU/2/09/095/005 - 100 ml
EU/2/09/095/006 - 250 ml

9. DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION

Date of first authorisation: 11/05/ 2009
Date of last renewal: 10/04/2014

10. DATE OF REVISION OF THE TEXT

Detailed information on this veterinary medicinal product is available on the website of the European Medicines Agency (http://www.ema.europa.eu/).

PROHIBITION OF SALE, SUPPLY AND/OR USE

Not applicable.

ANNEX II

A. MANUFACTURERS OF THE BIOLOGICAL ACTIVE SUBSTANCE AND MANUFACTURER RESPONSIBLE FOR BATCH RELEASE

B. CONDITIONS OR RESTRICTIONS REGARDING SUPPLY OR USE

C. STATEMENT OF THE MRLs

A. MANUFACTURERS OF THE BIOLOGICAL ACTIVE SUBSTANCE AND MANUFACTURER RESPONSIBLE FOR BATCH RELEASE

Name and address of the manufacturers of the biological active substance

Diphtheria toxoid:
Zoetis LLC
601 W. Cornhusker Highway
Lincoln, NE 68521
USA

Synthetic GnRF peptide analogue:
Auspep Clinical Peptides PTY Ltd.
15, Mareno Road, Tullamarine, 3052
Victoria
AUSTRALIA

GnRF analogue-protein conjugate:
Zoetis Belgium SA
Rue Laid Burniat 1
1348 Louvain-la-Neuve
BELGIUM

Name and address of the manufacturer responsible for batch release

Zoetis Belgium SA
Rue Laid Burniat 1
1348 Louvain-la-Neuve
BELGIUM

B. CONDITIONS OR RESTRICTIONS REGARDING SUPPLY OR USE

Veterinary medicinal product subject to prescription.

C. STATEMENT OF THE MRLs

The active substance, being a principle of biological origin intended to produce active immunity, is not within the scope of Regulation (EC) No 470/2009.

The excipients (including adjuvants) listed in section 6.1 of the SPC are either allowed substances for which table 1 of the annex to Commission Regulation (EU) No 37/2010 indicates that no MRLs are required or are considered as not falling within the scope of Regulation (EC) No 470/2009 when used as in this veterinary medicinal product.

ANNEX III

LABELLING AND PACKAGE LEAFLET

A. LABELLING

PARTICULARS TO APPEAR ON THE OUTER PACKAGE

Cardboard boxes, 10 x 100 ml and 4 x 250 ml HDPE bottles

1. NAME OF THE VETERINARY MEDICINAL PRODUCT

Improvac solution for injection

2. STATEMENT OF ACTIVE SUBSTANCES

One dose (2 ml) contains:

Gonadotropin releasing factor (GnRF) analogue-protein conjugate min. 300 µg.

3. PHARMACEUTICAL FORM

Solution for injection

4. PACKAGE SIZE

10 x 100 ml
4 x 250 ml

5. TARGET SPECIES

Male pigs (from 8 weeks of age).

6. INDICATION(S)

7. METHOD AND ROUTE(S) OF ADMINISTRATION

Subcutaneous use.
Read the package leaflet before use.

8. WITHDRAWAL PERIOD (S)

Withdrawal period(s): Zero days.

9. SPECIAL WARNING(S), IF NECESSARY

Accidental self-injection is dangerous.

10. EXPIRY DATE

EXP {month/year}
Once broached, the container should be returned to the refrigerator and then can be broached once more during the next 28 days, then discarded immediately after use.

11. SPECIAL STORAGE CONDITIONS

Store and transport refrigerated.
Do not freeze.
Protect from light.

12. SPECIAL PRECAUTIONS FOR THE DISPOSAL OF UNUSED PRODUCTS OR WASTE MATERIALS, IF ANY

Disposal: read package leaflet.

13. THE WORDS "FOR ANIMAL TREATMENT ONLY" AND CONDITIONS OR RESTRICTIONS REGARDING SUPPLY AND USE, IF APPLICABLE

For animal treatment only. To be supplied only on veterinary prescription.

14. THE WORDS "KEEP OUT OF THE SIGHT AND REACH OF CHILDREN"

Keep out of the sight and reach of children.

15. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER

Zoetis Belgium SA
Rue Laid Burniat 1
1348 Louvain-la-Neuve
BELGIUM

16. MARKETING AUTHORISATION NUMBER(S)

EU/2/09/095/002 - 10 x 100 ml
EU/2/09/095/003 - 4 x 250 ml

17. MANUFACTURER'S BATCH NUMBER

Lot {number}

PARTICULARS TO APPEAR ON THE OUTER PACKAGE

Cardboard boxes, 1 x 100 ml and 1 x 250 ml HDPE bottles

1. NAME OF THE VETERINARY MEDICINAL PRODUCT

Improvac solution for injection

2. STATEMENT OF ACTIVE SUBSTANCES

One dose (2 ml) contains:

Gonadotropin releasing factor (GnRF) analogue-protein conjugate min. 300 µg.

3. PHARMACEUTICAL FORM

Solution for injection

4. PACKAGE SIZE

1 x 100 ml
1 x 250 ml

5. TARGET SPECIES

Male pigs (from 8 weeks of age).

6. INDICATION(S)

7. METHOD AND ROUTE(S) OF ADMINISTRATION

Subcutaneous use.
Read the package leaflet before use.

8. WITHDRAWAL PERIOD (S)

Withdrawal period(s): Zero days.

9. SPECIAL WARNING(S), IF NECESSARY

Accidental self-injection is dangerous.

10. EXPIRY DATE

EXP {month/year}
Once broached, use within 28 days.

11. SPECIAL STORAGE CONDITIONS

Store and transport refrigerated.
Do not freeze.
Protect from light.

12. SPECIAL PRECAUTIONS FOR THE DISPOSAL OF UNUSED PRODUCTS OR WASTE MATERIALS, IF ANY

Disposal: read package leaflet.

13. THE WORDS "FOR ANIMAL TREATMENT ONLY" AND CONDITIONS OR RESTRICTIONS REGARDING SUPPLY AND USE, IF APPLICABLE

For animal treatment only. To be supplied only on veterinary prescription.

14. THE WORDS "KEEP OUT OF THE SIGHT AND REACH OF CHILDREN"

Keep out of the sight and reach of children.

15. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER

Zoetis Belgium SA
Rue Laid Burniat 1
1348 Louvain-la-Neuve
BELGIUM

16. MARKETING AUTHORISATION NUMBER(S)

EU/2/09/095/005 - 100 ml
EU/2/09/095/006 - 250 ml

17. MANUFACTURER'S BATCH NUMBER

Lot {number}

PARTICULARS TO APPEAR ON THE IMMEDIATE PACKAGE

100 ml and 250 ml HDPE bottles

1. NAME OF THE VETERINARY MEDICINAL PRODUCT

Improvac solution for injection

2. STATEMENT OF ACTIVE SUBSTANCES

GnRF analogue-protein conjugate min. 300 µg/2 ml

3. PHARMACEUTICAL FORM

4. PACKAGE SIZE

100 ml
250 ml

5. TARGET SPECIES

Male pigs (from 8 weeks of age).

6. INDICATION(S)

7. METHOD AND ROUTE(S) OF ADMINISTRATION

SC
Read package leaflet before use.

8. WITHDRAWAL PERIOD(S)

Withdrawal period(s): Zero days.

9. SPECIAL WARNING(S), IF NECESSARY

Accidental self-injection is dangerous.

10. EXPIRY DATE

EXP {month/year}
Once broached, use by ...

11. SPECIAL STORAGE CONDITIONS

Store and transport refrigerated.
Do not freeze.
Protect from light.

12. SPECIAL PRECAUTIONS FOR THE DISPOSAL OF UNUSED PRODUCTS OR WASTE MATERIALS, IF ANY

13. THE WORDS "FOR ANIMAL TREATMENT ONLY" AND CONDITIONS OR RESTRICTIONS REGARDING SUPPLY AND USE, IF APPLICABLE

For animal treatment only. To be supplied only on veterinary prescription.

14. THE WORDS "KEEP OUT OF THE SIGHT AND REACH OF CHILDREN"

15. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER

Zoetis Belgium SA
Rue Laid Burniat 1
1348 Louvain-la-Neuve
BELGIUM

16. MARKETING AUTHORISATION NUMBER(S)

17. MANUFACTURER'S BATCH NUMBER

Lot {number}

B. PACKAGE LEAFLET

PACKAGE LEAFLET:
Improvac, solution for injection for pigs

1. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER AND OF THE MANUFACTURING AUTHORISATION HOLDER RESPONSIBLE FOR BATCH RELEASE, IF DIFFERENT

Marketing authorisation holder and manufacturer responsible for batch release:
Zoetis Belgium SA
Rue Laid Burniat 1
1348 Louvain-la-Neuve
BELGIUM

2. NAME OF THE VETERINARY MEDICINAL PRODUCT

Improvac solution for injection for pigs

3. STATEMENT OF THE ACTIVE SUBSTANCE(S) AND OTHER INGREDIENT(S)

Once dose (2 ml) contains:

Active substance:
Gonadotropin releasing factor (GnRF) analogue-protein conjugate min. 300 µg.
(a synthetic peptide analogue of GnRF conjugated to diphtheria toxoid)

Adjuvant:
Diethylaminoethyl (DEAE)-Dextran, an aqueous, non-mineral oil-based adjuvant 300 mg.

Excipient:
Chlorocresol 2.0 mg.

4. INDICATION(S)

Induction of antibodies against GnRF to produce a temporary immunological suppression of testicular function. For use as an alternative to physical castration for the reduction of boar taint caused by the key boar taint compound androstenone, in entire male pigs following the onset of puberty.
Another key contributor to boar taint, skatole, may also be reduced as an indirect effect. Aggressive and sexual (mounting) behaviours are also reduced.

The onset of immunity (induction of anti-GnRF antibodies) can be expected within 1 week post second vaccination. Reduction of androstenone and skatole levels has been demonstrated from 4 to 6 weeks post second vaccination. This reflects the time needed for clearance of boar taint compounds already present at the time of vaccination as well as the variability of response between individual animals. Reduction of aggressive and sexual (mounting) behaviours can expected from 1 to 2 weeks post second vaccination.

5. CONTRAINDICATIONS

Do not use in female pigs. Do not use in male pigs intended for breeding.

6. ADVERSE REACTIONS

When administered to pigs at the youngest recommended age (8 weeks), injection site swellings of up to 4 x 8 cm are very commonly observed. A gradual resolution of the local reactions occurs, but in 20–30% of the animals these may persist for more than 42 days. A transient increase in rectal temperature (post-vaccination hyperthermia) of around 0.5 °C is very commonly observed during the 24-hours period post vaccination.
When administered to older pigs (14–23 weeks of age) injection site swellings ranging from 2 cm to 5 cm in diameter are commonly observed, and injection site reactions at slaughter are commonly observed if the second vaccination is given only 4 weeks before slaughter.
In very rare cases anaphylactoid type reactions (dyspnoea, collapse, cyanosis and hyper salivation associated with or without muscle twitching or emesis) have been observed within a few minutes after the first vaccination with duration up to 30 minutes. In a small number of animals death occurred following the reaction, however most animals recovered without treatment and did not appear to react to subsequent vaccinations.

The frequency of adverse reactions is defined using the following convention:
- very common (more than 1 in 10 animals treated displaying adverse reaction(s))
- common (more than 1 but less than 10 animals in 100 animals treated)
- uncommon (more than 1 but less than 10 animals in 1,000 animals treated)
- rare (more than 1 but less than 10 animals in 10,000 animals treated)
- very rare (less than 1 animal in 10,000 animals treated, including isolated reports)

If you notice any side effects, even those not already listed in this package leaflet or you think that the medicine has not worked, please inform your veterinary surgeon.

7. TARGET SPECIES

Male pigs (from 8 weeks of age).

8. DOSAGE FOR EACH SPECIES, ROUTE(S) AND METHOD OF ADMINISTRATION

2 ml, by subcutaneous injection (injection given under the skin).

9. ADVICE ON CORRECT ADMINISTRATION

Entire male pigs from 8 weeks of age onwards should be vaccinated with 2 doses of 2 ml at least 4 weeks apart, with the second dose normally given 4 to 6 weeks prior to slaughter. If slaughter is intended to be later than 10 weeks after the second dose a third dose should be given 4 to 6 weeks before the planned slaughter date. In case of suspected misdosing, the animal should be revaccinated immediately.

Administer by subcutaneous injection in the neck, immediately behind the ear, using a safety vaccinator. As a guide, use a short needle to give 12 to 15 mm penetration. To avoid intramuscular deposition and lesions, it is recommended to use a shorter needle to give 5 mm to 9 mm penetration in undersized pigs and pigs younger than 16 weeks of age. Note that when using a safety vaccinator part of the needle will be covered by the needle guard and will not penetrate the pig. Depending on the type of safety vaccinator, pressure may also be put on the skin and push the needle a few millimetres deeper into the tissue. These circumstances should be taken into account when choosing an appropriate needle length. The needle should be directed perpendicular to the skin surface. Avoid introduction of contamination. Avoid injecting pigs that are wet and dirty.

10. WITHDRAWAL PERIOD(S)

Zero days.

11. SPECIAL STORAGE PRECAUTIONS

Keep out of the sight and reach of children.
Store and transport refrigerated (2 °C–8 °C).
Do not freeze.
Protect from light.
Do not use this veterinary medicinal product after the expiry date which is stated on the label.
After first broaching with a sterile needle, the container should be returned to the refrigerator. The container can be broached once more only during the next 28 days, then discarded immediately after use.

12. SPECIAL WARNING(S)

Special precautions for use in animals:
Only healthy animals should be immunised. Improvac has been shown to be safe in male pigs from 8 weeks of age onwards. Accidental vaccination of male breeding stock may affect subsequent fertility.

The recommended time for slaughter is 4 to 6 weeks after the final injection. If pigs cannot be slaughtered within this recommended period the available trial data support that pigs may still be sent for slaughter up to 10 weeks after the final injection with minimal risk of boar taint. An increasing proportion will return to normal function after this time.

As skatole levels are not fully dependent on sexual status, both dietary and hygiene management procedures to reduce skatole levels are also important.

Special precautions to be taken by the person administering the veterinary medicinal product to animals:
Accidental self-injection may produce similar effects in people to those seen in pigs. These may include a temporary reduction in sexual hormones and reproductive functions in both men and women and an adverse effect on pregnancy. The risk of these effects occurring is greater after a second or subsequent accidental injection than after a first injection.

Special care should be taken to avoid accidental self-injection and needle stick injury when administering the veterinary medicinal product. The veterinary medicinal product must only be used with a safety vaccinator which has a dual safety system providing both a needle guard and a mechanism to prevent accidental operation of the trigger.

The veterinary medicinal product must not be administered by pregnant women or those who may be pregnant. In case of eye contact, rinse immediately with copious amounts of water. In case of skin contact, wash immediately with soap and water. The veterinary medicinal product should be stored safely out of the reach of children.

Advice to the user in the event of accidental self-injection:
Accidental injection/self-injection may result in severe pain and swelling, particularly if injected into a joint or finger, and in rare cases could result in the loss of the affected finger if prompt medical attention is not given.
In the event of accidental self-injection, wash the injury thoroughly with clean running water. Seek prompt medical advice even if only a very small amount is injected and take the package leaflet with you. If pain persists for more than 12 hours after medical examination, seek medical advice again. Do not administer the veterinary medicinal product in the future.

Advice to the physician:
Accidental self-injection could temporarily affect reproductive physiology of both men and women and may adversely affect pregnancy. If self-injection with Improvac is suspected, reproductive physiology should be monitored by assay of testosterone or oestrogen levels (as appropriate). The risk of a physiological effect is greater after a second or subsequent accidental injection than after a first injection. Clinically meaningful suppression of gonadal function should be managed with supportive endocrine replacement therapy until normal function returns. The patient should be advised not to administer Improvac and/or any other product with similar action in the future.
Even if small amounts have been injected, accidental injection with this product can cause intense swelling, which may, for example, result in ischaemic necrosis and even the loss of a digit. Expert, PROMPT, surgical attention is required and may necessitate early incision and irrigation of the injected area, especially where there is involvement of finger pulp or tendon.

Interaction with other medicinal products and other forms of interaction:
No information is available on the safety and efficacy of this vaccine when used with any other veterinary medicinal product. A decision to use this vaccine before or after any other veterinary medicinal product therefore needs to be made on a case by case basis.

13. SPECIAL PRECAUTIONS FOR THE DISPOSAL OF UNUSED PRODUCT OR WASTE MATERIALS, IF ANY

Any unused veterinary medicinal product or waste materials derived from such veterinary medicinal product should be disposed of in accordance with local requirements.

14. DATE ON WHICH THE PACKAGE LEAFLET WAS LAST APPROVED

Detailed information on this veterinary medicinal product is available on the website of the European Medicines Agency (http://www.ema.europa.eu/).

15. OTHER INFORMATION

Immunisation with Improvac induces an immune response against endogenous gonadotrophin releasing factor (GnRF), a factor that controls testicular function via the gonadotropic hormones LH and FSH. The active ingredient in this immunological is a synthetically produced analogue of GnRF, which is conjugated with an immunogenic carrier protein. The conjugate is adjuvanted to increase the level and duration of effect.

The effects of immunisation derive from the reduction in testicular function resulting from reduced GnRF activity. This leads to reduced production and concentration of testosterone and other testicular steroids, including androstenone, one of the main substances responsible for boar taint. Moreover, fully immunised boars develop metabolic characteristics typical of surgically castrated animals, including reduced concentrations of skatole, another key contributor to boar taint. A reduction of typical male behaviour such as mounting and aggressiveness when mixed with non-penmates can be expected after the second vaccination.

Boars given an initial dose of Improvac are immunologically primed but retain their full testicular function until they receive the second dose, which induces a strong immune response to GnRF and causes temporary immunological suppression of testicular function. This effect is apparent within one week of treatment but it may take up to 3 weeks for any existing concentrations of boar taint compounds to be reduced to insignificant levels.

Polyethylene bottle of 100 ml (50 doses) or 250 ml (125 doses) sealed with a rubber closure and secured with an aluminium cap.

Pack sizes:

Cardboard box with 1 bottle of 100 ml.
Cardboard box with 10 bottles of 100 ml.

Cardboard box with 1 bottle of 250 ml.
Cardboard box with 4 bottles of 250 ml.

Not all pack sizes may be marketed.

For any information about this veterinary medicinal product, please contact the local representative of the marketing authorisation holder.

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