

## COMMISSION REGULATION (EC) No 1950/2006

of 13 December 2006

**establishing, in accordance with Directive 2001/82/EC of the European Parliament and of the Council on the Community code relating to veterinary medicinal products, a list of substances essential for the treatment of equidae**

(Text with EEA relevance)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Directive 2001/82/EC of the European Parliament and of the Council of 6 November 2001 on the Community code relating to veterinary medicinal products <sup>(1)</sup>, and in particular Article 10(3) thereof,

Whereas:

- (1) No veterinary medicinal product may be placed on the market of a Member State unless a marketing authorisation has been issued by the competent authorities of that Member State in accordance with Directive 2001/82/EC or in accordance with Regulation (EC) No 726/2004 of the European Parliament and of the Council of 31 March 2004 laying down Community procedures for the authorisation and supervision of medicinal products for human and veterinary use and establishing a European Medicines Agency <sup>(2)</sup>.
- (2) Veterinary medicinal products for food-producing animals including equidae may be authorised only on conditions that guarantee that the foodstuffs produced will be harmless to consumers as regards any residues of such medicinal products, in accordance with Council Regulation (EEC) No 2377/90 of 26 June 1990 laying down a Community procedure for the establishment of maximum residue limits of veterinary medicinal products in foodstuffs of animal origin <sup>(3)</sup>.
- (3) For the reasons set out in the Communication from the Commission to the Council and the European Parliament on 'Availability of veterinary medicinal products' <sup>(4)</sup>, the available range of authorised veterinary medicinal products, particularly for food-producing animals, is gradually decreasing.
- (4) Consequently, measures aimed at a sustainable broadening of therapies are required in order to meet

the health-care and welfare needs of food-producing animals, such as animals of the equidae family, without compromising the high level of consumer protection.

- (5) By means of the derogation provided for in Directive 2001/82/EC, equidae intended for slaughter for human consumption may be administered substances essential for their treatment, hereinafter 'essential substances', subject to a withdrawal period of at least six months.
- (6) For the purpose of that derogation, the list of essential substances should therefore be established. A substance should only be included in that list in exceptional circumstances where no satisfactory alternative treatment for a therapeutic indication is authorised and where the condition would, if untreated, create unnecessary suffering for the animal.
- (7) Specific disease conditions or zootechnical purposes might require a choice of substances to be available in order to cater for different requirements related to the age and utilisation of equidae.
- (8) Since, pursuant to Directive 2001/82/EC, substances listed in Annexes I, II or III to Regulation (EEC) No 2377/90 which are not authorised in products intended for equidae may, in certain circumstances, be used for the treatment of equidae, those substances should not appear on the list of essential substances. Furthermore, no substances listed in Annex IV to Regulation (EEC) No 2377/90 should be included in the list. Consequently, the inclusion of a substance in Annexes I to IV to Regulation (EEC) No 2377/90 should preclude its use as an essential substance for the purposes of this Regulation.
- (9) It is necessary to ensure an appropriate surveillance of equidae which have been treated with essential substances. Therefore, the control mechanisms laid down in Commission Decision 93/623/EEC of 20 October 1993 establishing the identification document (passport) accompanying registered equidae <sup>(5)</sup> and Decision 2000/68/EC of 22 December 1999 amending Commission Decision 93/623/EEC and establishing the identification of equidae for breeding and production <sup>(6)</sup> to safeguard consumer health should apply.

<sup>(1)</sup> OJ L 311, 28.11.2001, p. 1. Directive as last amended by Directive 2004/28/EC (OJ L 136, 30.4.2004, p. 58).

<sup>(2)</sup> OJ L 136, 30.4.2004, p. 1.

<sup>(3)</sup> OJ L 224, 18.8.1990, p. 1. Regulation as last amended by Commission Regulation (EC) No 1451/2006 (OJ L 271, 30.9.2006, p. 37).

<sup>(4)</sup> COM(2000) 806 final, 5.12.2000.

<sup>(5)</sup> OJ L 298, 3.12.1993, p. 45.

<sup>(6)</sup> OJ L 23, 28.1.2000, p. 72.

- (10) It is necessary to ensure that any amendment of the list of essential substances is subject to a harmonised scientific evaluation carried out by the European Medicines Agency established by Regulation (EC) No 726/2004. In addition, the Member States and veterinary professional associations which have requested an amendment of that list should duly substantiate their request and provide relevant scientific data.
- (11) The measures provided for in this Regulation are in accordance with the opinion of the Standing Committee on Veterinary Medicinal Products,

HAS ADOPTED THIS REGULATION:

*Article 1*

The list of substances essential for the treatment of equidae, hereinafter 'essential substances', applicable by way of derogation from Article 11 of Directive 2001/82/EC, is set out in the Annex to this Regulation.

*Article 2*

Essential substances may be used, for the specific disease conditions, treatment needs or zootechnical purposes specified in the Annex, where no medicinal product authorised for equidae or referred to in Article 11 of Directive 2001/82/EC would yield equally satisfactory results in terms of successfully treating the animal, avoiding unnecessary suffering for the animal, or ensuring the safety of those treating the animal.

For the purposes of the first paragraph, the alternatives listed in the Annex shall be considered.

*Article 3*

1. Essential substances may be used only in accordance with Article 10(1) of Directive 2001/82/EC.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 13 December 2006.

2. The details of a treatment with essential substances must be recorded in accordance with the instructions laid down in Section IX of the identification document for equidae set out in Decisions 93/623/EC and 2000/68/EC.

*Article 4*

Any substance that is entered in one of the lists in Annexes I to IV to Regulation (EC) No 2377/90, or the use of which for equidae is prohibited by Community legislation, shall no longer be used as an essential substance for the purposes of this Regulation.

*Article 5*

1. The European Medicines Agency shall, at the request of the Commission, ensure that the Committee for Medicinal Products for Veterinary Use carries out a scientific evaluation of any draft amendment to the list set out in the Annex.

Within 210 days of receiving such a request, the European Medicines Agency shall deliver an opinion to the Commission on the scientific suitability of the amendment.

Where appropriate, the European Food Safety Authority shall also be consulted.

2. When Member States or veterinary professional associations ask the Commission to amend the list set out in the Annex they shall duly substantiate their request and include any relevant scientific data available.

*Article 6*

This Regulation shall enter into force on the third day following its publication in the *Official Journal of the European Union*.

For the Commission  
Günter VERHEUGEN  
Vice-President

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## ANNEX

**List of substances essential for the treatment of equidae**

The withdrawal period for each of the substances on the following list shall be six months.

Indication	Active substance	Justification and explanation of use
<b>Anaesthetics, analgesics and substances used in association with anaesthesia</b>		
<b>— Sedation and premedication (and antagonism)</b>	Acepromazine	<p>Purpose: premedication prior to general anaesthesia, mild sedation.</p> <p>Identification of alternatives: detomidine, romfidine, xylazine, diazepam, midazolam.</p> <p>Discussion of the specific advantages: acepromazine has consistently been shown to reduce risk of anaesthetic death. Mode of action (on limbic system) and unique quality of sedation cannot be produced by the alpha-2 agonist sedatives (detomidine, romfidine and xylazine) or the benzodiazepines (diazepam, midazolam).</p>
	Atipamezole	<p>Purpose: <math>\alpha</math>-2 adrenoceptor antagonist used for reversal of <math>\alpha</math>-2 agonists.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: only treatment for hypersensitive individual and overdose. Emergency medicine. Specifically used in cases of respiratory depression.</p>
	Diazepam	<p>Purpose: premedication and induction of anaesthesia. Mild (benzodiazepine) tranquilisation with minimal cardiovascular and respiratory side effects. Anti-convulsant, essential for treatment of seizures.</p> <p>Identification of alternatives: acepromazine, detomidine, romfidine, xylazine, midazolam, primidone, phenytoin.</p> <p>Discussion of the specific advantages: in modern medicinal standards an essential component of anaesthetic induction protocols with very considerable equine experience. Used with ketamine for induction of anaesthesia, producing essential relaxation that allows smooth induction and intubation. Mode of action (acts at GABA receptor) and unique tranquilisation without cardiorespiratory depression cannot be produced by the <math>\alpha</math>-2 agonist sedatives (detomidine, romfidine and xylazine) or acepromazine.</p>
	Midazolam	<p>Purpose: premedication and induction of anaesthesia. Mild (benzodiazepine) tranquilisation with minimal cardiovascular and respiratory side effects. Anti-convulsant, for treatment of seizures, particularly adult horses with tetanus.</p> <p>Identification of alternatives: acepromazine, detomidine, romfidine, xylazine, diazepam, primidone, phenytoin.</p> <p>Discussion of the specific advantages: similar to diazepam but water soluble, thus suitable for intravenous injection and essential for intravenous infusion in combination with anaesthetics. Shorter acting than diazepam. More suitable than diazepam for foals.</p> <p>Anti-convulsant, for treatment of seizures, particularly adult horses with tetanus – better than diazepam for use over several days due to water solubility.</p> <p>Used with ketamine for induction of anaesthesia, producing essential relaxation that allows smooth induction and intubation.</p> <p>Mode of action (acts at GABA receptor) and unique tranquilisation without cardiorespiratory depression cannot be produced by the <math>\alpha</math>-2 agonist sedatives (detomidine, romfidine and xylazine) or acepromazine.</p>
	Naloxone	<p>Purpose: opioid-antidote, emergency medicine.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: no alternatives available.</p>

Indication	Active substance	Justification and explanation of use
	Propofol	<p>Purpose: intravenous anaesthetic. Induction of anaesthesia in foals.</p> <p>Identification of alternatives: inhalation anaesthetics such as sevoflurane or isoflurane.</p> <p>Discussion of the specific advantages: rapidly cleared injectable anaesthetic. Recent reports demonstrate vast improvement in cardiovascular stability and quality of recovery over inhalation anaesthesia.</p>
	Sarmazenil	<p>Purpose: benzodiazepine antagonist.</p> <p>Identification of alternatives: flumazenil.</p> <p>Discussion of the specific advantages: clean reversal of benzodiazepine sedation required after infusion during total intravenous anaesthesia. Widest clinical experience with sarmazenil compared to other potential candidates for essential substances.</p>
	Tiletamine	<p>Purpose: Dissociative anaesthetic similar to ketamine, especially used for field anaesthesia. Used in combination with zolazepam.</p> <p>Identification of alternatives: ketamine.</p> <p>Discussion of the specific advantages: The use in combination with zolazepam is essential in cases when there is no access to inhalation anaesthesia such as for field anaesthesia. Combination is also essential where anaesthesia with ketamine combinations is too short. Typical applications are castrations, laryngotomies, periosteal stripping, cyst or lump excisions, repair of facial fractures, cast applications and umbilical hernia repairs.</p>
	Zolazepam	<p>Purpose: dissociative anaesthetic similar to ketamine, especially used for field anaesthesia. Used in combination with tiletamine.</p> <p>Identification of alternatives: ketamine.</p> <p>Discussion of the specific advantages: benzodiazepine tranquilliser, which is longer acting than either diazepam or midazolam. The use with tiletamine is essential in cases when there is no access to inhalation anaesthesia such as for field anaesthesia. Combination is essential where anaesthesia with ketamine combinations is too short. Typical applications are castrations, laryngotomies, periosteal stripping, cyst or lump excisions, repair of facial fractures, cast applications and umbilical hernia repairs.</p>
— Hypotension or respiratory stimulation during anaesthesia	Dobutamine	<p>Purpose: treatment of hypotension during anaesthesia.</p> <p>Identification of alternatives: dopamine.</p> <p>Discussion of the specific advantages: positive inotrope therapy, probably more used than dopamine but preferences vary. Horses usually develop hypotension during anaesthesia, and maintenance of normal blood pressure has been shown to reduce the incidence of serious post-operative rhabdomyolysis. Dobutamine is invaluable during volatile anaesthesia in horses.</p>
	Dopamine	<p>Purpose: treatment of hypotension during anaesthesia.</p> <p>Identification of alternatives: dobutamine.</p> <p>Discussion of the specific advantages: dopamine is required in horses that do not respond to dobutamine. In foals dopamine is used in preference to dobutamine. Additionally required for treatment of intraoperative bradycardias that are resistant to atropine.</p>

Indication	Active substance	Justification and explanation of use
	Ephedrine	<p>Purpose: treatment of hypotension during anaesthesia.</p> <p>Identification of alternatives: dopamine, dobutamine.</p> <p>Discussion of the specific advantages: required where dopamine and dobutamine are ineffective. A unique sympathomimetic agent, which is structurally similar to adrenaline. It is impossible to use the action of catecholamines on specific receptors in the body to the benefit of equine patients without recourse to the use of a number of catecholamines, each active at a different receptor profile. Hence ephedrine, which causes noradrenaline release at the nerve endings, thereby increasing cardiac contractility and obtunding hypotension, is used when dobutamine and dopamine are ineffective. Ephedrine lasts minutes to hours and is effective after a single intravenous injection, whereas dobutamine and dopamine last only a few seconds or minutes and must be given by infusion.</p>
	Glycopyrrolate	<p>Purpose: prevention of bradycardia. Anticholinergic. Anticholinergics are fundamental treatment for prevention of parasympathetic effects such as bradycardia and are routine components of eye and airway surgery.</p> <p>Identification of alternatives: atropine.</p> <p>Discussion of the specific advantages: glycopyrrolate has a limited central effect and is more suitable in conscious horses (before and after anaesthesia) than atropine.</p>
	Noradrenaline (norepinephrine)	<p>Purpose: cardiovascular failure. Infusion for the treatment of cardiovascular failure in foals.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: the animal's catecholamine receptor profile responds precisely to medicines acting at different sites. Hence a range of catecholamines acting more or less exclusively on different types of adrenergic receptors is used to produce a precise effect. Noradrenaline acts primarily on alpha-1 receptors to vasoconstrict arterioles, thereby increasing blood pressure and maintaining central circulation. In foals, noradrenaline is commonly the only catecholamine effective in treatment of hypotension.</p>
— Analgesia	Buprenorphine	<p>Purpose: analgesia, used with sedatives for restraint.</p> <p>Identification of alternatives: butorphanol, fentanyl, morphine and pethidine.</p> <p>Discussion of the specific advantages: partial <math>\mu</math>-agonist opioid analgesic. <math>\mu</math>-receptor activity produces better analgesia than <math>\kappa</math>-agonist opioids such as butorphanol. Long-acting analgesic. Due to partial agonist characteristic, has limited addictive and respiratory depressant properties. Long and short-acting opioids have different indications, hence the need for more than one alternative substances as choice.</p>
	Fentanyl	<p>Purpose: analgesia.</p> <p>Identification of alternatives: butorphanol, buprenorphine, morphine and pethidine.</p> <p>Discussion of the specific advantages: <math>\mu</math>-agonist opioid, <math>\mu</math>-receptor activity produces better analgesia than <math>\kappa</math>-agonist opioids such as butorphanol. Very short acting due to rapid metabolism and excretion. Fentanyl is the only opioid used in horses that is suitable for infusion and skin patch administration. Highly effective for pain management.</p>
	Morphine	<p>Purpose: analgesia.</p> <p>Identification of alternatives: butorphanol, buprenorphine, pethidine and fentanyl.</p> <p>Discussion of the specific advantages: full <math>\mu</math>-agonist opioid analgesic. <math>\mu</math>-receptor activity produces the best analgesia. Used with sedatives for restraint, used for epidural anaesthesia. Mid duration analgesic. Morphine is the <math>\mu</math>-opioid agonist with the best solubility characteristics for epidural administration. It provides long-acting analgesia with few systemic effects by this route. This technique is widely used in modern veterinary medicine for treating severe perioperative and chronic pain.</p>

Indication	Active substance	Justification and explanation of use
	Pethidine	<p>Purpose: analgesia.</p> <p>Identification of alternatives: butorphanol, buprenorphine, morphine and fentanyl.</p> <p>Discussion of the specific advantages: a <math>\mu</math>-agonist opioid analgesic about 10 times less potent than morphine. Short-acting opioid that has been proven to be effective to treat spasmodic colic in horses. Only opioid with spasmolytic properties. More sedation and less potential for excitement than other opioids in horses.</p>
— <b>Muscle relaxants and associated substances</b>	Atracurium	<p>Purpose: muscle relaxation during anaesthesia.</p> <p>Identification of alternatives: guaifenesin.</p> <p>Discussion of the specific advantages: non-depolarising neuromuscular blocking agent. Neuromuscular blocking agents are used in particular for eye and deep abdominal surgery. Edrophonium is required for reversal. Atracurium and edrophonium have the most extensive clinical support data.</p>
	Edrophonium	<p>Purpose: reversal of atracurium muscle relaxation.</p> <p>Identification of alternatives: other cholinesterase inhibitors.</p> <p>Discussion of the specific advantages: cholinesterase inhibitor, essential for reversal of neuromuscular blockade. Edrophonium has least side effects of the cholinesterase inhibitors in horses.</p>
	Guaifenesin	<p>Purpose: muscle relaxation during anaesthesia.</p> <p>Identification of alternatives: atracurium.</p> <p>Discussion of the specific advantages: essential alternative to <math>\alpha</math>-2/ketamine regimens in horses where <math>\alpha</math>-2 agents and ketamine are contraindicated such as in horses not responding to these agents or horses having shown adverse effects during a previous administration. Invaluable in combination with ketamine and <math>\alpha</math>-2 agents for remarkably safe field anaesthesia for which no effective alternative intravenous techniques have been developed.</p>
— <b>Inhalation anaesthetics</b>	Sevoflurane	<p>Purpose: inhalation anaesthesia for horses with limb fractures and other orthopaedic injuries and mask induction of anaesthesia in foals.</p> <p>Identification of alternatives: isoflurane, halothane, enflurane.</p> <p>Discussion of the specific advantages: sevoflurane is a volatile anaesthetic with minor metabolism and fast excretion. While there is an MRL for isoflurane in the EU, isoflurane is not suitable for all equine anaesthetic cases due to its recovery characteristics where excitement may lead to the horse breaking a leg. Sevoflurane is essential in certain equine surgeries where a smooth recovery is vital, as it has been shown to produce a smoother, more controlled recovery in horses. It is therefore selected in preference to isoflurane for horses with limb fractures and other orthopaedic injuries. Furthermore sevoflurane is essential for mask induction of anaesthesia in foals as it is completely non-irritant as opposed to isoflurane, which is irritant and therefore causes coughing and breath holding.</p>
— <b>Local anaesthetics</b>	Bupivacaine	<p>Purpose: local anaesthesia.</p> <p>Identification of alternatives: lidocaine.</p> <p>Discussion of the specific advantages: long-acting local anaesthetic. Long duration of action required for perioperative analgesia and treatment of chronic severe pain such as laminitis. Bupivacaine is a longer-acting local anaesthetic than the commonly used lidocaine. Lidocaine alone gives approximately one hour of local anaesthesia. Addition of adrenaline may prolong the effect to two hours, but runs the risk of cutting the local blood supply, and this combination therefore is unsuitable in a number of conditions. Bupivacaine provides four to six hours of local anaesthesia and is therefore much better suited to post-operative analgesia and for management of laminitis because a single injection is often sufficient; this is essential on welfare grounds than repeated hourly lidocaine injections. Shorter acting local anaesthetics are therefore not suitable for the above as they require frequent repeat injections with the attendant increased risk of adverse reactions and unacceptability for animal welfare reasons.</p>

Indication	Active substance	Justification and explanation of use
	Oxybuprocaine	<p>Purpose: local anaesthesia for use in eyes.</p> <p>Identification of alternatives: other local anaesthetics for use in eyes such as amethocaine, proxymetacaine.</p> <p>Discussion of the specific advantages: widest clinical experience with oxybuprocaine compared to other potential candidates for essential substances.</p>
	Prilocaine	<p>Purpose: local anaesthesia prior to intravenous catheterisation.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: in specific preparations (eutectic mixture of local anaesthetics) for topical application to skin where it is absorbed intradermally in 40 min. Used to facilitate intravenous catheterisation, especially in foals.</p>

### Cardiovascular medicines

	Digoxin	<p>Purpose: treatment of heart failure.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: additionally digoxin is the only treatment for the side effects of quinidine treatment</p>
	Quinidine sulfate and quinidine gluconate	<p>Purpose: treatment of cardiac arrhythmias.</p> <p>Identification of alternatives: procainamide, propranolol.</p> <p>Discussion of the specific advantages: anti-dysrhythmic agent. Use is rare but important therapeutic choice, different mode of action necessary for different types of arrhythmias. Treatment of choice for atrial fibrillation.</p>
	Procainamide	<p>Purpose: treatment of cardiac arrhythmias.</p> <p>Identification of alternatives: quinidine sulfate and quinidine gluconate, propranolol.</p> <p>Discussion of the specific advantages: anti-dysrhythmic agent. Use is rare but important therapeutic choice, different mode of action necessary for different types of arrhythmias.</p>
	Propranolol	<p>Purpose: treatment of cardiac arrhythmias.</p> <p>Identification of alternatives: quinidine sulfate and quinidine gluconate, procainamide.</p> <p>Discussion of the specific advantages: anti-hypertensive, which is used because it also exerts some anti-arrhythmic activity. Use is rare but important therapeutic choice. Due to the different pathophysiology of arrhythmias it is essential to have a variety of different acting medicines in order to be able to treat the specific condition. Use of these medicines consists usually of a single treatment to convert back to normal rhythm, which may have to be repeated on only rare occasions.</p>

### Convulsions

	Phenytoin	<p>Purpose: anti-convulsant therapy in foals. Treatment of rhabdomyolysis. Treatment of stringhalt.</p> <p>Identification of alternatives: diazepam, primidone, dantrolene sodium (for rhabdomyolysis).</p> <p>Discussion of the specific advantages: essential anti-convulsant in foals. Phenytoin is generally added to the treatment of seizure control if primidone/phenobarbital does not control the seizures. Phenytoin is a calcium channel-blocking agent and useful for the treatment of recurrent forms of rhabdomyolysis.</p>
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Indication	Active substance	Justification and explanation of use
	Primidone	<p>Purpose: anti-convulsant therapy in foals.</p> <p>Identification of alternatives: diazepam, phenytoin.</p> <p>Discussion of the specific advantages: primidone is indicated as follow-on from diazepam therapy or as an alternative.</p>

**Gastrointestinal agents**

	Bethanechol	<p>Purpose: treatment of ileus, treatment of gastroduodenal stricture in foals, treatment of recurrent small colon impactions in adults.</p> <p>Identification of alternatives: neostigmine, metoclopramide, cisapride, erythromycin and other prokinetic substances.</p> <p>Discussion of the specific advantages: bethanechol is a muscarinic cholinergic agonist that stimulates acetylcholine receptors on gastrointestinal smooth muscles, causing them to contract. It has been shown to increase the rate of gastric and caecal emptying. Both bethanechol and metoclopramide have been shown to be beneficial in the treatment of post-operative ileus.</p>
	Diocetyl sodium sulfosuccinate	<p>Purpose: treatment of impactions.</p> <p>Identification of alternatives: mineral oil.</p> <p>Discussion of the specific advantages: achieves improved softening of intestinal contents when compared to mineral oil as it potentiates the penetration of water into the impacted faecal mass.</p>
	Metoclopramide	<p>Purpose: treatment of post-operative ileus.</p> <p>Identification of alternatives: bethanechol, neostigmine, cisapride, erythromycin and other prokinetic substances.</p> <p>Discussion of the specific advantages: Metoclopramide is a substituted benzamide with several mechanisms of action: (1) it is a dopamine receptor antagonist; (2) it augments the release of acetylcholine from intrinsic cholinergic neurons and (3) it has adrenergic blocking activity. It is effective in restoring gastrointestinal coordination post operatively and it decreases the total volume, rate and duration of gastric reflux. Metoclopramide is a prokinetic drug, which acts more in the proximal gastrointestinal tract. Both bethanechol and metoclopramide have been shown to be beneficial in the treatment of post-operative ileus.</p>
	Propantheline bromide	<p>Purpose: anti-peristaltic.</p> <p>Identification of alternatives: atropine, lidocaine given diluted intrarectally as an enema.</p> <p>Discussion of the specific advantages: propantheline bromide is a synthetic quaternary ammonium anticholinergic which inhibits gastrointestinal motility and spasm and diminishes gastric acid secretion. It also inhibits the action of acetylcholine at the postganglionic nerve endings of the parasympathetic nervous system. Its effects are similar to those of atropine although they last longer (six hours). Propantheline bromide is an important choice for decreasing peristalsis to avoid rectal tearing during rectal palpation or to explore and treat a potential rectal tear where it can be difficult to get a lidocaine enema to work effectively.</p>

**Rhabdomyolysis**

	Dantrolene sodium	<p>Purpose: treatment of rhabdomyolysis. Treatment of malignant hyperthermia during anaesthesia.</p> <p>Identification of alternatives: phenytoin.</p> <p>Discussion of the specific advantages: dantrolene exhibits muscle relaxation activity by direct action on muscle as it inhibits the release of calcium from the sarcoplasmic reticulum and thus causes a dissociation of excitation-contraction coupling. Both phenytoin and dantrolene sodium have been found to be useful in the treatment of recurrent forms of rhabdomyolysis.</p>
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Indication	Active substance	Justification and explanation of use
<b>Antimicrobials</b>		
— <i>Klebsiella</i> ssp. infections	Ticarcillin	<p>Purpose: treatment of <i>Klebsiella</i> ssp. infections.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: Specific antibiotic for <i>Klebsiella</i> ssp. infections.</p>
— <i>Rhodococcus equi</i> infections	Azithromycin	<p>Purpose: treatment of <i>Rhodococcus equi</i> infections.</p> <p>Identification of alternatives: erythromycin.</p> <p>Discussion of the specific advantages: standard treatment in combination with rifampicin, better tolerated in foals than erythromycin.</p>
	Rifampicin	<p>Purpose: treatment of <i>Rhodococcus equi</i> infections.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: treatment of <i>Rhodococcus equi</i> in combination with erythromycin or azithromycin. Treatment of choice.</p>
— Septic arthritis	Amikacin	<p>Purpose: treatment of septic arthritis.</p> <p>Identification of alternatives: gentamicin or other aminoglykosides.</p> <p>Discussion of the specific advantages: better tolerated in foals than gentamicin or other aminoglykosides.</p>
<b>Respiratory medicines</b>		
	Ambroxol	<p>Purpose: stimulation of surfactant in the premature foal.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: no alternatives available.</p>
	Ipratropium bromide	<p>Purpose: bronchodilation.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: anticholinergic action. Necessary as therapeutic choice as in some cases more efficacious than <math>\beta</math>-agonists.</p>
	Oxymetazolin	<p>Purpose: treatment of nasal oedema.</p> <p>Identification of alternatives: phenylephrine.</p> <p>Discussion of the specific advantages: <math>\alpha</math>-adrenoceptor agonist with strong vasoconstrictive properties which is used in preference to phenylephrine due to the fact that it is longer-acting.</p>
<b>Antiprotozoal agents</b>		
	Isometamidium	<p>Purpose: treatment of equine protozoal myeloencephalitis.</p> <p>Identification of alternatives: pyrimethamine.</p> <p>Discussion of the specific advantages: disease sometimes refractory to treatment with pyrimethamine, and therefore an alternative is required.</p>

Indication	Active substance	Justification and explanation of use
	Pyrimethamine	<p>Purpose: treatment of equine protozoal myeloencephalitis.</p> <p>Identification of alternatives: isometamidium.</p> <p>Discussion of the specific advantages: at least 75 % success rate when used in conjunction with sulfadiazine-sulfonamide.</p>

**Ophthalmic medicines**

— <b>Ocular ulcers</b>	Acyclovir	<p>Purpose: treatment of ocular ulcers (antiviral medicine). Topical use.</p> <p>Identification of alternatives: idoxuridine.</p> <p>Discussion of the specific advantages: both acyclovir and idoxuridine have been shown to be equally effective in the treatment of ulcerative herpetic keratitis.</p>
	Idoxuridine	<p>Purpose: treatment of ocular ulcers (antiviral medicine). Topical use.</p> <p>Identification of alternatives: acyclovir.</p> <p>Discussion of the specific advantages: both acyclovir and idoxuridine have been shown to be equally effective in the treatment of ulcerative herpetic keratitis.</p>
— <b>Glaucoma</b>	Phenylephrine	<p>Purpose: treatment of glaucoma, epiphora, nasal oedema and splenic entrapment.</p> <p>Identification of alternatives: tropicamide, (for glaucoma), otherwise none identified.</p> <p>Discussion of the specific advantages: both phenylephrine and tropicamide have been shown to be equally effective in the treatment of glaucoma.</p>
	Tropicamide	<p>Purpose: treatment of glaucoma. Topical use.</p> <p>Identification of alternatives: phenylephrine.</p> <p>Discussion of the specific advantages: both phenylephrine and tropicamide have been shown to be equally effective in the treatment of glaucoma.</p>
	Dorzolamide	<p>Purpose: treatment of glaucoma. Topical use.</p> <p>Identification of alternatives: latanoprost, timolol maleate.</p> <p>Discussion of the specific advantages: its specific mode of action as a carbonic anhydrase inhibitor. Important therapeutic choice.</p>
	Latanoprost	<p>Purpose: treatment of glaucoma. Topical use.</p> <p>Identification of alternatives: dorzolamide, timolol maleate.</p> <p>Discussion of the specific advantages: its specific mode of action as a prostaglandin F<sub>2α</sub>-analogue. Important therapeutic choice.</p>
	Timolol maleate	<p>Purpose: treatment of glaucoma. Topical use.</p> <p>Identification of alternatives: dorzolamide, latanoprost</p> <p>Discussion of the specific advantages: its specific mode of action as a non-selective beta-adrenergic receptor blocking agent, causes vasoconstriction, which in turns leads to decrease of the aqueous humour. Important therapeutic choice.</p>

Indication	Active substance	Justification and explanation of use
	Cyclosporin A	<p>Purpose: immunosuppressive used for the treatment of autoimmune diseases of the eye.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: no alternatives available.</p>
	Ketorolac	<p>Purpose: treatment of eye pain and inflammation, non-steroidal anti-inflammatory medicine, eye drops, topical use.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: widest clinical experience with ketorolac compared to other potential candidates for essential substances.</p>
	Ofloxacin	<p>Purpose: treatment of eye infections resistant to commonly used ophthalmic antibiotic treatments.</p> <p>Identification of alternatives: ciprofloxacin, cefamandole, commonly employed ophthalmic antibiotic treatments</p> <p>Discussion of the specific advantages: widest clinical experience with ofloxacin compared to other potential candidates for essential substances. Compared to commonly employed ophthalmic antibiotic treatments ofloxacin should only be used as a reserve antibiotic in individual cases.</p>
	Fluoresceine	<p>Purpose: diagnostic tool for corneal ulceration, topical use.</p> <p>Identification of alternatives: Rose Bengal.</p> <p>Discussion of the specific advantages: Rose Bengal has some antiviral activity while fluoresceine has no significant effect on virus replication. Thus, the diagnostic use of Rose Bengal prior to viral culture may preclude a positive result. Therefore fluoresceine is the diagnostic tool of choice when a viral culture is planned.</p>
	Rose Bengal	<p>Purpose: diagnostic tool for early corneal damage, topical use.</p> <p>Identification of alternatives: fluoresceine.</p> <p>Discussion of the specific advantages: Rose of Bengal is the diagnostic tool of choice to ascertain very early corneal damage.</p>
	Hydroxypropyl methylcellulose	<p>Purpose: corneal protection, topical use.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: no alternatives available.</p>

### Hyperlipaemia

	Insulin	<p>Purpose: treatment of hyperlipaemia, used in combination with glucose therapy, diagnosis of metabolic disorders.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: no alternatives available.</p>
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Indication	Active substance	Justification and explanation of use
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**Fungal infections**

	Griseofulvin	<p>Purpose: systemic antifungal use. Treatment of ringworm.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: griseofulvin given orally has good activity against trichophyton, microsporum, and epidermophyton.</p>
	Ketoconazole	<p>Purpose: systemic antifungal use. Treatment of fungal pneumonia and guttural pouch mycosis.</p> <p>Identification of alternatives: other azoles such as itraconazole.</p> <p>Discussion of the specific advantages: widest clinical experience with ketoconazole compared to other potential candidates for essential substances.</p>
	Miconazole	<p>Purpose: treatment of fungal infections of the eye.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: topical use on the affected eye, wider antifungal activity and/or lesser irritation than other antifungal agents.</p>
	Nystatin	<p>Purpose: treatment of yeast infections for eyes and genital tract.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: specific activity against yeast infections.</p>

**Miscellaneous**

	Chondroitin sulphate	<p>Purpose: cartilage healing. Chondroprotection. Treatment of arthritis.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: clinical improvement is likely attributable to anti-inflammatory effects, including inhibition of PGE<sub>2</sub> synthesis and inhibition of cytokine release.</p>
	Domperidone	<p>Purpose:agalactia in mares.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: dopamine antagonist and up-regulates prolactin production.</p> <p>Oxytocin is not a suitable alternative because it produces milk letdown as opposed to increasing milk production, which is the aim of domperidone therapy. Additionally, oxytocin is likely to cause abdominal pain if used in large doses.</p>
	Hydroxyethylstarch	<p>Purpose: colloidal volume substitution.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: practical and readily available alternative to blood or plasma.</p>
	Imipramine	<p>Purpose: pharmacologically induced ejaculation in stallions with ejaculatory dysfunction.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: no alternatives available.</p>

Indication	Active substance	Justification and explanation of use
	Thyrotropin releasing hormone	<p>Purpose: diagnostic used for the confirmation of thyroid and pituitary disorders.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: no alternatives available.</p>
	Barium sulphate	<p>Purpose: radiographic contrast agent used for oesophageal and gastrointestinal contrast examinations.</p> <p>Identification of alternatives: none identified.</p> <p>Discussion of the specific advantages: no alternatives available.</p>
	Iohexol	<p>Purpose: radiographic contrast agent used for lower urinary tract studies, arthrography, myelography, sino- or fistulography and dacryocystography.</p> <p>Identification of alternatives: iopamidol.</p> <p>Discussion of the specific advantages: non-ionic low osmolar contrast agent. Both iohexol and iopamidol are equally acceptable.</p>
	Iopamidol	<p>Purpose: radiographic contrast agent used for lower urinary tract studies, arthrography, myelography, sino- or fistulography and dacryocystography.</p> <p>Identification of alternatives: iohexol.</p> <p>Discussion of the specific advantages: non-ionic low osmolar contrast agent used for. Both iohexol and iopamidol are equally acceptable.</p>