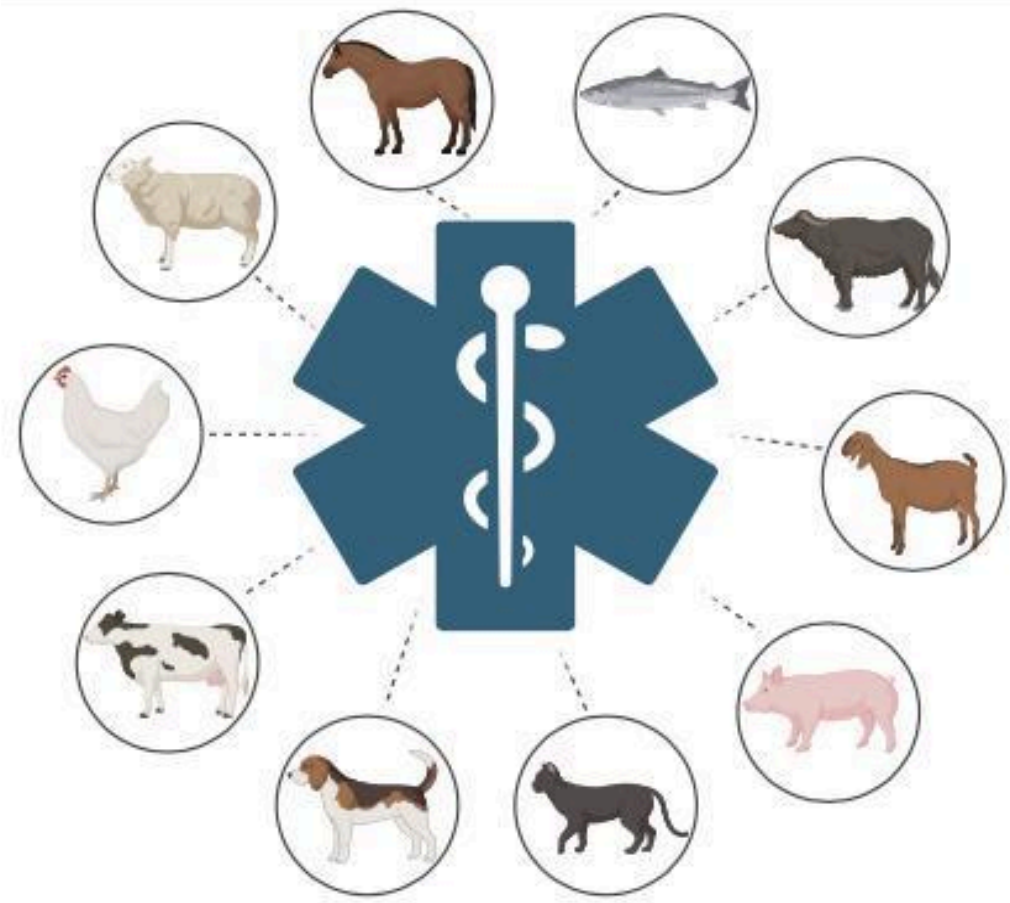
ROYAL GOVERNMENT OF BHUTAN
Ministry of Agriculture and Livestock
Department of Livestock

NATIONAL VETERINARY DRUG FORMULARY



2025 Edition

Website: www.ncah.gov.bt; Email:ncah@moal.gov.bt

Toll free number 1244 for any queries/reporting on livestock and poultry diseases

FOREWORD

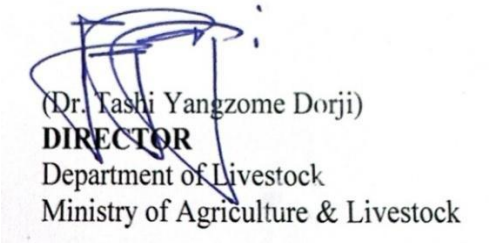
It is with great pleasure that I present the National Drug Formulary, a comprehensive reference designed to guide veterinary professionals and paraprofessionals in the safe, effective, and rational use of medications for the treatment of various clinical conditions. This formulary has been developed to support evidence-based decision-making and promote standardized therapeutic practices across the veterinary field in Bhutan

The document provides detailed information on essential veterinary drugs, including their indications, dosages, administration routes, contraindications, potential adverse effects, and withdrawal periods in food-producing animals. Organized systematically by drug categories, it serves as a quick and reliable resource for veterinarians and paraprofessionals working in both clinical and field settings. Additionally, it aligns with the Essential Veterinary Drug List, ensuring accessibility to critical medications while promoting cost-effective and judicious use of pharmaceuticals.

To enhance field applicability, this formulary also includes guidelines on drug storage, handling, and prescription practices, as well as considerations for antimicrobial stewardship and responsible use of medications to combat antimicrobial resistance. Furthermore, key reference values for physiological parameters such as body temperature, pulse, and respiration rates are incorporated to assist in accurate clinical assessments.

I extend my sincere appreciation to the Department of Livestock, National Center for Animal Health, National Veterinary Hospital, Regional Livestock Development Center, Regional Veterinary Hospital & Epidemiology Centers, Dzongkhag Veterinary Hospitals and College of Natural Resources, and others for their invaluable contributions in compiling and refining this formulary. Their dedication has ensured that this document serves as a practical and authoritative resource for veterinary professionals and paraprofessionals at all levels.

It is my sincere hope that this National Drug Formulary will enhance veterinary healthcare by improving prescribing practices, ensuring better treatment outcomes, and ultimately contributing to the welfare of animals and public health care. Regular updates and reviews will be conducted to keep this formulary aligned with evolving veterinary practices and emerging pharmaceutical advancements.



(Dr. Tashi Yangzome Dorji)
DIRECTOR
Department of Livestock
Ministry of Agriculture & Livestock

ACKNOWLEDGEMENT

The National Center for Animal Health, under the Department of Livestock, would like to express its sincere gratitude to the Fleming Fund project for its generous financial support in reviewing and updating the Veterinary Drug Formulary. This crucial initiative will enhance the accessibility of accurate and up-to-date information on veterinary medicines, including antimicrobials ensuring their safe and effective use in animal health care.

The support from the Fleming Fund phase II has also been instrumental in strengthening antimicrobial resistance surveillance in animal health. Their further support to veterinary pharmaceutical management will also contribute to improved disease control and antimicrobial stewardship in the country. We look forward to continuing collaboration in advancing veterinary health and responsible medicine use.

ACRONYM

ADR	Adverse drug reaction
AEFV	Adverse Event Following Vaccination
q	qua que (every/per)
BID	Bis In Die (Twice daily)
BW	Body Weight
CI	Contraindication
DLO	District Livestock Office
DoFPS	Department of Forest and Park Services
DoL	Department of Livestock
DRA	Drug Regulatory Authority
DVEU	Drugs, Vaccines and Equipment Unit
DVH	District Veterinary Hospital
EVDL	Essential Veterinary Drug List
EVDP	Essential Veterinary Drug Program
HCl	Hydrochloride
IM	Intramuscular
IV	Intravenous
IU	International Unit
LCS	Livestock Central Store
MAH	Market Authorization Holder
MoAL	Ministry of Agriculture and Livestock
NVH	National Veterinary Hospital
NCA	National Centre for Aquaculture
NCAH	National Centre for Animal Health
NPDC	National Poultry Development Centre
NSAID	Non-steroidal Anti-inflammatory Drugs
NVDC	National Veterinary Drug Committee
NVDF	National Veterinary Drug Formulary
OD	Om Ni Die (Once daily)
PO	Per Os (Oral)
QID	Quarter In Die (Four times a day)
RLDC	Regional Livestock Development Centre
RVH & EC	Regional Veterinary Hospital & Epidemiology center
SC	Subcutaneous
TID	Ter In Die (Three times a day)
WCD	Wildlife Conservation Division
WP	Withdrawal period

TABLE OF CONTENTS

I. ANTIMICROBIALS

1. Amoxycillin trihydrate

Indication	Respiratory tract infection, mastitis, UTI, wound infection, calf scour, otitis, hemorrhagic septicemia, metritis	
Presentation	Bolus	1.5 g Bolus
Dosage	Ruminants	11-20mg/kg BW PO BD for 5-7 days
	Dogs/Cat	10-20mg/kg BW PO BID/TID for 5-7days
	Swine	10mg/kg BW PO OD for 5-7 days
AR: Gastrointestinal disturbances and rashes WP: in meat 20days and in milk 96hrs		

2. Amoxycillin + Potassium clavulanate

Indication	Upper respiratory infection, GIT infection, skin and soft tissue, UTI, periodontal diseases.	
Presentation	Tablet	375mg (250mg Amoxicillin + 125mg Potassium clavulanate)
Dosage	Dog	12.5-25mg/kg BW PO BID for 5-7days
	Cat	10-20mg/kg BW PO BID for 5-7days
CI: Patients hypersensitive to beta lactam group of antibiotics ADR: Gastrointestinal disturbances and rashes		

3. Ampicillin

Indication	Cattle/buffalo/horse/sheep/goat/pig/dog/cat: Respiratory tract infection, urinary tract infection, gastro genital, soft tissues and skin infections, otitis, pneumonia, pharyngitis, mastitis, metritis, synovitis.	
Presentation	Injectable & Tablet	500mg/vial or 250mg/tab
Dosage	Dog & Cat	20mg/kg BW SC, IM, IV QID for 5-7days
	Ruminants, Horse & Pig	5-10mg/kg BW SC, IM, IV QID for 3-5 days

Note: Avoid concurrent use with bacteriostatic antibiotics e.g.: Tetracycline chloramphenicol etc. CI: Patients hypersensitive to beta lactam group of antibiotics. Do not use in rabbits, guinea pigs and hamsters. Excreted in milk.

4. Ampicillin + Cloxacillin

Indication	Mixed bacterial infection like mastitis, metritis, septicemia, chronic wound, systemic or local infections, abscesses and enteritis and pneumonia.	
Presentation	Injectable	1gm Ampicillin + 1gm Cloxacillin
Dosage	Dog & Cat	10-20mg/kg BW Sc, IM, IV QID for 5-7days
	Ruminants	10-15mg/kg BW SC, IM, IV QID for 3-5 days
	Swine	10-15mg/kg BW SC, IM, IV QID for 3-5 days
	Equine	10-15mg/kg BW SC, IM, IV QID for 3-5 days
Note: Avoid concurrent use with bacteriostatic antibiotics e.g.: Tetracycline chloramphenicol etc. CI: Patients hypersensitive to beta lactam group of antibiotics		

5. Azithromycin

Indication	*Erysipelas rushiphathy,* respiratory infection (*Psedumonas aeuroginosa*), both systemic and local infection, mild to moderate soft tissue infection, Upper respiratory tract infection, bronchopneumonia, enteritis, metritis, pyodermatitis, Genital and UTI, arthritis, non-tubercular mycobacterial infection.	
Presentation	Injectable / Tablet	100mg/ml or 250mg/tab
Dosage	Dog	5-10mglkg BW OD PO, IM, IV for 3-5days
	Cat	5mg/kg BW PO, IV, IM q.2days or 48 hrs.
	Foal	10mg/kg BW OD PO IM, IV for 3-5days.
	Large ruminant	5mg/kg BW OD PO, IV, IM for 3-5 days
	Small ruminant	5mg/kg BW OD PO, IV, IM for 3-5 days
Note: Administer in empty stomach,		

ADR: Gastrointestinal disturbances and rashes CI: Not used in adult horse (cause severe gastrointestinal upset)

6. Benzathine Penicillin (LA)

Indication	Actinomycosis, anthrax, BQ, tetanus, arthritis, mastitis, metritis, HS, exudative epidermatits, pyodermatitis	
Presentation	Injectable	24,00,000 IU/vial
Dosage	Horse	10,000-40,000 IU/kg BW deep IM q. 48hrs
	Cattle	12,000-40,000 IU/kg BW deep IM alternate day for 3 Dosages.
	Swine	12,000 IU/kg BW deep IM
Note: Avoid in penicillin hypersensitivity patient, deep IM only. WP: Pig: 8 days, cattle: 10 days for meat, 96 hours for milk.		

7. Benzathine Penicillin (SA)

Indication	Actinomycosis, anthrax, BQ, tetanus, arthritis, mastitis, metritis, HS, exudative epidermatitis, rickettsia disease, wound infection, respiratory infection	
Presentation	Injectable	6,00,000 IU/vial
Dosage	Small animal	20,000-40,000 IU/kg BW deep IM OD.
Note: Avoid in animals sensitive to beta lactam antimicrobials, deep IM only. Avoid concurrent use with bacteriostatic antibiotics.		

8. Cefotaxime

Indication	Acute sepsis, respiratory tract infection, genital UTI, severe gastroenteritis (specific gram-negative organism) intra-abdominal infection,	
Presentation	Injectable	1gm/vial
Dosage	Dog/Cat	20-40mg/kg BW IM, IV BID for 5-7days
Note: *Use only after culture and AST.* Use with caution in animals hypersensitive to penicillins. CI: Avoid concomitant with drugs having nephrotoxic effect. Avoid use in animals hypersensitive **We would like to express our deepest gratitude to the following officials for their valuable contributions:**to		

beta lactam antimicrobials.

9. Cephalexin

Indication	Pyoderma, otitis externa, respiratory tract infections, urinary tract infections, gangrenous dermatitis, salmonellosis, coryza and E coli, soft tissue infection	
Presentation	Tablet	250mg/tab or 1.5gm/bolus
Dosage	Dog/Cat	22-30mg/kg BW PO BID for 5-7days
	Horse	25-33mg/kg BW PO QID for 3-5days
	Swine	3-5mg/kg BW PO QID for 3-5 days
	Ruminants	5-10mg/kg BW BID 3-5 days
WP: Cattle: 6 days for meat ADR: Salivation, tachypnea, gastrointestinal disturbances and excitability CI: Avoid use in animals hypersensitive to penicillin		

10. Clindamycin

Indication	Pyoderma, bone and joint infection associated with gram positive, Actinomycosis, Protozoal infection, Toxoplasmosis, infection cause by obligate anaerobes	
Presentation	Tablet	75mg/150mg/tab
Dosage	Dog/Cat	10-15mg/kg BW PO OD for 3-5days
Note: Administer after feed intake. Use with care in animal with hepatic and renal impairment. ADR: GI disturbances may occur in all species. In cats may be associated with esophagitis and esophageal stricture		

11. Doxycycline Hyclate

Indication	for treating infections caused by bacteria, protozoal (ehrlichiosis), rickettsia, Lyme disease in equine, canine heartworm, respiratory disease	
Presentation	Tablet	50mg
Dosage	Dog/Cat	5mg/kg BW OD or 10mg/kg BW BID PO for 5-7 days (3weeks for rickettsia diseases)

	Horse	10mg/kg BW BID PO for 5-7 days.
Note: Administer after feed intake. CI: Do not give with antacid and iron supplements. Do not administer to pregnant animals or if there is evidence of esophagitis or dysphagia. Avoid concurrent use with bactericidal group of antibiotics. ADR: Nausea, vomiting, diarrhea, esophagitis and esophageal ulceration; teeth discoloration in young animals with tooth development stage.		

12. Enrofloxacin

Indication	Acute and chronic mastitis, Respiratory tract infections, Pneumonia, Hemorrhagic septicemia, Black quarter, Pyometra, Gastrointestinal infections, Metritis, joint ill, Urogenital infections, Secondary bacterial infections associated with viral diseases, Otitis, Brucellosis, Salmonellosis, Wooden tongue, Coli septicemia;	
Presentation	Tablet & Injectable	150 mg tablet & 10mg/ml
Dosage	Ruminants	2.5-5mg/kg BW OD PO, IM for 3-5 days
	Cat & Dog	5mg/kg BW OD IM, IV, PO for 5 days
	Equine	5-10mg/kg BW OD IV, PO for 3-5 days
	Swine	7.5mg/kg BW SC OD for 3-5 days
Note: *Use only after culture and AST.* CI: in young animals (arthropathic effect) ADR: Potential cartilage abnormalities in young animals; irreversible retinal blindness in cats; GI distress (vomiting, anorexia); WP: Cattle: Meat – 5 days IV & 12 days SC; milk – 3 days IV & 4 days SC , Pig: 5 days		

13. Gentamicin Sulfate

Indication	Mastitis, metritis, wound infection, urinary tract infection, pyometra, otitis, pneumonia, ocular infection, Baby pig scours, enzootic pneumonia gastro enteritis, mastitis- metritis agalactia (MMA) syndrome.	
Presentation	Injectable & Ointment	40 mg/ml, 0.1%w/w
Dosage	Large Ruminant	5-6mg/kg BW OD IV, IM for 3-5 days

	Equine	4-6.6mg/kg BW OD IM, IV for 3-5 days
	Swine	5mg/kg BW OD IM, SC for 3-5 days
	Cat & Dog	2-4mg/kg BW OD IM, IV for 5 days
Note: Use with extreme caution in patients with preexisting renal disease CI: Contraindicated in pregnant animal as it crosses placental barrier leading to renal impairment and ototoxicity of the fetus AR: Nephrotoxicity; ototoxicity; neuromuscular blockade facial edema		

14. Metronidazole

Indication	Giardiasis, active against obligate anaerobic bacteria, intestinal amebiasis, trichomonas, Balantidium infection.	
Presentation	Injectable	5mg/ml
Dosage	Dog/Cat	Giardiasis: 25mg/kg BW IV, PO BID for 5-7 days
		GIT: 10-15mg/kg BW IV, PO BID for 5-7 days
	Horse	15-25mg/kg BW IV BID for 5-7 days
Note: Avoid usage in animals hypersensitive to nitroimidazole derivatives. Avoid usage in severely debilitated animals, pregnant and nursing animals. Avoid use in large animals as it is carcinogenic. AR: Nausea, vomiting, diarrhea, nervous disorder, depression, salivation and lethargy		

15. Oxytetracycline LA & SA

Indication	Respiratory tract infection, anthrax, bovine anaplasmosis and bacterial infections.	
Presentation	Injectable	200mg/ml & 50mg/ml per vial
Dosage	Large animal	20mg/kg BW IM, IV slow q.48 hrs. for 2-3 Dosage
	Horse	10mg/kg BW IV q. 48 hrs. for 2-3 Dosage
	Dog/Cat	5-10mg/kg BW IM, IV OD for 5-7 days (in rickettsia BID)
CI: Do not administer with RL while giving IV; Last trimester of the pregnancy; concurrent use with antacids containing divalent and trivalent cations ADR: Causes nausea, vomiting, diarrhea, esophagitis; discoloration of teeth and bones;		

hypotension & anorexia

16. Streptomycin

Indication	Cattle/buffalo: Pasteurellosis, salmonellosis, brucellosis, actinomycosis, actinobacillosis, bovine tuberculosis, abortion. Horse: Brucellosis, Glaser's disease, pink eye, poll eve. Sheep/goat: Brucellosis, abortion, erysipelas. Pig: Swine erysipelas, pasteurellosis, enzootic pneumonia. Dog: Leptospirosis, brucellosis.	
Presentation	Injectable	1gm/vial
Dosage	Cattle, Sheep, Goat, Buffalo & Pig	10mg/kg BW IM OD for 3-5days
	Dog	10-25mg/kg BW IM OD for 3-5days
Note: Avoid concurrent use with cephalosporins, cytotoxic drugs and loop diuretics CI: Cats; pregnant animals ADR: nephrotoxic and ototoxic		

17. Strepto-penicillin

Indication	Mix bacterial infection caused by penicillin sensitivity.	
Presentation	Injectable	Streptomycin sulfate 2.5gms Procaine penicillin 15,00000 IU + penicillin sodium 500000 IU
Dosage	Large animal	2ml/50kg BW IM OD for 3-5days
	Small animal	1ml/5kg / 0.02ml/kg BW IM OD for 3-5days
Note: Add 7.5ml of sterile distill water to make 10ml suspension CI: Pregnant animals ADR: Nephrotoxic and ototoxic		

18. Sulphadiazine + Trimethoprim

Indication	Use for Respiratory tract infection, UTI, prostatic infection, protozoal, soft tissue infection, coccidial infection, GIT infection

Presentation	Powder / Tablet	400mg+80mg/gm (Powder), 2gm+400gm (bolus).
Dosage	Dog/Cat	15-30mg/kg BW PO BID for 5-7days
	Cattle	15-30mg/kg BW PO BID for 5-7days
	Horse	24mg/kg BW PO BID for 5-7days
CI: Patients with Kerato-conjunctivitis Sicca (KCS) ADR: GI disturbances; Kerato-conjunctivitis Sicca (KCS) ; Hypersensitive type III reactions; acute hepatitis; cholestasis		

19. Sulphadimidine

Indication	DOC for HS, Intestinal coccidiosis, bacterial enteritis, Pododermatitis, pneumonia	
Presentation	Injectable	33.33%w/v per vial
Dosage	Cattle	100mg/kg BW IV/IM OD for 5-7days (loading dose) 50mg/kg BW IV/IM OD for 5-7days
CI: Patients with Kerato-conjunctivitis Sicca (KCS) ADR: GI disturbances; Kerato-conjunctivitis Sicca (KCS) ; Hypersensitive type III reactions; acute hepatitis; cholestasis WP: Meat 10 days, milk 4 days		

II. ANTHELMINTICS

1. Albendazole

Indication	Effective against gastrointestinal nematodes of ruminants (large/small) and swine.	
Presentation	Tablet	150 mg or 600mg
Dosage	Cattle	10 mg/kg BW PO
	Sheep/Goat	7.5 mg/kg BW PO

	Pig	5-10 mg/kg BW PO
	Horse	Round-worms- 7.5mg/kg BW Lungworm -25mg/kg BW BID PO for 5days
	Dog	25-50 mg/kg BW PO OD 3 days
Note: WP; Cattle- meat 14days, sheep-meat 4days, milk 3 days. Meat 10 days, milk 4days, CI: In early-stage pregnancy (first trimester) and in lactating animals, AR: anorexia, diarrhea, vomiting, sleepiness.		

2. Levamisole + Oxyclozanide

Indication	for treatment and control of roundworms and liver flukes in cattle and sheep, goats.	
Presentation	Suspension	Levamisole 3 % + Oxyclozanide 6 % W/V
Dosage	Cattle	30ml in 100kg BW or 7.5mg/kg BW Levamisole STAT
	Sheep and goat	3ml in 10kg BW STAT
Note: WP; Meat 14days and milk 7days, GIT disturbances, vomiting and diarrhea.		

3. Triclabendazole

Indication	Acute fasciolosis, mixed infestation, arthropods, general deworming.	
Presentation	Tablet	900mg per tab
Dosage	Large ruminant	12mg/kg BW PO STAT
	Small ruminant	10mg/kg BW PO STAT
Note: WP; Cattle 56days in meat and 2days in milk. Adverse effect: urticaria or pruritus. GIT issues.		

4. Fenbendazole

Indication	Ascarid, hookworm, lungworm, tapeworm, whipworm, nodular worm,

	small stomach worms, kidney-worm.	
Presentation	Bolus	1500mg
Dosage	Large animal	5-7.5mg/kg BW PO STAT
	Cat	20mg/kg BW PO OD for 5days
	Dog	50mg/kg BW PO OD for 3 days
Note: Safe in pregnant animal WP: Meat 14-20 days Milk 4days. AR; in long run, it causes bone marrow hypoplasia		

5. Piperazine Citrate

Indication	Roundworms (Toxocarids sp., Hookworms)	
Presentation	Suspension	40% w/v solution
Dosage	Puppies & Kitten	100-200mg/kg BW PO *(1st Dosage 2week of age and repeat after every 2 weeks till they reach 3month old and repeat after every 3month till it reach 9month of age.)*
	Poultry	50mg/bird for <6week of age PO. 100mg/bird for >6week of age PO
	Swine	200-300mg/kg BW PO STAT
Note: Avoid giving Piperazine and pyrantel together, it acts as antagonist. Overdosage may cause emesis. WP; Meat 2 day and egg 1day		

6. Praziquantel

Indication	Dipylidium caninum, tenia pisiformes, meso-cestodes and Echinococcus granulosa. Cestodes of ruminants (e.g., *Moniezia* sp., *Schistosomiasis*)	
Presentation	Tablet	50mg/tab

Dosage	Dog/Cat	5-12mg/kg BW PO STAT
	Cattle	20mg/kg BW PO BID for 2 days for Schistosomiasis 50 mg/kg BW PO BID for 2 days Cysticercosis 5-25mg/kg BW PO STAT Tapeworm
Note: AR: transit hypersalivation in cat, Anorexia, diarrhea, lethargic and vomiting.		

7. Ivermectin

Indication	Sarcoptic, Cheyletid, demodicosis	
Presentation	Injectable/Tablet	10mg/ml or 6mg/tab
Dosage	Dog & Cat	200-400mcg/kg BW SC, PO weekly interval (Sarcoptic) 200-300mcg/kg BW SC, PO weekly interval for 6-8week (Cheyletidillosis) 300-600mcg/kg BW SC, PO OD till scraping for mites is negative. (Demodicosis)
	Cattle	0.2mg/kg BW SC STAT
	Horse	0.2mg/kg BW SC STAT
	Swine	0.2mg/kg BW SC STAT
Note: Do not use it in foal less than 4-month-old and puppies less than 6week old and in dairy animal within 28days after calving. AR: allergic reaction, fever, skin rash, difficulty in breathing, shock and neurotoxicity		

7. Milbemycin Oxime + Afoxolaner

Indication	Generalized Demodicosis, ectoparasitic, Acaricide	
Presentation	Tablet	30mg Milbemycin Oxime + 150mg Afoxolaner 3.75mg Milbemycin Oxime + 18.75mg Afoxolaner 15mg Milbemycin Oxime + 75mg Afoxolaner

Dosage	Dog / cat	0.5-1mg/kg Milbemycin oxime + 2.5-5mg/kg BW Afoxolaner PO OD for 30days
Note: CI in cats, do not use in dogs, less than 2 kg, in dogs under 8 weeks of age.		

8. Praziquantel + Pyrantel pamoate + Febantel

Indication	Tapeworm, roundworm, hookworm and whipworm	
Presentation	Tablet	50mg+144mg+150mg
Dosage	Dog	5mg/kg BW Praziquantel + 14.4mg/kg BW Pyrantel pamoate + 15mg/kg BW Febantel or 1 tablet for 10kg BW PO STAT
	Cat	5mg/kg BW Praziquantel + 14.4mg/kg BW Pyrantel pamoate + 15mg/kg BW Febantel PO STAT
Note: Side effects are rare, but oral forms of praziquantel may cause drooling, drowsiness, loss of appetite, vomiting and diarrhea		

9. Tetramisole

Indication	Mature and immature stage of GIT and pulmonary nematodes and lungworm infestation	
Presentation	Oral powder	30%
Dosage	Cattle, sheep, goat	15mg/kg BW PO STAT
	Poultry	15-20mg/kg BW PO STAT
Note: WP 7days in meat and egg, Milk 48hour.		

III. ECTOPARASITCIDES

1. Deltamethrin

Indication	Ectoparasite Control	
Presentation	Solution	1.25% EC

Dosage	Mites	4ml in 1 Liter of clean water topical application.
	Lice	1ml in 1 Liter of clean water topical application.
	Ticks and Flies	2ml in 1 Liter of clean water topical application.
Note: WP: Milk 0 days and Meat 20 days		

2. Flumethrin

Indication	Ectoparasite	
Presentation	Solution	1% w/v
Dosage	Lice or Mange	1-2ml/10kg BW topically
Note: Administer as indicated by the manufacturer.		

3. Gamma Benzene Hexachloride

Indication	Maggot wound, cut, minor wound, scabies, pediculosis	
Presentation	Ointment	Gamma Benzene 0.1%, Proflavine hemi-sulphate 0.1% Cetrimide 0.45%
Dosage	Topically application	
Note: CI in cat (cause rashes)		

4. Maggoticidal Spray-Gamma-benzene HCl + Proflavine

Indication	Maggot wound, cut, minor wound, scabies, pediculosis	
Presentation	Spray	Gamma Benzene 0.1%, Proflavine hemi-sulphate 0.1% Cetrimide 0.45% (Eucalyptus oil, turpentine oil, neem oil as base)
Dosage	NA	Topically
Note: CI in cat		

5. Propoxer + Camphors + Sulphanilamide (dusting powder)

Indication	Acaricide, maggot wound, myasis, cut, surgical or minor wound.	
Presentation	Powder	Each gram of powder contains Propoxer 20 mg, Camphor 30 mg, Sulphanilamide 50 mg
Dosage	Sprinkle powder covering the wound BID	
Note: Can be used in foot wound in FMD		

IV. ANTIFUNGAL

1. Clotrimazole

Indication	Superficial antifungal, also against gram negative organisms (*Staphylococcus, streptococcus, Gardnerella vaginalis*)	
Presentation	ointment	1% ointment
Dosage	Apply topically on affected area gently BID for 4 weeks.	
Note: NA		

2. Itraconazole

Indication	Aspergillosis, candidiasis, blastomycosis. Coccidiomycosis, cryptococcosis, histoplasmosis and dermatophytosis	
Presentation	Tablet	100mg/tab
Dosage	Dogs/Cat	5mg/kg BW PO OD for 4-20weeks
Note: CI in pregnancy, avoid in patient with hepatic problem ADR: vomiting diarrhea, anorexia, salivation, depression, apathy, abdominal pain, ulcerative dermatitis, edema of limbs		

3. Ketoconazole

Indication	Antifungal

Presentation	Tablet	200mg/tab
Dosage	Dogs	5-10mg/kg BW PO BID or TID till the remission of symptoms
Note: administer after food intake ADR: hepatotoxic, anorexia, vomiting, teratogenic, alteration in hair code color, cataract.		

V. ANTI-PROTOZOAL

1. Diaminazine aceturate

Indication	For the treatment and prophylaxis of Babesiosis, Theileriosis, and mixed haemo-protozoan infections.	
Presentation	Injectable	Each ml contains Diminazene aceturate: 70.0 mg Phenazone BP: 375.0 mg
Dosage	Cattle, sheep, goat	3.5-5 mg/kg BW IM STAT
	Dog and cat	3.5-5 mg/kg BW IM STAT
Note: maximum total Dosage should not exceed 4gram. WP: 2days in milk and 35 days in meat. adverse effect: pain and swelling at injetion site, vomiting and diarrhoea. (Do not give IV)		

2. Buparvaquone

Indication	Theileriosis	
Presentation	Injectable	50mg/ml
Dosage	Cattle, sheep, goat	2-5 mg/kg BW IM
Note Administration by intravenous or subcutaneous route is contraindicated. Not more than 10ml should be injected at the single site. Follow aseptic measure while administration of the drug. Localized, painless, and edematous swelling may be seen at the site of injection		

3. Quinapyramine sulfate + Chloride

Indication	Cattle/buffalo/sheep/goat/pig/dog: Trypanosomiasis; Horse: Surra

Presentation	Injectable	50mg/ml
Dosage	Cattle, sheep, goat	12mg/kg BW IM
	Horse	7-10mg/kg BW IM
Note Administration by intravenous or subcutaneous route is contraindicated. Not more than 10ml should be injected at the single site. Follow aseptic measure while administration of the drug. Localized, painless, and edematous swelling may be seen at the site of injection		

VI. ANTI-COCCIDIAL

1. Amprolium + Sulfaquinoxaline

Indication	Early and effective control of intestinal and cecal coccidiosis in poultry. *E. tenella, E. necatrix and E. acervulina*	
Presentation	Powder	Amprolium 100 g + Sulfaquinoxaline 100 g + Vitamin K3 2g
Dosage	Please refer as indicated by manufacturer	
Note: WP: 28days in meat and 7days in egg. CI: hypersensitivity patient. (for poultry use only)		

2. Diaveridine + S'Quinoxaline

Indication	Control of intestinal and cecal coccidiosis in poultry.	
Presentation	Powder	Diaveridine 3.3 % W/W + S'Quinoxaline 18.7% W/W
Dosage	Please refer as indicated by manufacturer	
Note: WP: 28days in meat and 7days in egg. CI: hypersensitivity patient. (for poultry use only)		

VII. EXTERNAL OINTMENT

1. Gamma Benzene Hexachloride

Indication	Maggot infestation, follicular mange	
Presentation	Ointment	Gamma benzene hexachloride 0.1%, proflavine hemisulfate 0.1 %, and cetrimide 0.45% , 100g tube
Dosage	Please refer as indicated by manufacturer	
Note: Avoid licking of the compound as its highly toxic		

2. Gentamicin Ointment

Indication	Indicated in treatment of bacterial infection of surgical or traumatic origin, superficial wounds, burns, ulcers	
Presentation	Ointment	0.1% w/w, 100 g tube
Dosage	Please refer as indicated by manufacturer	
Note: NA		

3. Neomycin Ointment

Indication	Indicated in treatment of bacterial infection of surgical or traumatic origin, superficial wounds, burns, ulcers	
Presentation	Ointment	0.1% w/w, 100 g tube
Dosage	Please refer as indicated by manufacturer	
Note: NA		

VIII. RUMENOTORIC / STOMACHIC

1. Antimony Pot. Tartrate + FeSo4 + CuSo4 + Cobalt chloride

Indication	Rumeno-toric to improve ruminal stasis.	
Presentation	Bolus	Antimony Pot. Tartrate 2g + FeSo4 2g + CuSo4 50mg + Cobalt chloride 100mg
Dosage	Sheep & goat	1-2boli OD PO for 2-4days
	Cattle & Buffalo	2-4boli OD PO for 2-4days
Note: NA		

2. Rumenotoric / stomachic powder

Indication	Rumenotoric.	
Presentation	Powder	Herbal Powder
Dosage	Please refer as indicated by manufacturer	
Note: NA		

IX. ANTACID

1. Aluminum Hydroxide

Indication	Ruminal-stasis due to grain overload, bloat.	
Presentation	Suspension	Dried aluminum hydroxide 25 0mg + Dimethyl polysiloxane 40 mg + Magnesium hydroxide 250 mg in each 5 ml
Dosage	Please refer as indicated by manufacturer	
Note: Avoid administration with tetracycline, fluroquinolones, and digoxin within 2hrs orally.		

2. Omeprazole

Indication	Gastric and duodenum ulcers, esophagitis,	
Presentation	Injectable	Omeprazole sodium 42.6 mg/vial or 20 or 40mg/tab
Dosage	Dog	0.5-1-5mg/kg IV, PO OD maximum for 8 weeks
	Cat	0.75-1mg/kg BW IV, PO OD maximum for 8 weeks
Note: If administered for more than 8 weeks, it may lead to hypergastrinemia, which can result in carcinoid. ADR: Nausea, diarrhea, constipation, and skin issues		

3. Pantoprazole

Indication	Gastric and duodenum ulcers, esophagitis, Helicobacter pylori eradication	
Presentation	Injectable	40mg/vial
Dosage	Dog/cat	0.7-1mg/kg OD
Note: Administer strict IV. ADR: Diarrhea, nausea, constipation and skin rashes		

4. Ranitidine

Indication	Gastric and duodenum ulcers, esophagitis, Uremic or drug related erupted gastritis, mast cell neoplasia.	
Presentation	Injectable	25 mg/ml
Dosage	Dogs	2mg/kg BW IM, IV, SC BID SOS
	Cat	2.5mg/kg BW IV BID SOS 3.5mg/kg BW PO BID SOS
	Horse	- 2.2 6.6/kg BW IV, IM TID SOS - 6.6-10mg/kg BW PO TID SOS
Note: Administer slow IV, when used with metoclopramide, a gap of at least 2 hours should be		

maintained between Dosages. CI: Avoid administering in pregnant, lactating animals, in renal and hepatic diseases ADR: Cardiac arrhythmia in hypotension especially when administered rapid IV.

X. ANTI-BLOAT

1. Anti-bloat Herbal powder

Indication	Anti-bloat (gaseous bloat)	
Presentation	Powder	Herbal
Dosage	Please refer as indicated by manufacturer	
Note: NA		

2. Simethicone

Indication	Anti-bloat mostly for frothy bloat.	
Presentation	Suspension	10% w/v (200ml bottle)
Dosage		
Note: NA		

XI. ANTIDIARRHEAL

1. Loperamide

Indication	Management of non-specific acute and chronic diarrhea, irritable bowel syndrome.	
Presentation	Tablet	2 mg tab
Dosage	Dog/Cat	0.04-0.2mg/kg BW PO TID or BID
Note: CI: Contraindicated in breeds including collie breeds, Australian shepherds, Old English sheepdogs,		

longhaired whippets, and Shetland sheepdogs. Do not use in pregnant or lactating animals. Do not use it in intestinal obstruction. in dogs, if sensitive to ivermectin. ADR: constipation and excitation in cat

2. Metronidazole + Loperamide

Indication	For amoebiasis and giardiasis. Effective against trichomoniasis, enterocolitis, ulcerative gingivitis, helicobacter pylori infections, bacterial infections after surgery, brain abscess, endocarditis and Balantidium infection in Swine.	
Presentation	Boli	1000 mg+7.5 mg/tab
Dosage	Large animal	3-4 boli OD PO for 3-5days
	Small animal	1-2 boli OD PO for 3-5days
Note: Do not use it in bloody diarrhea. ADR: diarrhea and dyscariasis and CNS disorders.		

XII. LAXATIVE

1. Dioctyl sodium sulfosuccinate

Indication	Used as surfactant and stool softener.	
Presentation	Tube	20 mg/ml
Dosage	Dog	- 20-100mg total Dosage PO OD/ BID OR - 20-30ml of 2% solution mixed with 10ml of water per-rectal
	Cat	- 50mg PO OD/ BID OR - 4ml of 2% solution mixed with 50ml of water per-rectal
Note: Avoid using along with mineral oil. CI; in intestinal obstruction, ADR: is seen while using along with mineral oil.		

2. Ispaghula (Psyllium) husk

Indication	use in management of impacted anal sac, diarrhea, constipation, sand colic in horse.	
Presentation	Powder	100% pure
Dosage	Dog	15-30gm or 1-2 table spoons PO STAT
	Cat	7.5-15gm or ½ -1 table spoon PO STAT
	Horse	1gm/kg BW PO BID for 3-7days
Note: CI: Bowel obstruction ADR: if given in excess it will cause diarrhea and bloating		

3. Liquid Paraffin suspension

Indication	Constipation, fecal impaction and to lubricate GIT also treat KCS, treat in frothy bloat. for fur ball	
Presentation	Suspension	IP 450 ml
Dosage	Dogs	10-15ml PO - for constipation
	Cattle & Horse	3-4 liter per 450kg BW
	Sheep & goat	200-300ml per animal
Note: Adverse reaction; might cause lipoidal pneumonia due to aspiration		

XIII. ANTISPASMODIC

1. Dicyclomine hydrochloride

Indication	Rapid relief of all types of muscle spasms, colic, prolapse and as a pain relief in ROP, especially in the gastrointestinal (GI), urinary, and respiratory systems

Presentation	Injectable	10 mg/ml
Dosage	Large animal	0.5mg/kg BW IM STAT
	Small animal	10mg total Dosage BW IM STAT
Note: NA		

XIV. HEPTATONIC

1. Ursodeoxycholic acid

Indication	Adjunctive therapy for patients with liver disease especially where cholestasis is present.	
Presentation	Tablet, Suspension	150mg tablet, 50mg /ml
Dosage	Dog	15 - 20 mg/kg po with food q 24hrs
	Cat	15 - 20 mg/kg po with food q 24hrs
Note: Avoid concurrent use with aluminium containing antacids		

2. S- Adenosylmethionine (SAMe)

Indication	Adjunctive therapy for patients with liver disease especially for acute hepatotoxin induced liver disease, osteoarthritis and cognitive dysfunction	
Presentation	Tablet, Suspension	50 mg, 100 mg, 200mg, 400mg
Dosage	Dog	20 mg/kg po with food q 24hrs
	Cat	20 mg/kg po with food q 24hrs
Note: ADR: Vomiting, nausea, diarrhoea, dry mouth, headache, sweating and dizziness		

3. Liver tonic powder

Indication	Liver dysfunction, hepatitis, jaundice, general liver health, digestive disorders, indigestion and bloat	
Presentation	Powder	Herbal
Dosage	Please refer as indicated by manufacturer	
Note: NA		

XV. METABOLIC ACIDOSIS

1. Sodium Bicarbonate

Indication	Metabolic acidosis	
Presentation	Injectable, Suspension	7.5% solution W/V
Dosage	All species	mEQ of NaHCO3 = 0.3*BW*base deficit *(base deficit-mild=5, moderate=10 severe=15)* IV, PO SOS
Note: 1ml of 7.5% w/v solution supplies 1mEQ NaHCO3. it should be diluted with only NS.		

XVI. REPRODUCTIVE DRUGS/ I/UTERINE PREPARATION

1. Nitrofurazone + Urea + Metronidazole bolus

Indication	Mixed infection by bacterial and parasite, Metritis, pyometra, vaginitis, retention of fetal membrane	
Presentation	Bolus	60 mg + 6g +1000mg bolus
Dosage	Intra-uterine and Dosage as indicated by manufacturer	
Note: NA		

2. Uterine tonic powder

Indication	Metritis, pyometra, vaginitis, retention of fetal membrane	
Presentation	Powder	Herbal
Dosage	Please refer as indicated by manufacturer	
Note: NA		

3. Sodium carboxymethyl cellulose

Indication	Obstetric condition such as dystocia, vaginal examination and general lubrication	
Presentation	Powder	99% carboxymethyl cellulose.
Dosage	2% solution f	
Note: NA		

XVII. Minerals

1. Calcium gluconate

Indication	Cattle/buffalo/sheep/goat/horse/pig/dog/cat: Hypocalcemia, rickets, osteomalacia, osteoporosis, Lead and fluoride poisoning, tympany, acid indigestion.	
Presentation	Injectable	10% calcium gluconate
Dosage	Dog	50-150mg/kg BW over 2—30 mins IV
	Cat	95-140mg/kg BW over 20-30 mins IV
	Cattle, Horse, Sheep, Goat, Pig	150- 250mg/kg IV slow
Note: If bradycardia develops, halt the infusion.		

CI: Contraindicated in animals with ventricular fibrillations and hypercalcemia.

2. Butaphosphan + Cyanocobalamin

Indication	Low productivity, ketosis, infertility, puerperal diseases, hepatic dysfunction, supportive therapy.	
Presentation	Injectable	Butaphosphan 100 mg + Cyanocobalamin 50 mcg per ml
Dosage	*Refer the product inserts*	
Note: NA		

3. Iron Dextran

Indication	Iron dextran is used in the treatment and prophylaxis of iron deficiency anemia primarily.	
Presentation	Injectable	Iron dextran 50mg/ml, 2ml ampoule
Dosage	Pig	1 – 3 days of age: 100 – 150 mg of elemental iron IM > 3days of age: 100-200 mg of elemental iron IM
	Dog	For iron deficiency anemia - Iron dextran 10 – 20 mg/kg once IM, followed by oral therapy.
	Cat	Chronic renal failure: 50mg/cat IM every 3-4 wks in conjunction with erythropoietin.
Note: Avoid concurrent use of chloramphenicol and antacid and advice the owner to avoid egg and milk as they decrease its bio availability.		

4. Yeast extract+Ferrous sulphate+Copper sulphate+Vit B+Lactic acid

Indication	Anorexia, microbial imbalance, simple indigestion, ruminal acidosis, ruminal stasis.	
Presentation	Bolus	Each bolus contains Lactobacillus sporogenes 2 million CFU, Lactobacillus boulardii 1 million CFU, Lactobacillus acidophilus 1.5 million CFU, Live Yeast culture 3g, Ginger

		powder 100mg, Liver extract 5mg, DL Methionine 100mg, L- Lysine 170mg, Amylase 1500 FCCU, Cellulose 3500 CMCU, Xylanase 2000FCCU, Papain 1500 FCCU
Dosage	Refer product inserts	
Note: NA		

5. Mineral supplement

Indication	Mineral deficiency disorders like impaired digestion and assimilation, retarded growth and muscular dysfunction. For faster growth, improved fertility, higher productivity.	
Presentation	Bolus	Per kg of mineral mixture contains Vit A 2000,000 IU, Vit D3 11600 IU, Vit E 800 IU, Vit B2 1200IU, Vit B12 1600mcg, Vit B6 240 mg, Vit K 160mg, Folic acid 40mg, Niacinamide 5.28 g, Calcium pantothenate 1760 mg, Choline chloride 600mg, L-methionine 8g, L-lysine 4g L- Tryptophan. 1kg packet.,
Dosage	Refer product inserts	
Note: NA		

XVIII. OPHTHALMIC DRUGS

1. Chloramphenicol Eye aplicap

Indication	Ocular Bacterial infection	
Presentation	Applicap	Each applicap contains 1% w/w Chloramphenicol, 100 capsules/jar
Dosage	Apply topically on the conjunctival sac/eye QID q 5 days	

Note: NA

2. Ciprofloxacin eye/ear drops

Indication	Ocular Bacterial infection	
Presentation	Applicap	Each applicap contains 1% w/w Chloramphenicol, 100 capsules/jar
Dosage	Apply 2-3 drops TID/QID q 5-7 days	
Note: NA		

3. Patented Hyaluronic acid + amino acids + bio salts eye drop

Indication	Dry, irritated and other ocular conditions which requires lubrication and hydration of eye	
Presentation	Eye drops/ ointment	Hyaluronic acid (0.4%), Glycine (0.1%), Proline (0.075%), Leucine (0.01%), Lysine (0.01%), Bio salts (Sodium chloride, Disodium Phosphate, Potassium Chloride, Potassium Phosphate), 5ml vial (125 drops)
Dosage	Dog	Instill 1 drop twice daily
	Cat	Instill 1 drop twice daily
Note: Should be stored at room temperature		

4. Ketorolac

Indication	Anterior Uveitis and ulcerative keratitis where topical steroids are contraindicated	
Presentation	Eye drops/ ointment	0.5% drops in 5ml bottle
Dosage	Dog	1 drop per eye q 6 -24 hrs depending upon the severity of the inflammation

	Cat	1 drop per eye q 6 -24 hrs depending upon the severity of the inflammation
Note: ADR: May cause local irritation		

5. Cyclosporine eye drop

Indication	Ocular Bacterial infection	
Presentation	Applicap	Each applicap contains 1% w/w Chloramphenicol, 100 capsules/jar
Dosage	Apply 2-3 drops TID/QID q 5-7 days	
Note: NA		

XIX. MULTIVITAMIN

1. B-complex Liver extract

Indication	Non-specific anorexia, liver disorders, debility and general weakness, eczema, during convalescence from diseases, parasitic anemia, growth and development of young animals, GIT & neurological disorders.	
Presentation	Injectable	*Thiamine HCl I.P 10mg +ribfalvin I.P 3mg + Niacinamide I.P 100mg+ vitamin B12 I.P 10mcg + Liver Injectable crude I.P 0.66ml (having Vitamin B12 activity equivallent to 2mcg opf cynocobalamin per ml)*
Dosage	Please refer as indicated by manufacturer	
Note: NA		

2. Methylcobalamin + Vit B6 (Neurovet/Neuroxin)

Indication	Liver disorders like fatty liver degeneration and hepatitis. Neurological disorders Debility and exhaustion. Anorexia, Fatigue.

Presentation	Injectable	Methylcobalamin 500 mcg + Vit B6 50 mg + Nicotinamide 50 mg per ml
Dosage	Please refer as indicated by manufacturer	
Note: NA		

3. Vitamin A

Indication	Hypovitaminosis, conjunction therapy, sebaceous adenitis or primary seborrhea	
Presentation	Injectable	600,000 IU in 2 ml
Dosage	Dogs	10,000-100,000 IU IM q.3days - Hypovitaminosis 10,000 IU per dog OD PO- dermatological.
	Cat	10,000-100,000 IU IM q.3days - Hypovitaminosis
	Cattle	66,000 IU/kg BW OD STAT
	Sheep & Goat	45,000 IU/kg BW OD STAT
Note: No more than 2 Dosages should be given		

4. Vitamin K

Indication	Hypoprothrombinemia induced by ingestion of coumarin-based compounds, common ingredients in commercial rodenticides, coagulation disorders,	
Presentation	Injectable	10 mg vit K (Phytomenadione) per ml
Dosage	Dog	Coumarin toxicity - 2.5-5mg/kg BW SC in several sites then reduce to 1-2.5mg/kg in divided Dosages PO BID/TID for 5-7days Liver diseases - 0.5-1mg/kg SC BID STAT (Pre-biopsy)

	Cat	Coumarin toxicity same as Dog Liver diseases - 1mg/kg SC BID STAT (Pre-biopsy)
Note: Avoid giving IV AR: Anaphylactic reactions following IV administration. Hemolytic anemia in cats when overdosage.		

XX. INFUSION FLUIDS

Refer annexure for the fluid dose calculation

1. Calcium, Magnesium, Phosphorous & Dextrose

Indication	Milk fever, hypomagnesaemia (grass tetany), hypophosphatemia or hypoglycaemia (ketosis), post-parturient hemoglobinuria and neuromuscular disorders	
Presentation	Injectable	Ca borogluconate 25 %, Mg hypophosphite 5%, and dextrose monohydrate 10%, 450 ml
Dosage	Cattle, Buffalo, Horse	200 to 500 ml IV, SC
	Sheep & Goat	50-125ml IV, SC
	Dog	10-30ml IV, SC
	Cat	5-15ml IV, SC
Note: Before intravenous injection, the solution should be warmed to body temperature and must be administered slowly to avoid possible coronary depression (heart block). Before intravenous injection, the solution should be warmed to body temperature and must be administered slowly to avoid possible coronary depression (heart block).		

2. Dextrose

Indication	Dextrose infusion is indicated in bovine ketosis, hypoglycemia, weakness, cachexia and in conditions in which oral feeding is impossible. Amount and rate of infusion depends on the severity of the condition. (*Choice of fluid for Anorexia and hypoglycemia)*	
Presentation	Injectable	Each ml contains 0.5gm of dextrose. Each ml contains 0.2gm of dextrose. Each 100 ml contains Anhydrous Dextrose 5g, 500ml

<table>
<tr><td>Dosage</td><td>All Species</td><td>50% Dextrose, 0.5 -1 ml/kg BW diluted in normal saline (1:2-1:4) over IV 5–10 minutes.
50% Dextrose, 0.5 -1 ml/kg diluted in normal saline (1:2-1:4) over IV 5–10 minutes.
<table>
<tr><th>Final dextrose concentration required in saline solution</th><th>Volume of 50% dextrose Required (ml)</th><th>Volume of 0.9% saline required (ml)</th></tr>
<tr><td>25%</td><td>250</td><td>250</td></tr>
<tr><td>10%</td><td>100</td><td>400</td></tr>
<tr><td>5%</td><td>50</td><td>450</td></tr>
<tr><td>2.5%</td><td>25</td><td>475</td></tr>
</table>
*Best made up in a 500 ml bottle of 0.9% saline; remove volume of dextrose to be added; then add the 50% dextrose and mix well before setting up the CRI.</td></tr>
<tr><td colspan="3">Note:
Precaution: Hypertonic solution (10% or 25%) may result in phlebitis so administer only via peripheral veins (e.g. cephalic or jugular) in emergency situations and flush with adequate amounts of saline.</td></tr>
</table>

3. Dextrose Sodium Chloride (DNS)

<table>
<tr><td>Indication</td><td colspan="2">Indicated in hypoglycemia complicated with dehydration/fluid loss due to infectious diseases, trauma, surgery, burns, debility etc. in which oral supplementation is impossible.
(Choice of fluid for Anorexia and hypoglycemia)</td></tr>
<tr><td>Presentation</td><td>Injectable</td><td>Each 100 ml contains Sodium chloride-0.9g, Anhydrous Glucose-0.5g, 500ml</td></tr>
<tr><td rowspan="4">Dosage
(Amount and rate of infusion depends on the severity of the condition. The following are the recommended maintenance fluid rates)</td><td>Large animal</td><td>50ml/kg BW OD IV</td></tr>
<tr><td>Small animal</td><td>60ml/kg BW OD IV</td></tr>
<tr><td>Dog</td><td>2-6mg/kg/hr OD IV</td></tr>
<tr><td>Cat</td><td>2-3mg/kg/hr OD IV</td></tr>
<tr><td colspan="3">Note: In case of increased fluid loss due to various conditions, the maintenance rate should be increased by 15-20ml/kg/day for necessary replacement of lost fluid
Before IV injection the solution should be warmed to body temperature. Do not use if solution is not clear.
Dextrose containing infusion must be used with care in diabetic patients.
In general, it is preferable to add 2.5 to 5% glucose to a non-alkalinizing fluid type (RL) and</td></tr>
</table>

administer a slightly hypertonic solution than to administer isotonic dextrose by itself.

4. Sodium Chloride

Indication	Indicated to restore circulatory volume; replacement of fluid and electrolyte in dehydration, shock, fluid loss due to vomiting, diarrhea, hemorrhage. (*Choice of fluid for Vomiting and Urinary tract obstruction)*	
Presentation	Injectable	Each 100 ml contains NaCl 90 mg, 500ml
Dosage	Large animal	Generally-100-150ml/kg BW OD Maintenance- 60-80ml/kg BW OD
	Horse	Fluid resuscitation-10-20ml/kg BW (*repeat if animal is not stabilized)* Maintenance- 40-60ml/kg BW OD
	Dog	Fluid resuscitation- 15-20ml/kg BW for 15-30 mins (*Check for CRT, heart rate and repeat if animal is not stabilized.)* Total shock dose shouldn't exceed 60-90ml/kg BW Maintenance- 60ml/kg BW OD During anesthesia- 5-10ml/kg BW per hrs.
	Cat	Fluid resuscitation- 5-10ml/kg BW for 15-30 mins (*Check for CRT, heart rate and repeat if animal is not stabilized.)* Total shock dose shouldn't exceed 45-60ml/kg BW Maintenance- 40ml/kg BW OD During anesthesia- 5-10ml/kg BW per hrs.
Note**:** *In case of increased fluid loss due to various conditions, the maintenance rate should be increased by 15-20ml/kg/day for necessary replacement of lost fluid* Before IV injection the solution should be warmed to body temperature. Do not use if solution is not clear.		

5. Ringers Lactate

Indication	Indicated to restore circulatory volume; replacement of fluid and electrolyte in dehydration, shock, fluid loss due to vomiting, diarrhea, hemorrhage. (*Choice of fluid for Diarrhoea)*

Presentation	Injectable	Each 100 ml contains Dextrose 29 g, NaCl 0.6 g, KCl 0.04 g, CaCl 0.027 g, Na lactate 0.312 g, 500ml
Dosage	Large animal	Generally-100-150ml/kg BW OD Maintenance- 60-80ml/kg BW OD
	Horse	Fluid resuscitation-10-20ml/kg BW (*repeat if animal is not stabilized)* Maintenance- 40-60ml/kg BW OD
	Dog	Fluid resuscitation- 15-20ml/kg BW for 15-30 mins (*Check for CRT, heart rate and repeat if animal is not stabilized.)* Total shock dose shouldn't exceed 60-90ml/kg BW Maintenance- 60ml/kg BW OD During anesthesia- 5-10ml/kg BW per hrs.
	Cat	Fluid resuscitation- 5-10ml/kg BW for 15-30 mins (*Check for CRT, heart rate and repeat if animal is not stabilized.)* Total shock dose shouldn't exceed 45-60ml/kg BW Maintenance- 40ml/kg BW OD During anesthesia- 5-10ml/kg BW per hrs.
Note**:** *In case of increased fluid loss due to various conditions, the maintenance rate should be increased by 15-20ml/kg/day for necessary replacement of lost fluid* Before IV injection the solution should be warmed to body temperature. Do not use if solution is not clear.		

6. Amino acid solution

Indication	Indicated to restore circulatory volume; replacement of fluid and electrolyte in dehydration, shock, fluid loss due to vomiting, diarrhea, hemorrhage.	
Presentation	Solution or suspension	L-isolucine 0.5 gm, leucine 0.74 g, lysine acetate 0.931 g, kysine 0.66 g, Methionine 0.44 g, Phenylalanine 0.51 g, Threonine 0.44 g, Tryptophan 0.2 g, Valine 0.62 g, Arginine 1.2 g, Histidine 0.3 g, alanine 1.4 g, Glycine 1.1 g, Proline 1.12 g, Serine 0.65 g, Tyrosine 0.02=4 g, Taurine 0.1 g
Dosage	Administer as the manufactures indicate	
Note**:** ***NA***		

XXI. ANTISEPTIC / DISINFECTANT

1. Boric acid

Indication	Antifungal, antibacterial, and insecticidal properties. eye wash and wound cleaning	
Presentation	Powder	Pure Pharmaceutical grade
Dosage	0.25% w/v in clean water for washing of wounds and eyes.	
Note: Toxic if ingested in large amounts – Can cause nausea and kidney damage. Avoid direct skin and eye contact in high concentrations.		

2. Cetrimide + Chlorhexidine solution

Indication	General antiseptic, ineffective against bacterial spores, have variable antifungal activity, and are effective against some viruses. It is used for the cleaning and disinfecting of wounds as an antiseptic treatment for burns.	
Presentation	Solution	Cetrimide 15% + Chlorhexidine gluconate 7.5%
Dosage	Tropical antiseptic solution, dilute as directed by manufacturer's direction	
Note: Do not mix with detergents or other chemicals, should not be used in the eye, intravenously, orally, in the auditory canal (especially perforated eardrums) or near meninges, brain or spinal cord, should not be used in body cavities or as an enema, should not be used in preoperative skin preparations for the face and head, for the disinfection of soft contact lenses. AR: Skin irritation, may cause burns and ulceration in cats,		

3. Formaldehyde solution

Indication	Used as disinfectants and have potent germicidal properties against all organisms, including spores, however, premises where they are used as disinfectants (e.g., piggeries and poultry farms) must be vacated.	
Presentation	Solution	37-40% solution

Dosage	1%–10% (1 ml in 99 ml water) solution of formaldehyde is commonly used as a disinfectant. Formalin at 10% concentration effectively fixes and preserves tissues and therefore is used to preserve organ samples for histopathologic examination and to preserve cadavers for dissection. To eliminate ovine foot-rot: use 4% formaldehyde footbath.
Note: Flammable and highly toxic, proper ventilation should be in place to decrease formalin vapor concentration in work spaces. AR: Exposure to formaldehyde can irritate the skin, throat, lungs, and eyes. Repeated exposure to formaldehyde can possibly lead to cancer.	

4. Glutaraldehyde Derivatives

Indication	Used as a disinfectant, they have potent germicidal properties against all organisms, including spores, used to sterilize surgical and endoscopic instruments, as well as plastic and rubber apparatus.	
Presentation	Solution	Each 100 ml contains Glutaraldehyde 7.0 g Dihydroxy, Diohexane 9.5 g, polymethy1 urea 16.23 g
Dosage	500 mL in 50 L of water (1%) (5ml in 500ml water) and wet surfaces with mob or low-pressure sprayers.	
Note: while using as disinfectants, piggeries and poultry farms must be vacated, AR: Irritate the skin, throat, lungs, and eyes. Repeated exposure to formaldehyde can possibly lead to cancer.		

5. Hydrogen peroxide

Indication	Tropical antiseptic and cleansing agent (disinfacant) for minor cuts, abrasions and wounds. Reacts with the catalase present on wound surfaces, helps remove pus and cellular debris from wounds, infected tissue, limited to the superficial layer of the applied surface, to eliminate Salmonella and E coli from the hospital setting.	
Presentation	Solution	H2O2 3% USP
Dosage	Tropical antiseptic solution, dilute as directed by manufacturer's direction	

Note: Do not use deep or puncture wounds or serious burns. AR: Irritate the skin.

6. Potassium permanganate (Crystal)

Indication	General antiseptic, ineffective against bacterial spores. It is used for the cleaning and disinfecting of wounds as an antiseptic treatment for burns, udder wash and shed disinfectant in combination with formalin.	
Presentation	Powder	450gm
Dosage	Tropical antiseptic solution, dilute as directed by manufacturer's direction	
Note: AR: Skin irritation, dryness of the skin Caution: will stain clothing, fabrics and ceramic basins.		

7. Povidone Iodine

Indication	Tropical antimicrobial agent, widely used as a preoperative scrub on surgeons' hands and patients' skin, effective against bacteria, viruses, and fungi but less effective against spores; they remain active even in the presence of organic matter, used in teat dips to control mastitis, as dairy sanitizers, and as a general antiseptic or disinfectant for various dermal and mucosal infections, cleansing agent for minor cuts, abrasions and wounds.	
Presentation	Solution	5% solution, 100ml
Dosage	Tropical antiseptic solution, dilute as directed by manufacturer's direction	
Note: AR: Irritating and drying effects; concurrent use with emollients may alleviate the drying effects; Systemic absorption may cause renal and thyroid dysfunction. Contraindication: Repeated exposure to iodophors can result in dermatitis. They may also be corrosive to metals. Animals with hypersensitivity to iodine; thyroid diseases; renal failure; burns covering large surfaces pregnancy; lactating animals and deep wounds. Cautions: Povidone iodine stains skin, hairs and fabrics; use gloves while handling Povidone iodine or wash hands after use; avoid pooling of Povidone iodine over the wound and contact with eyes		

8. Rectified spirit

Indication	Germicidal, used as disinfectant, as rubbing alcohol: especially after cleansing with a chlorhexidine- or iodine-based scrub, to disinfect the skin before surgery. If applied immediately after a dog or cat bite, it is very effective at preventing bacterial infection. Ethanol is more effective than isopropanol against calicivirus	
Presentation	Solution	90% alcohol, 450ml
Dosage	Tropical: 70% as rubbing alcohol, 70% ethanol 90% ethanol is required for control of methicillin-resistant Staphylococcus aureus (MRSA).	
Note: Contraindication: Repeated exposure causes dryness of skin. Caution: Taken orally, concentrated alcohols are lethal.		

9. Copper Sulphate

Indication	Astringent, Antiseptic, Fungicidal, Algacidal, Molluscicidal, Caustic & Hemostatic.	
Presentation	Powder	450 gm net
Dosage	● For wounds and ulcers: 0.1-5% antiseptic solution. Foot Bath: 5-10% solution twice daily for prevention and treatment of foot rot in sheep and cattle. Prevention of post-dipping lameness in sheep: 0.03% solution is added to the dipping bath. ● Combination with iron-sulphate and zinc sulphate to form a dressing in case of canker of the horse foot (0.5:1:1) respectively. ● For proliferative dermatitis, excessive granulation tissues, non-parasitic eczema and dermatosis: 0.1-2%. Caustic powder to warts. ● Skin ulcerative wounds and necrotic lesions: Remove dead tissues and debris firstly, then dust at concentration of 5 ppm twice a day. ● Foot lesions in FMD cases: wash with disinfectant solution, then apply a mixture of copper sulphate and tar (1:100) respectively.	

Note: Toxic, strong irritant to skin and mucous membranes.

10. Sulphanilamde powder

Indication	To treat sulphanilamide - sensitive organisms, notably streptococcal septicemia; equine pneumonia, strangles, joint-ill, metritis in mares, cows and ewes. Sulphanilamide Powder is also used as a dusting powder for wounds by topical application.	
Presentation	Powder	450gm pkt
Dosage	Sprinkle powder covering the wound BID	
Note: Can be used in foot wound in FMD		

11. Zinc oxide powder

Indication	Encourages the healing of superficial wounds and has soothing effects, used as disinfectant	
Presentation	Powder	450gm pkt
Dosage	Topical antiseptic as directed by manufacturer's direction	
Note: Caution: For external use only, for application to the skin (do not apply to open wounds)		

12. Zinc sulphate anhydrous

Indication	Encourages the healing of superficial wounds and has soothing effects, used as disinfectant	
Presentation	Powder	500gm pkt
Dosage	Topical antiseptic as directed by manufacturer's direction	
Note: Caution: For external use only, for application to the skin (do not apply to open wounds)		

13. Salicylic acid

Indication	Antimicrobial and antipruritic (anti-itching) agent used in the treatment of seborrheic (dry or greasy dandruff) disorders in cats, dogs, and other animals. treats for wart.	
Presentation	Powder	450mg/pkt
Dosage	Compound: Topically use 12% w/w with petroleum-based as ointment for wart and antiseptic ointment	
Note: peeling/burning/dry/reddened skin may occur		

14. Tincture Benzoin Compound solution

Indication	Used on minor skin sores and wounds to protect the area from irritation and infection. Benzoic is also used on canker sore in and around the mouth to protect them so they can heal. Benzoin is also used to help relieve and soothe minor irritation of the nose, throat, and airways	
Presentation	Solution	70-77 % Alcohol
Dosage	Topical antiseptic as directed by manufacturer's direction	
Note: Do not use it on direct wound AR: cause Mild irritation, burning, or redness of the skin may occur		

XXII. DIURETICS

1. Mannitol

Indication	reduction of Cerebrospinal fluid and intraocular fluid pressure	
Presentation	Injectable	20% solution or 200mg/ml
Dosage	Dog/Cat	Intracranial Pressure: 0.25g/kg BW IV of 20% solution over 30-60min. repeat after 4-8hours. Glaucoma: 1-2g/kg IV infusion over 30min (withhold water for the first few hr. after administering.
Note: Must not exceed total Dosage of 2g/kg BW. Do not use in patient with anuria, constipation, intracranial hemorrhage and severe CHF AR: Fluid loss (dehydration), Electrolyte imbalances (e.g., abnormally low or high levels of		

potassium, sodium or calcium in the blood), Nausea, Vomiting, Pulmonary edema, Dizziness, Headache, Heart disorders

2. Furesemide

indication	Edema caused by heart failure, CHF,	
Formulations	Injectable/Tab	50mg/ml or 20mg/tab
dosage	Dog	2-4mg/kg BW IM, IV, SC, PO BID till signs subsides
	Cat	0.5-2mg/kg BW IM, IV, SC, PO BID till signs subsides
	Pig	5 mg/kg BW PO, IM, IV BID SOS.
	Horse and cattle	1-2 mg/kg BW PO, IM, IV BID SOS
Note: Do not use in patient with anuria, constipation, intracranial hemorrhage and severe CHF ADR: Fluid loss (dehydration), Electrolyte imbalances (e.g., abnormally low or high levels of potassium, sodium or calcium in the blood), Nausea, Vomiting, Pulmonary edema, Dizziness, Headache, Heart disorders		

3. Acetazolamide

Indication	Treatment of acute and chronic glaucoma in dogs, Cavalier King Charles Spaniel episodic falling syndrome (CKCS)	
Dosage	Tab	250mg/tab
dosage	Dogs	Glucomma5-10mg/kg BW IV single Dosage or 4-8mg/kg PO TID/BID CKCS - 4-8mg/kg PO OD
Note: CI: in Cats, avoid in anorexia dogs and those with hepatic and renal dysfunction AR: Weakness, GI disturbances, diarrhea, anorexia, vomiting, metabolic acidosis, electrolytes disturbances		

XXIII. EXPECTORANT / BRONCHODILATOR

1. Theophylline

indication	Bronchodilation or treatment of small airway diseases, enhance muco-ciliary clearing.	
Dosage from	tablet	100mg or 200mg/Tab
Dosage	Dog	15-20mg/kg BW PO BID/TID
	Cat	10mg/kg BW PO OD.
ADR: vomiting, diarrhea, polydipsia, polyuria, reduce appetite, tachycardia, arrythmia, nausea, excitement.		

2. Salbutamol

Indication	Treatment of bronchospasm in inflammatory airway disease and irritation	
Presentation	Suspension/ Inhaler	
Dosage	Do	0.1-0.3mg/dog TID PO or as inhaler
	Cat	0.1mg/cat TID PO or as inhaler
ADR: Tachycardia, arrythmia, muscle cramp, shivering and agitation.		

XXIV. ANALGESIC

1. Methadone

Indication	Management of moderate to severe pain during perioperative period	
Presentation	Injectable	Butorphanol 10 mg/ml
Dosage	Dog	0.1–0.5 mg/kg BW, IM 0.1-0.3 mg/kg, IV
	Cat	0.1–0.6 mg/kg BW, IM, slow IV, SC

Note: ADR: Respiratory depression, Bradycardia, Lip Licking, Vocalization, Hypersalivation, vocalization, excitation, panting, hypothermia (dogs), hyperthermia (cats), involuntary defecation and urination. C: Avoid in Pregnant and lactating animals P: Avoid direct contact with body surfaces while handling with the medicine

2. Fentanyl

Indication	Intraoperative analgesia	
Presentation	Injectable	Fentanyl 50mcg/ml
Dosage	Dog	Intraoperative analgesia: 1- 5 mcg/kg IV q 20min Anesthesia: 2.5 - 10mcg/kg/h CRI Post operative period: 1 -5 mcg/kg/h Transdermal: 4 mcg/kg/h
	Cat	Intraoperative analgesia: 5 mcg/kg bolus iv q 20min Anesthesia: 2.5 - 10mcg/kg/h CRI Transdermal: 25 mcg/h for 3-5kg, 12.5 mcg/h for kittens
ADR: Severe bradycardia		

3. Butorphanol Tartrate

Indication	Horse: For relief of pain associated with colic of gastrointestinal tract origin. For sedation in combination with certain α2-adrenoceptor agonists Dog: For relief of moderate visceral pain. For sedation in combination with certain α2-adrenoceptor agonists Cat: For the relief of moderate pain associated with soft tissue surgery.	
Presentation	Injectable	Butorphanol 10 mg (equivalent to butorphanol tartrate 14.6 mg)
Dosage	Dog	0.2–0.4 mg/kg BW, IM or SC BID/TID
	Cat	0.1–0.2 mg/kg BW, IV; 0.2–0.4 mg/kg, IM, SC TID/QID
	Horse	0.05–0.1 mg/kg BW IV, IM, SC
Note: Intended for use where short duration analgesia is required.		

4. Carprofen

Indication	Relief pain and inflammation.	
Presentation	Tablet	25 mg tablet
Dosage	Dog	2.2 mg/kg BW PO BID 4.4 mg/kg BW PO OD
	Cat	2 mg/kg BW PO single Dosage
CI in dogs with bleeding disorder; use with caution in geriatric patients. More than single administration causes vomiting in cats.		

5. Flunixin Meglumine

Indication	Pyrexia and inflammation related to Metritis, Mastitis, Endotoxemia (Septicemia), and Pneumonia.	
Presentation	Injectable	Flunixin Meglumine – 83 mg (equivalent to Flunixin 50 mg)
Dosage	Horse	1.1 mg/kg BW IV OD 3 days
	Cattle	1.1-2.2 mg/kg BW IM OD 3days
	Pig	1-2 mg/kg BW IM OD 3 days
CI in animals with preexisting GI ulcers, renal or hepatic disease.		

6. Meloxicam

Indication	Symptomatic treatment of osteoarthritis, postoperative pain and inflammation associated with surgery.	
Presentation	Injectable	Meloxicam
Dosage	Dog	0.2 mg/kg BW IV, IM, SC on first day of treatment, subsequent Dosage 0.1 mg/kg PO OD 3 days

	Cat	0.2 mg/kg BW SC stat or 0.2 mg/kg BW IV, IM, SC on first day of treatment, subsequent Dosage 0.1 mg/kg PO OD 3 days
Note		

XXV. ANTI-CONVULSANT / MUSCLE RELAXANT

1. Diazepam

Indication	Anticonvulsant, anxiolytic and muscle relaxant	
Presentation	Injectable	Diazepam: 5mg/ml
Dosage	Dogs	Anxiolytic: 0.5 - 2 mg/kg. po. TID Skeletal Muscle relaxant: 2-10mg/dog PO TID Anticonvulsant: 0.5 - 1 mg/kg BW SOS
	Cats	Anxiolytic: 0.2 - 0.4mg/kg BW PO TID Skeletal Muscle relaxant: 0.5-1 mg/kg BW IV STAT Anticonvulsant: 0.5 - 1 mg/kg BW IV or intrarectally.
Note: Avoid in patients with CNS depression, Respiratory depression, hepatic impairment or severe muscle weakness. IV infusion must be given slowly i.e. 5mg over 1min. ADR: Muscle weakness and ataxia. Rapid iv infusion will cause marked paradoxical excitation (including aggression) and elicits signs of pain.		

2. Levetiracetam

Indication	Anticonvulsant, anxiolytic and management of epileptic seizure	
Presentation	Tablet	500mg/tab
Dosage	Dogs	20mg/kg BW PO TID
	Cats	10-20mg/kg BW PO TID
Note: Avoid in patients with CNS depression, Respiratory depression, hepatic impairment or severe muscle weakness.		

ADR: Overdose may cause agitation, aggression, somnolence, decrease level of consciousness.

3. Phenobarbitone sodium

Indication	Management of epileptic seizures	
Presentation	Tablet	30mg/tab
Dosage	Dog or Cat	0.5 - 1 ml IM SOS Total dose
Note: Overdose may cause CNS and respiratory depression which may progress to areflexia, constriction of pupils to slight degree, oliguria, tachycardia, hypotension, lowered body temperature and coma.		

XXVI. ANTI-EMETIC

1. Micropitant Citrate

Indication	Prevention of nausea induced by chemotherapy, motion sickness, prevention and treatment of vomiting.	
Presentation	Tablets & Injectable	16mg/tab, 24mg/tab, 60mg/tab & 10mg/ml
Dosage	Dogs	Acute Vomiting: 2-7 months old: 2mg/kg BW PO OD up to 5 consecutive days 7 months and above: 2mg/kg BW PO until the symptoms resolve. 2-4 months of Age: 1mg/kg BW SC OD for up to 5 consecutive days. 4 months of age and older: 1mg/kg BW IV, SC for up to 5 consecutive days Motion sickness: 4 months and older: 8mg/kg BW for 2 consecutive days
	Cats	4 months of age and older: 1 mg/kg BW IV over 1-2 mins or SC up to 5 consecutive days
Note: prolonged usage causes skin sensitization, ocular irritant, avoid usage in pups ADR; lethargy, hypersalivation, vocalization upon Injectable, dyspnea, ataxia, fever, recumbency,		

panting, convulsion and muscle tremor.

2. Metoclopramide

Indication	Antiemetic	
Presentation	Injectable	5mg/ml
Dosage	Dog	0.25 - 0.5 mg/kg BW PO, SC, IV BID
	Cat	0.25 - 0.5 mg/kg BW PO, SC, IV BID
	Horse	0.125-0.25mg/kg diluted in 500ml of NS IV in 60min
Note: CI; Epileptic patients, GI obstruction and GI perforated patients ADR; Depression, nervousness, restlessness, sedation and extrapyramidal effects. Cats may exhibit frenzied behavior or signs of disorientation.		

3. Ondansetron

Indication	Management of nausea and vomiting	
Presentation	Tablet & Injectable	2mg/ml
Dosage	Dog/cat	0.5mg/kg BW IV 0.5 - 1 mg/kg BW PO BID/TID
Note: CI; Patients with intestinal obstruction AR; Constipation		

XXVII. CARDIAC STIMULANT

1. Adrenaline

Indication	Cardiac resuscitation, anaphylaxis	
Presentation	Injectable	1mg/ml
Dosage	Dog	20 mcg/kg BW of a 1:1000 solution (1000mcg/ml) diluted to 5-10 ml in normal saline, IV or

		intraosseous
	Cat	20 mcg/kg of a 1:10,000 solution (100mcg/ml) diluted to 5-10 ml in normal saline IV or intraosseous, intratracheal
Note: During cardiac resuscitation, repeated or higher Dosages up to 100 mcg may be required at the intervals of 2-5min ADR; increased myocardial oxygen demand and produces arrhythmias, dry mouth, cold extremities and necrosis on Injectable site.		

2. Atropine sulphate

Indication	Prevent or correct bradycardia and bradyarrhythmia, dilate pupils for ocular examinations, management of organophosphate and carbamate toxicities.	
Presentation	Injectable	1mg/ml
Dosage	Dogs/cats	Bradyarrhythmia: 0.01 - 0.03 mg/kg BW IV repeated Dosages, 0.03 - 0.04 mg/kg BW IM to prevent bradycardia while using opioids. Organophosphate poisoning: 0.2 - 0,5mg/kg BW (¼ Dosage iv, ¾ Dosage IV or SC)
Note: CI; Glaucoma, lens luxation, Keratoconjunctivitis sicca ADR: Tachycardia, mydriasis causing blurred vision and drying of bronchial secretions.		

XXVIII. CARDIACTONIC

1. Pimobendan

Indication	Management of congestive heart failure	
Presentation	Capsules	2.5mg/capsule, 5mg/capsule
Dosage	Dog/cat	0.1-0.3mg/kg po. q12 hrs, one hr before food
Note: CI: Patients with hypertrophic cardiomyopathy		

ADR; Vomiting

XXIX. RESPIRATORY STIMULANT

1. Doxapram

Indication	Management of nausea and vomiting	
Presentation	Tablet & Injectable	2mg/ml
Dosage	Dog/cat	0.5mg/kg BW IV 0.5 - 1 mg/kg BW PO BID, TID
Note: CI; Patients with intestinal obstruction ADR; Constipation		

XXX. HEMOSTAT

1. Adenochrome monosemicarbaxone

Indication	Hemostat	
Presentation	Injectable	5mg/ml
Dosage	Small animal	5-10mg IM (Total dose)
	Large animals	20-25mg IM (Total dose)
Note: Administered strictly through IM		

2. Hemocoagulase

Indication	Hemostat	
Presentation	Injectable	Haemocoagulase 1 IU + NaCL IP 0.9% per ml
Dosage	All species	0.5 - 1ml Total dose IM SOS

Note: NA

3. Etamsylate BP

Indication	Hemostat	
Presentation	Injectable	125mg/ ml
Dosage	All species	5-12.5mg/kg BW QID can be repeated until desired effect is reached
Note: for prevention of surgical bleeding (must administer 30 mins before surgery) WP; meat after IV- 0day or IM- 1 day		

XXXI. EMETIC

1. Apomorphine

Indication	To induce emesis after ingestion of toxic, non - caustic foreign material.	
Presentation	Injectable & Tablet	3mg/ml & 3mg/tab
Dosage	Dogs	20 - 40 mcg/kg BW PO, SC, IM
CI; Avoid induction of emesis if strong acid or alkali has been ingested or if the ingesta contains paraffin, petroleum products or oily or volatile products has been ingested, avoid in unconscious animals or reduced cough reflex or if the poison has been ingested for more than 2 hours. ADR: respiratory depression and sedation		

2. Ropinirole

Indication	Induce emesis	
Presentation	Ophthalmic solution	30mg/ ml
Dosage	Dogs	2.7 - 5.4 mg/m2, repeat the dosage of emesis is not achieved after 20 mins.

Body weight in kilograms	Body weight in pounds	Total number of eye drops	Example administration
1.8 - 5	4 - 11.1	1	1 drop into either left or right eye
5.1 - 10	11.2 - 22.1	2	1 drop each eye
10.1 - 20	22.2 - 44.1	3	2 drops in one eye and 1 drop in the other eye
20.1 - 35	44.2 - 77.2	4	2 drops in each eye
35.1 - 60	77.3 - 132.3	6	An initial dose of 2 drops in each eye, followed 2 minutes later by 1 drop in each eye
60.1 - 100	132.4 - 220.5	8	An initial dose of 2 drops in each eye, followed 2 minutes later by 2 drops in each eye

Note: Wear gloves or protective eye wear to prevent accidental exposure.
CI; Do not use in dogs with CNS depression or seizures, patients who has ingested sharp foreign body, corrosive agents, volatile substances or organic solvents. Do not use it in animals with corneal ulcers, ocular irritations or injuries.
ADR: Vomiting, diarrhea, temporary eye irritation/itchiness, increased tear production, lethargy, blepharospasm, tachycardia, hyperventilation, incoordination, reduced appetite.

XXXII. ANTI-NEOPLASTIC

1. Vincristine Sulphate

Indication	Canine or feline neoplastic diseases	
Formulation	Injectable	1mg/vail, 2mg/vail
Dosage	Dogs/ cats	TVT; 0.025 mg/kg BW IV, q 7 days for 4 weeks Other neoplastic diseases; 0.5 - 0.75 mg/m2 IV
Note: Vincristine is a cytotoxic drug, wear gloves while handling the drug. Should be administered strictly through IV ADR; Peripheral neuropathy, constipation, local irritation		

2. Toceranib

Indication	Non resectable grade 2 and grade 3 recurrent cutaneous mast cell tumor., Mammary tumor, soft tissue sarcomas, multiple myelomas, melanomas,

	other carcinomas	
Presentation	Tablet	10mg, 15mg, 50mg
Dosage	Dogs	2.5 - 3.25 mg/kg BW PO q 48h
Note: Stop treatment if there are any signs of GI hemorrhage CI; Do Not use in pregnant or lactating bitches, in dogs less than 2 years old, in dogs weighing less than 3 kg. ADR; Weight loss, Diarrhea, vomiting, anorexia, lethargy, myelosuppression, lameness, musculoskeletal disorders		

XXXIII. PSYCHOTROPIC DRUG

i. Chlorpromazine HCl

Indication	For pre-medication in anesthesia, sedation, control of nausea and vomiting and colic in horses. It can also be used as preoperative medication and tranquilizer. As an antiemetic, chlorpromazine will inhibit apomorphine induced emesis in the dog but not the cat.	
Presentation	Injectable & Tablet	100mg/tab
Dosage	Dog	Antiemetic - 0.5 mg/kg IV, IM or SC three to four times daily Sedative - 3 mg/kg PO q12h or 0.5 mg/kg IM or IV q12h Pre-anesthetic - 1.1 mg/kg IM 1 – 1.5 hours prior to surgery Muscle relaxant - 2 mg/kg IM twice daily (during tetanus) Treatment for amphetamine toxicosis - 10 – 18 mg/kg IV
	Cat	Antiemetic - 0.5 mg/kg IV, IM or SC three to four times daily Sedative/restraining - 3 mg/kg PO OD or 0.5 mg/kg IM or IV OD Pre-anesthetic - 1.1 mg/kg IM 1 – 1.5 hours prior to surgery
	Cattle	Premedication for standing procedures - 1 mg/kg IM

	Pig	Premedication - 1 mg/kg IM Restraint - 1.1mg/kg IM Pre-anesthetic to barbiturate - 2 – 4 mg/kg IM
	Sheep & Goat	0.55 – 4.4 mg/kg IV or 2.2 – 6.6 mg/kg IM
Note: Not recommended for use in horses. Use strictly by IV in rabbits. CI: Patients with shock and strychnine poisoning. IV injections must be diluted with saline to concentrations of no more than 1 mg/ml and administered slowly.		

XXXIV. ANTIHISTAMINE

1. Chlorpheniramine maleate

Indication	Reduce histamine mediated adverse effect; treatment of pruritus; Allergic reactions with acute respiratory signs, rhinitis, eczema, insect bite & asthma.	
Presentation	Injectable & Tablet	10mg/ml & 4 mg tablet
Dosage	Dog	4-8 mg (Total dose) PO, IM BID
	Cat	2-4 mg (Total dose) PO, IM BID
	Large animal	30-50 mg (Total dose) PO, IM BID
Note: CNS depression, GI effect (diarrhea, vomiting, anorexia)		

XXXV. STERIOD

1. Dexamethasone

Indication	An anti-inflammatory and anti-allergic agent in horses, cattle, dogs and cats, and for the treatment of primary ketosis in cattle. The product can also be used to induce parturition in cattle.	
Presentation	Injectable	4 mg/ml
Dosage	Dog	0.25-1 mg IV, IM

	Cat	0.125-0.5 mg IV, IM
	Horse	2-5 mg IV, IM
	Cattle	5-20 mg IV IM
Note: If using for therapy use as little as possible for as short an amount of time as possible. CI demodectic mange, AE-Gastrointestinal bleeding, colon perforation in dog.		

2. Prednisolone

Indication	Prednisolone crystalline suspension is used as a supportive treatment in ketosis, rheumatoid arthritis, bursitis inflammatory and allergic conditions in large and small animals.	
Presentation	Injectable & Tablet	10mg/ml & 5 mg tablet
Dosage	Cattle	5-20 ml IM
	Calves	2.5-5 ml IM
	Piglet	1-3 ml IM
	Dog/Cat	0.5 – 2mg/kg IV,IM,PO q 12-24 hrs
CI: Pregnant animals, patient with renal disease and diabetes mellitus ADR: Vomiting, diarrhea, GI ulceration, prolonged cause may cause adrenal atrophy causing iatrogenic hyperadrenocorticism		

XXXVI. CHEMICAL DRUGS/ NON-PATENT DRUGS

1. Alum Pure

Indication	Antiseptic on external wounds and also used as one of the constituents in preparation of eye lotion (ZAB): 5% solution as an antiseptic externally on wounds in Foot and Mouth Disease. Also applied topically to certain animal skin conditions to reduce infection.	
Presentation	Powder	450 gm/Pkt.

Dosage	As indicated by the manufacturer
Note: NA	

2. Benzoic acid powder

Indication	Treatment of dermatomycosis (ringworm), fungistatic and keratolytic activity. Benzoic acid may help to acidify urine, which can be useful in preventing urinary tract infections and the formation of certain types of urinary stones in animals, particularly in dogs and cats. It can also be used in topical applications for treating minor fungal or bacterial infections in animals, such as skin conditions	
Presentation	Powder	450 gm pkt
Dosage	As indicated by the manufacturer	
Note: Its application should always be carefully managed due to potential toxicity in higher Dosages.		

3. Glycerine (IP minimum 98% purity)

Indication	Treatment of bovine ketosis and pregnancy toxemia, preservation of FMD samples, lubricant in probes and probing, tracheal tube, sweetening agent for mixture, electuaries, laxatives and as enema. Also, as a laxative and digestive aid particularly in dogs and cats, to relieve constipation.	
Presentation	Liquid	450 ml/Bottle
Dosage	Large ruminant	350 ml-500ml
	Small ruminant	100-150 ml
	Dog	15 ml
	Equine	300 ml
Note: Overuse of glycerine as a laxative (in oral or rectal form) can cause dehydration, diarrhea, and electrolyte imbalances.		

4. Hexamine Powder

Indication	Urinary antiseptic in infection of the urinary tract such as nephritis and cystitis: Composition of urinary antiseptic in herbivores.	
Presentation	Powder	400 gm/pkt
Dosage	Large ruminant	Hexamine: 4-8 g, Sodium Acid Phosphate: 30 g PO
Note: Sodium acid phosphate is to be given 4 hrs. before the administration of hexamine in herbivores, this is because hexamine has no action in alkaline urine, so Sodium acid phosphate is added to acidify the urine of herbivores. CI: Hepatic dysfunction; renal parenchymal infection; severe dehydration and metabolic acidosis.		

5. Petroleum Jelly (WSF)

Indication	It is used as a lubricant, stomach tube, protect minor cuts, abrasions and burns.	
Presentation	Liquid	450 gm/Jar
Dosage	As indicated by the manufacturer	
Note: GIT or discomfort if licked.		

6. Sodium Acid Phosphate

Indication	To prevent post-parturient haemoglobinuria, Pica, to improve milk production, conception rate, enhance protein synthesis and recovery from milk fever. Also used along with the hexamine as a urinary antiseptic (Buffer to help maintain the acid-base balance in the body).	
Presentation	Powder	450 gm/Pkt.
Dosage	As indicated by the manufacturer.	
Note: NA		

7. Turpentine Oil

Indication	Turpentine has antiseptic, analgesic, and rubefacient properties. It is applied to the skin for joint pain, muscle pain, nerve pain, as a counter irritant to remove fly larvae from wounds, as an antiseptic and disinfectant to debride severe wounds infested with fly larvae.	
Presentation	Liquid	1000ml/Bottle
Dosage	As indicated by the manufacturer	
CL; It can be toxic if ingested in large amounts.		

XXXVII. HORMONES

1. Buserelin acetate

Indication	Treatment of follicular cysts Early post-partum oestrus cycle induction Improvement of conception rate post artificial insemination Synchronization of oestrus	
Presentation	Injectable	Buserelin 0.004 mg/ml
Dosage	Cattle	2.5-5 ml IM
	Mare	10 ml IM
Note: 5 ml IM-Fertility disorder of ovarian origin, early post-partum oestrus cycle induction; 2.5 ml-Improvement of conception rate post artificial insemination, Synchronization of oestrus.		

2. FSH (Follitropin)

Indication	For the induction of superovulation in beef and dairy heifers and cows.	
Presentation	Injectable	700 IU FSH/vial as a lyophilized powder.
Dosage		Reconstitute FOLLTROPIN with 20 mL of the diluent provided using strict aseptic technique. Do not use if clumps or particles are visible after gentle mixing.

		Regimen: ● Start Injectables on day 8 to 10 following observed or induced estrus. ● Administer 2.5 mL (87.5 IU*) of FOLLTROPIN intramuscularly, twice daily at 12hour intervals, for 4 consecutive days. ● In conjunction with the 6th Dosage of FOLLTROPIN, administer an FDA-approved prostaglandin product (cloprostenol sodium or dinoprost tromethamine) for cattle, using the labeled dosage and administration instructions to cause luteolysis and induce estrus. Inseminate animals at 12 and 24 hours after the onset of estrus or 60 and 72 hours after prostaglandin treatment. Additional inseminations may be conducted at 12-hour intervals, if indicated. Collection of embryos is normally started on day 7 following insemination.
Note: Not for use in male cattle or reproductively immature heifers because safety and effectiveness have not been tested.		

3. Oestradiol benzoate

Indication	Treatment of reproductive disorders like anoestrus & sub oestrus. Synchronisation of oestrus. To stimulate uterine expulsion of retained placenta and mummified fetus.	
Presentation	Injectable	Oestradiol Benzoate 1 mg/ml
Dosage	Cattle/Mare	2 ml IM total dose
	Dog	1-3mg PO OD or 0.5-1mg IM total dose
Note: Polydipsia, polyuria, GI upsets, and suppression of red cell production are some of the side effects. Chronic use may lead to hypogonadism and cystic ovary in females.		

4. Oxytocin

Indication	To support delivery in case of primary and secondary depression of contractions

	and to accelerate the expulsive phase of delivery. During the puerperal period: depression of uterine muscle contractility: To stimulate involution in case of placenta retention and exometra (the product is administered immediately after delivery or caesarotomy and two to four hours later), to remove the pathological contents of uterus, endometritis, pyometra. Agalactia in consequence of milk production disorder in all target species. To remove residual milk and toxic material from the udder after delivery and during the treatment of infectious mastitis in cows.	
Presentation	Injectable	5.0 IU
Dosage	Cattle	20– 40 IU (IM, SC) 2.5 – 10 IU (IV)
	Mare	10 – 20 IU (IM, SC) 0.5 – 2.5 IU (IV)
	Sows	10 – 30 IU (IM, SC) 0.5 – 2.5 IU (IV)
	Sheep/Goat	10 – 20 IU (IM, SC) 0.5 – 2.5 IU (IV)
	Bitches	2 – 10 IU (IM, SC), 0.5 IU (IV)
Note: Store in a refrigerator (2°C – 8°C). The product may be applied intramuscularly (IM), subcutaneously (SC) or intravenously (IV). For the intravenous infusion the product may be diluted with physiological solution or 5 % glucose solution.		

5. PG (Estrumate)

Indication	Estrus Synchronization Treatment of non-detected estrus associated with a functioning of persistent corpus luteum, chronic endometritis/pyometra and treatment of ovarian luteal cysts Induction of parturition. Termination of pregnancy.	
Presentation	Injectable	Each ml contains 263 mcg of Cloprostenol sodium, equivalent to 250 mcg cloprostenol
Dosage	Cattle	2 ml by Intra muscular route

Note: Do not store above 25°C

6. PG 600

Indication	Induction of fertile estrus (heat) in healthy prepuberal (non-cycling) gilts over five and one-half months of age and weighing at least 85 kg. Induction of estrus in healthy weaned sows experiencing delayed return to estrus.	
Presentation	Injectable	400IU PMSG + 200IU HCG
Dosage	Sows/gilt	One Dosage (5 mL) of reconstituted P.G. 600, containing 400 IU serum gonadotropin (PMSG) and 200 IU chorionic gonadotropin (HCG), should be injected into the gilt or sow's neck behind the ear.
Note: Store at 2-8°C		

7. Prostaglandin F2 alpha (Natural)

Indication	For synchronization of heat, embryo transfer, for therapy of cystic corpus luteum, chronic metritis, pyometra, & for induction of parturition & abortion	
Presentation	Injectable	5mg/ml
Dosage	Cattle & Buffalo	Heat synchronization: 25 mg. Two injections 11 days apart between 5th and 18th day of oestrus cycle Induction of heat: 25 mg between 5^{th} and 18^{th} day and a second dose may be administered in non-responders after 11 days. Treatment of chronic metritis, pyometra, induction of abortion after 2nd month of pregnancy, and cystic corpus luteum: 25 mg
	Sheep	Heat synchronization: 5 to 20 mg. Non responders may be again treated on the 6th day. Induction of lambing: 20 mg after 140^{th} day of pregnancy
	Mare	To induce heat: 3 to 5 mg

	Pig	Induction of farrowing after 113th day of pregnancy: 25 mg IM or 5 to 10 mg IM on two days & labor starts approximately 27 hours from last treatment.
	Dog	For abortion: 20 mcg/kg from day 33 - 53 of gestation every 8 hours or 30 mcg/kg every 12 hours for 72 hours (total dose 180 mcg/kg) results in abortion within 56 - 80 hours after the treatment begins, the bitches should be hospitalized and food withheld 24 hours before starting the treatment. In pseudopregnancy: 0.5 mg/kg
	Cats	For abortion: 0.5 mg/kg during 3rd trimester of pregnancy results in abortion after 24 hours of treatment.
Note: Do not use in pregnant animals unless indication is for abortion. Non steroid anti-inflammatory agents like indomethacin should not be used simultaneously. It must not be administered IV.		

8. Hydroxyprogesterone Caproate

Indication	Threatened abortion, habitual abortion, repeat breeding caused due to failure of implantation (nidation) of zygote in uterus associated with progesterone deficiency, Induction of estrus, Prolapse of uterus due to higher level of estrogen, supportive therapy in Cystic Ovarian Disease	
Presentation	Injectable	250mg/ml
Dosage	Cattle & Buffalo	500 mg IM after $1^{1/2}$ month of pregnancy. To be repeated at every 10days interval for 4-5 times. Habitual abortions in mid or late pregnancy: 500 mg IM for 3 days. To be repeated every week for 3 weeks Induction of oestrus in post-partum anoestrus condition: 500 mg IM. To be repeated after 10 days if female does not come in heat or oestrus. Repeat breeders with weak corpus luteum: 250 mg IM after insemination followed at weekly interval for 3 weeks Prolapse of uterus due to pronounced heat: 500 mg IM. To be repeated on the 3rd day if necessary. Habitual pronounced estrus: 500 mg IM to be given at the beginning of oestrus.

		Post-partum prolapses of uterus: 500 mg IM on alternate days for three times followed by weekly for three weeks. Antepartum prolapse of uterus: 500 mg IM every two days for three times. Cystic Ovarian Disease: 500 mg IM
Note: Prolonged exogenous progesterone administrations may cause uterine glandular hyperplasia, accumulation of fluids in uterus and may lead to endometritis		

XXXVIII. ANESTHETIC AGENT

1. Guaifenesin powder

Indication	Guaifenesin is used in combination with Xylazine and Ketamine for maintenance anesthesia in equine (commonly referred as 'Triple Drip').	
Presentation	Powder	Guaifenesin 99%, 5kg bag.
Dosage	Equine	Anesthetic Protocol Induction: 1. Xylazine 1.1 mg/kg BW IV 2. Ketamine 2.2 mg/kg BW IV Maintenance: 1. Dissolve Guaifenesin 100 mg/kg BW in 500 ml Ringer's Lactate warmed to body temperature for complete dissolution. Add Xylazine 1.1 mg/kg BW and Ketamine 2.2 mg/kg BW to the Guaifenesin solution. Administer 100 ml as bolus Dosage and then administer drop by drop with continuous monitoring of vital parameters.
Note:		

2. Isoflurane

Indication	General anesthesia for clinical examination and surgical procedures (It has some distinct advantages over either halothane or methoxyflurane due to lessened myocardial depressant and catecholamine sensitizing effects, and ability to use it safely in animals with either hepatic or renal disease)	
Presentation	Injectable	100ml
Dosage	Dog & Cat	Induction-5% inhalation Maintanence-1.5-2.5% inhalation

Note: It is contraindicated in patients with a history or predilection towards malignant hyperthermia. Hypotension, respiratory depression and GI affects are some of the reported adverse effects which are dose dependent.

3. Ketamine

Indication	Induction & Maintenance of anesthesia	
Presentation	Injectable	50 mg/ml; 100 mg/ml
Dosage	Dog	2–5 mg/kg IV 5–10 mg/kg IM (in very uncooperative dogs)
	Cat	2–10 mg/kg IV 10–20 mg/kg IM
	Horse	2.2 mg/kg BW
Note: Dosing for combination-Ketamine 5 mg/kg BW IV & Diazepam 0.25 mg/kg BW IV.		

4. Lignocaine

Indication	Local Anesthetic, Regional nerve block.	
Presentation	Injectable	20 mg/ml
Dosage	Dog & Cat	Epidural- 1ml per 22kg BW
	Cattle & Horse	Epidural- 5-15ml total dose Nerve block- 5-20ml total dose
	Infiltration	Dilute to 0.5% concentration (1 ml of 2% solution diluted with 3 ml of sterile water = 4ml of a 0.5% solution)
Note: Prevent in animals with myasthenia gravis, severe shock, or impaired cardiac conduction. ADR: Hypersensitivity.		

5. Propofol

Indication	Induction of anesthesia; Sedation for short diagnostic procedure.

Presentation	Injectable	10 mg/ml
Dosage	Dog	6–8 mg/kg BW IV STAT 2–4 mg/kg BW IV STAT
	Cat	4–8 mg/kg BW IV STAT 4–6 mg/kg BW IV STAT
Note: Rapid single or repeat bolus administration may cause undesirable cardiorespiratory depression including hypotension, apnea and oxygen desaturation.		

6. Thiopentone Sodium

Indication	Induction of anesthesia	
Presentation	Injectable	1gm/vial
Dosage	Dog	8–12.5 mg/kg BW IV STAT
	Cat	10 mg/kg BW IV STAT
Note:		

7. Xylazine HCl

Indication	Sedation of a wide variety of domestic, wild or exotic species, analgesia, muscle relaxation and immobilization of excited animals	
Presentation	Injectable	20 mg/ml & 100mg/ml
Dosage	Dog/Cat	1.1 mg/kg BW IV, 1.1-2.2 mg/kg IM
	Cattle	0.02-0.05mg/kg BW IM
	Birds	1-4 mg/kg BW IM
	Horse	1.1 mg/kg BW IM, IV
	Goat	0.01-0.5mg/kg BW IV or 0.05-0.5 mg/kg BW IM
Note: Ruminants are sensitive to xylazine, hence use with caution.		

XXXIX. INTRAMAMMARY INFUSION

1. Procaine penicillin G + Streptomycin sulphate + sulfamerazine + Hydrocortisone Intramammary Infusion

Indication	Mastitis	
Presentation	6 ml Intramammary tube	Procaine penicillin G IP 100, 000 units, Streptomycin sulphate 100mg, sulfamerazine 0.5 g, Hydrocortisone 20 mg
Dosage	Cattle	One tube per teat.
Note: Complete removal of milk from infected udder and teat is very important to leverage the effectiveness of the preparation.		

2. Amoxicillin & Cloxacillin

Indication	Mastitis in lactating cattle and buffaloes (early treatment) caused by penicillin resistant *Staphylococci*, *E. coli*, *Streptococci* and other sensitive organisms	
Presentation	Intramammary infusion	Each tube contains cloxacillin sodium 200mg and ampicillin 75mg, 10 ml tube
Dosage	Cattle	*As per manufacturer's directives in the product insert*
Note: Complete removal of milk from infected udder and teat is very important to leverage the effectiveness of the preparation.		

XL. WILD LIFE MEDICINES

1. Ketamine

Indication	For sedation, tranquilization, restraint and as general anesthetic agent. It is used in combination with muscle relaxants or tranquilizers. It is commonly used in conjunction with alpha2 agonist like xylazine and medetomidine in varied wild

	species	
Presentation	Injectable	100mg/ml
Dosage	Small mammals	Commonly used as cocktails: b) Ketamine/Xylazine: mix 2ml of Xylazine (100mg/ml) with 10ml of ketamine (100mg/ml) and add 0.25ml of atropine sulphate (15mg/ml). The xylazine portion of mixture is reversed by yohimbine @ 0.15mg/kg BW IV. a) Ketamine/Acepromazine: mix 0.5ml acepromazine (100mg/ml) with 10ml ketamine (100mg/ml).
	Reptiles	20-40mg/kg for sedation (0.2-0.4 ml ketamine per 100-gram body weight IM).
	Fox, Skunk, Raccoon	3-5mg/kg ketamine with 0.03-0.05mg/kg medetomidine
	Birds	5-10mg/kg IM, IV.
	Elephants	ketamine @ 0.33mg/kg with xylazine @ 0.12mg/kg (100-300mg total dose) IM.
	Himalayan Black bear	1. Ketamine+Xylazine- 2+4mg/kg BW IM 2. Medetomedine+ketamine- 0.04+1.5mg/kg BW IM 3. Medetomidinw+zoletil- 0.05+2mg/kg BW IM 4. Zoletil-7mg/kg BW
	Deer	2-3mg/kg in combination with 2 mg/kg xylazine and Atropine sulphate @ 0.02-0.05mg/kg IM, IV, Ketamine 1-2mg/kg with medetomidine 60-90 mcg/kg IM (reverse with atipamezole 3-7 times volume of medetomidine).
	Samber	5mg/kg IM with Xylazine @ 1mg/kg IM plus Atropine sulphate @ 0.02-0.05mg/kg IM
	Chital	1.5-2mg/kg with 1-2mg/kg xylazine and atropine sulphate @ 0.02- 0.05mg/kg IM.
	Takin	a) 0.3ml ketamine (100mg/ml) with 0.6ml xylazine (100mg/ml). Xylazine is reversed by Riverzine @ 5times the dose of xylazine used. b) Xylazine+zoletil- 0.01+1mg/kg BW IM

	Non-human Primate	ketamine 5-10mg/kg with 0.1mg/kg medetomidine IM, SC, ketamine 5-10mg/kg with xylazine 0.25-3mg/kg IM, SC.
	Rabbit	ketamine 35-50mg/kg with 0.5mg/kg xylazine IM, SC. Reversal with 0.1-1mg/kg atipamezole.
	Lion	3-7mg/kg ketamine with 80-110mcg/kg medetomidine IM
	Jackals	ketamine 5-8mg/kg with xylazine 0.5mg/kg IM
	Large felids	3.5-6.8mg/kg ketamine with 0.3-1mg/kg xylazine IM or 2.5-4.5mg/kg ketamine with 50-70mcg/kg medetomidine IM
	Hyena	4-6 mg/kg ketamine with 1mg/kg xylazine IM
	Monkey	5mg/kg ketamine with 50-80mcg/kg medetomidine IM
	Yak	2-3mg/kg ketasmine with 70-100mcg/kg medetomidine IM.
	Tiger	1. Ketamine+Medetomidine- 3+0,07mg/kg BW IM 2. Ketamine+Xylazine- 11+0.8mg/kg BW IM 3. Zoletil or Telazol-5mg/kg BW IM
CI: Do not use ketamine as sole agents for anesthesia as it does not possess muscle relaxant activity. It should never be used in animals having hepatic or renal insufficiency.		

2. Zoletil

Indication	Anesthesia and sedation for transport, radio collaring, examination, radiography and surgery.	
Presentation	Injectable	100mg/ml
Dosage	Primate	5-10 mg/kg BW IM
	Wild felids	4-6 mg/kg BW IM
	Wild uriside	3-5 mg/kg BW IM

	Wild canids	8-10 mg/kg BW IM
	Deer	5-9 mg/kg BW IM
	Snakes	15-30 mg/kg BW IM
	Turtle	3.5-14 mg/kg BW IM
	Pigeon	10-50 mg/kg BW IM
Note: Never use phenothiazine tranquilizer (acepromazine) as premedication. Do not use chloramphenicol pre or post operatively as this will retard the elimination of zoletil. Not to be used in pregnant animals. It is contraindicated in giraffes and Equidae. As no complete antagonist exists therefore recovery can be longer than with other drugs combination that can be completely reversed.		

3. Captivon 98 – Etorphine hydrochloride

Indication	Sedition and anesthesia for immobilization, radio collaring, transport and treatment of ungulates, elephant, gaur and other wild species.	
Presentation	Injectable	9.8mg/ml
Dosage	Equidae	0.44mg per 100 lbs.
	Ursidae	0.50mg per 100 lbs.
	Cervidae	0.98mg per 100 lbs.
	Bovidae	0.09mg per 100 lbs.
	Elephant	0.003mg/kg. Antagonize with 0.012mg/kg diprenorphine. 1mg/1000kg IM; 6-7mg total etorphine is sufficient to immobilize an Asian elephant.
	Deer	0.5-0.75ml/100kg IM.

	Tiger	1mg/100 lbs.
	Antelope	4.2-6mg total IM.
Note: Antagonist trexonil should be administered 3-5times the dose of etorphine in elephant, rhino, gaur, etc. 2-3 times the dose of etorphine in other animals. Do not use unless antidote or antagonist is on hand. Accidental human exposure is quite dangerous. Do not use in domestic animals. Do not use in old, diseased, emaciated and highly stressed animals		

4. Xylaxine hydrochloride

Indication	Tranquilization and sedation	
Presentation	Injectable	100mg/ml or 20mg/ml
Dosage	Deer	2-3mg/kg BW IM
	Rodents	4-8mg/kg BW IM
	Bovidae	0.05-0.3mg/kg BW IM
	Guar	Xylazine 0.12-0.22mg/kg + acepromazine 0.04-0.09 mg/kg + Etorphine 0.010-0.22mg/kg IM. Reversal with diprenorphine 0.020- 0.044mg/kg
	Yak	Xylazine 0.05-0.2mg/kg + acepromazine 0.025-0.10mg/kg + etorphine 0.006-0.024mg/kg IM. Reversal with diprenorphine 0.012-0.024mg/kg IM
	Antelope	0.17mg/kg BW xylazine with 0.017-0.018 carfentanil IM
	Elephant	100mg xylazine/metric ton with 0.04-0.06mg/kg acepromazine or 0.12mg/kg xylazine (100-300mg total dose) with 0.33mg/kg ketamine IM.
Note: Bradycardia, ruminal stasis and occasionally bloat. Never use alone for sedation. There is depressed respiration. Do not use xylazine in conjunction with tranquilizers. Provide adequate ventilation. Always use atropine sulphate when using xylazine		

5. Medetomidine / Zalopine

Indication	Tranquilization and sedation	
Presentation	Injectable	1mg/ml
Dosage	Canids	0.04mg/kg BW IM
	Rabbit	0.2mg/kg BW IM
	Bird	0.1mg/kg BW IM
	Small ruminant	50-100mcg/kg IM, IV with ketamine 2-4mg/kg BW IM
	Deer	60-90 mcg/kg medetomidine with 1.5-2mg/kg ketamine IM.
	Reptiles (Snake, tortoise)	0.1mg/kg with 5-10mg/kg ketamine IM. Reversal by injecting 0.5mg/kg atipamezole IM.
Note: Cardiac diseases, respiratory disorders, renal and hepatic disease, shock and severe debilitation. Should not be used alone for sedation. Always use atropine sulphate when using such drugs. Atipamezole is used for reversal about 3-5 times the dose of medetomidine should be used CI: Very young and very old animals.		

6. Acepromazine / Acetlypromazine

Indication	Tranquilization/Pre-medication and control of vomiting and nausea. It is used in combination with ketamine. Usually, 0.5ml acepromazine is added with 10ml of ketamine.	
Presentation	Injectable	10mg/ml
Dosage	Canids	0.25-0.5mg/lbs. BW IM, SC
	Felids	0.5-1mg/lbs. BW IM, SC

	Rabbit	0.05-0.2mg/kg BW SC, IM, IV
	Rodents	1-2mg/kg BW SC, IM, IV
	Primates	0.1-0.5mg/kg BW SC, IM, IV
	Mice, Rats, Hamsters, Guinea pigs, Chinchillas:	0.5mg/kg BW IM
	In *other species* the recommended dose is 0.25 to 1mg per pound body weight	
Note: Low blood pressure, renal and hepatic insufficiency. It potentiates the toxicity of organophosphate; therefore, it should not be used to control tremors associated with organic phosphate poisoning.		

7. Diazepam / Valium

Indication	Mild sedation and as pre-anesthetics. Cause muscle relaxant.	
Presentation	Injectable	10mg/ml
Dosage	For all species	0.25-0.5 mg/kg IM, IV up to 2.5-5mg/kg BW IM, IV
	Ferrets	For premedication/sedation: 1 – 2 mg/kg IM; may be given with ketamine@10 – 20 mg/kg. (Morrisey and Carpenter 2004).
	Rabbit/rodents/ small mammals	1-5mg/kg BW IM, IV
	Birds	0.5 – 2 mg/kg BW IV or IM.
	Deer	0.5-1mg/kg BW IM, IV
Note: Hypersensitivity to benzodiazepines, significant liver disease. Hepatic or renal disease, aggressive, debilitated or geriatric patients, patients in coma, shock or with significant respiratory depression. Never give diazepam in shock.		

8. Common Antagonist Drugs used as Reversal Agents in Wildlife

Name	Action	Dosage	Presentation
Diprenorphine Naltrexone Naloxone	Reversal of captivon 98 and other opiods	5 times dose of etorphine. Narcan dose is 0.015-0.04mg/kg IV, IM	50mg/ml
Atipamizole, yohimbine, tolazoline	Antagonizes agonists such as medetomidine or xylazine	3-5 times that of domitor or xylazine or Yohimbine 0.1 -0.15mg/kg BW IV, IM	100mg/ml
Reverzine	Reversal of Xylazine	5times dose of a2 agonist used.	100mg/ml

9. Other Accessory Drugs in Wildlife

Drug	Indication	Dosage
Epinephrine or Adrenaline	Used systemically for treating anaphylaxis & cardiac resuscitation and as local hemostat	1:10,000 solution for IV, Intratracheal use- dilute 1ml in 9ml NS. 0.1mg/mkl IV or IM
Atropine sulphate	Used for a variety of indications like bradycardia, premedication for control of respiratory secretion, antidote, etc.	0.01-0.05mg/ml BW SC, IM, IV.
Doxapram	CNS/respiratory stimulant. It stimulates respiration during and after general anesthesia and/or to speed awakening and reflexes after anesthesia	1-2mg/kg BW IV for all species 5-10mg/kg BW for Birds 5mg/kg BW for reptiles.
Enalapril maleate	Used primarily as a vasodilator in the treatment of heart failure or hypertension	0.25-0.5mg/kg BW for all species
Fentanyl citrate	Used parenterally & transdermally in small animals. Useful for the adjunctive control of postoperative pain and in the control of severe pain associated with chronic pain, dull pain, and non-specific, widespread pain.	0.02-0.05mg/kg SC, IM, IV
Carfentanil citrate / wildnil	Used exceptionally for rapid immobilization with dose volume as low as 1ml or less in free-ranging and captive Cervidae. It is reversed by naltrexone HCL at dose rate of 100 mg	0.005-0.02mg/kg BW deep IM. *Caution: Extremely potent drug, need to be careful. Do not use unless antidote is no hand*

	of naltrexone for each mg of carfentanil. It has morphine like action but it is 10,000 times more potent than morphine.	
Frusemide	Treatment of congestive cardiomyopathy, pulmonary edema, udder edema, hypercalcuric nephropathy, uremia, as adjunctive therapy in hyperkalemia &, occasionally, as an antihypertensive agent	All species- 0.5-2mg/kg IV, IM
Chlorpheniramine maleate	Used primarily for its antihistamine / antipruritic effects; occasionally used for CNS depressant (sedative) effects.	All species- 0.3-0.5mg/kg BW IM
Prednisolone acetate	Used to lower pain and inflammation of wild animals	All species- 0.5-1mg/kg BW IM and tapering manner for 3-5days
Dexamethasone	Steroid used in emergency case like shock, circulatory collapse and burns.	All species- 10-30mg total dose. Deer – 5mg/kg BW IV.
Lignocaine HCl / Lidocaine 2%	Local anesthetic used for local infiltration for suturing of minor wounds in wild animals.	
Etamsylate / Butorphase	Hemostatic agent. It used to control bleeding in injured animals.	
Neuroxin	Nervine tonic drug. It is commonly used for neurological disorders, debility, exhaustion, anorexia and as supportive therapy along with antimicrobials.	2-10ml IM depending on animal size.
Belamyl or Vitamin B complex	Used for anorexia, general weakness, anemia and also for growth and development.	0.2-2ml IM, SC up to 10ml in large animal
Butorphanol tartrate.	Partial opiate agonist/antagonist used in a variety of species as an analgesic, premedication, antitussive and antiemetic.	1. Ferret- 0.05-0.1mg/kg BW IM, SC. Or Butorphenol + Xylazine- 0.2mg/kg + 2mg/kg BW IV 2. Rabbit/ rodent/small animal (restraint)- 0.1 – 0.5 mg/kg IV (Ivey and Morrisey 2000) 3. Birds- 1 – 2 mg/kg IM (Lichtenberger 2006a) 4. Reptiles/Amphibians (analgesic): 0.05 – 1 mg/kg q12h IM, IV, PO, SC up to 20 mg/kg in tortoise (Bays 2006).

Azaperone tartrate	For the control of aggressiveness and as a preoperative agent prior to general anesthesia.	1-2mg/kg BW deep IM

10. Veterinary drugs commonly used in Wildlife

Category of drug	Type of drug	Species	Dosage (mg/kg)
Antibiotics	Amoxicillin	Small mammals Birds	12.5-20 IM, IV q12hr 125-150 IM, IV q12hr
Antibiotics	Amikacin	Reptiles Most Animals Reptiles Birds	5-6 IM 2-5 IM q24hr 25 IM q24-48hr 20 IM q12hr
Antibiotics	Gentamicin	Mammals Birds Reptiles	2-3 IM, IV 5 IM BID for 3days 2.5mg/kg IM q72hr
Antibiotics	Cephalexin	Small mammals Birds	15-20 IM q12hr 35-100 IM q6-8hr
Antibiotics	Cefotaxime	Birds Reptiles	50-100 IM 20-40mg/kg IM q24hr
Antibiotics	Chloramphenicol	Small mammals Birds Reptiles As ophthalmic	25-50 IM 50 IM 40-50 IM 1drop for 4-8hr
Antibiotics	Ciprofloxacin	Small mammals Bird Bird Reptiles	5-20 IM q12h 5-10 IM q24h 5-20 IV, IM q12h 5-10 IM q24h
Antibiotics	Metronidazole	Primates Birds Reptiles	12.5-25 PO for 5days 50-60 PO 125-250 PO for 5days
Antibiotics	Oxytetracycline LA	Primates Deer (wound)	10 IM 20 IM single dose
Antibiotics	Benzathine penicillin	Primates	20,000-60,000 IM
Antibiotics	Trimethoprim +Sulfa	Deer	20 IM
Antibiotics	Amoxicillin + Ampicillin	Most mammals Birds Reptiles	11-22 BID 150-200 BID 6 SID
Anthelmintics	Albendazole	Primates	10 PO q12h X 5days

Anthelmintics	Levamisole	Primates	4-5 PO q 24h X 6days
Anthelmintics	Ivermectin	Most animals Deer	0.2 SC, repeat in 10- 14days 0.2 SC single dose
NSAIDs	Ketoprofen	Small animals Birds	2 IM q24 x 3days 1-5 IM
NSAIDs	Meloxicam	Small mammals Birds Reptiles	0.3-0.6 IM 0.5-1 IM 0.2 IM
NSAIDs	Flunixin meglumine	Most species Deer Rodents	0.3-1 IM, IV x 3days 2 IV SID x 3days 2-2.5 IM
NSAIDs	Phenylbutazone	Most species	1-5 PO, IV SID
Anti-histaminic	Cimetidine	Monogastric animals Small mammals	5-10 IM, PO TID 2.5-5 IM, IV, PO TID

XLI. AQUATIC DRUGS

1. Salmon Gonadotropin Releasing Hormone analogue and Domperidone (Ovaprim)

Indication	Artificial induction of spawning in fish	
Presentation	Injectable	GnRH 20 mcg+Domperidone 10mg, 10ml vial
Dosage	Cattle	Male fish: 0.5 ml/kg bw, IM or IP Female fish: 0.25 ml/kg, IM, IP
CI: Not to be used in animal/fish intended for use as human consumption or other animals. Precaution:Store at room temperature and protect from direct light. Use in a well ventilated area		

2. Synthetic Gonadotropin Releasing Hormone (SGnRH) Analogue (WOVA FH)

Indication	Artificial induction of spawning in fish	
Presentation	Injectable	Synthetic Gonadotropin releasing hormone Analogue, 10ml vial
Dosage	Indian major carps	Male fish: 0.30-0.50 ml/kg Female fish: 0.10-0.30 ml/kg
	Grass Crap	Male fish: 0.40-0.80 ml/kg Female fish: 0.10-0.30 ml/kg
	Silver Carps	Male fish: 0.40-0.80 ml/kg Female fish: 0.10-0.30 ml/kg
Note: Store medicine Store below or at 25° C.		

3. Synthetic Salmon gonadotropin releasing hormone and Domperidone (Ovatide)

Indication	Artificial induction of spawning in fish	
Presentation	Injectable	Synthetic peptide protein Salmon Gonadotropin RH : 20 mcg/ml Domperidone 10mg/ml
Dosage	Catla (Catla catla)	Male fish: 0.20-0.30ml/kg, IM Female fish: 0.40-0.50 ml/kg, IM
	Rohu	Male fish: 0.10-0.20 ml/kg, IM Female fish: 0.20-0.40 ml/kg, IM
	Mrigal	Male fish: 0.10-0.20 ml/kg, IM Female fish: 0.20-0.40 ml/kg, IM
	Silver Carp	Male fish: 0.40-0.50 ml/kg, IM Female fish: 0.40-0.50 ml/kg, IM
	Grass Carp	Male fish: 0.40-0.50 ml/kg, IM Female fish: 0.40-0.50 ml/kg, IM
Note: Store medicine Store below or at 25° C and away from direct sunlight Precaution: Should not be handled by pregnant women.		

4. Anesthetic

a) Benzocaine

Indication	Used as anesthetics for fish to reduce stress while handling	
Presentation	Powder	Each 100g contains minimum of 99% Benzocaine, 450g bottle
Dosage	Prepare standard stock by dissolving 100 g of benzocain in 1 litre of acetone/ ethanol. 1ml of standard stock solution is dissolved for every litre of water as anesthetics.	
Note: Precaution: The powder is respiratory irritant, use masks and in a well ventilated area. Keep the stock solution in dark bottle as is it photo liable		

b) Phenoxy ethanol

Indication	Used as anesthetics for fish to reduce stress while handling for breeding and transportation.	
Presentation	Solution	Minimum of 99% 2 phenoxy ethanol, 500ml bottle
Dosage	While handling for breeding: Dissolve 2-4 ml of 2 phenoxy ethanol in 10 litres of water contained within a plastic tub. Transportation of fry or fingerling: Dissolve 1 ml of 2 phenoxy ethanol in 5 litres of water contained within the transportation bag, Transfer the fish in the transportation bag and diffuse oxygen into the bag and then seal the bag tightly.	
ADR: may cause mild irritation to the skin; avoid contact with the eye. Keep tightly closed and away from bright light.		

5. Drugs/Chemicals for Bath and Pond Treatment

a) Acriflavin

Indication	Acriflavin is effective against external parasitic, treating open wound, fish egg disinfection, fungal and bacterial treatment

Presentation	Solution	Acriflavin Neutral 100%, 250gm packet.
Dosage	Treatment of parasites and Bacterial infection: 10ppm solution Prevention of bacterial, fungal infection and parasitic infection during transportation: 1-2ppm solution.	
Note:Hampers growth of the aquatic plant and stains water, therefore decorations of the tank should be removed before use.		

b) Chloramine Trihydrate

Indication	Bacterial Gill Disease.	
Presentation	Solution	Minimum assay 99% matter insoluble in absolute ethanol 1.5%, 500gm packet.
Dosage	Place 10ppm, 15ppm and 20 ppm for 60 minutes in a continuous flow or static bath system for three alternative days.	
Note:Avoid skin contact, eye contact, inhalation and ingestion. Keep the solution in a tightly closed container and away from bright light. Store in Room temperature between 10°C to 30°C.		

c) Methylene Blue

Indication	Treatment of skin and gill flukes, external parasites, fungus and bacterial infection.	
Presentation	Powder, Solution	Methylene blue (β Dimethylaminol and triphenylethanol in ratio of 13:1) in 250mg pkt or 250ml bottle
Dosage	5mg to 25 litres of water for 2 days.	
Note: Doses of methylene blue over 4mg/litre damages live plants, ensure that the plants are exposed for a limited period of time. Do not use concurrently with Erythromycin or tetracycline antibiotics.		

d) Praziquantel (Prazi-Pro)

Indication	Treatment of Flukes, Turbellarians and intestinal worms
Presentation	Oxybispropanol and more than 5% praziquantel by weight, 470ml jar
Dosage	2.5mg/L of water
Note: Praziquantal depletes oxygen, add air stones or infuse more oxygen while using praziquantal	

e) Formaldehyde

Indication	Treatment of external parasites of fish	
Presentation	Solution	450ml Bottle
Dosage	15-25mg/L of water	
Note: Formaldehyde is carcinogenic, wear protective gloves while handling formalin. Formalin should be kept in air tight contained and well ventilated area, exposure to formalin fumes causes irritation of eye and respiratory surfaces. Formalin must be stored between 5 - 20 C, do not use it if there is formation of white precipitates.		

f) Malachite green

Indication	Treatment of external parasites, protozoans and fungus infections of fishes, and egg fungus.	
Presentation	Powder, solution	2gm/packet
Dosage	Prepare Stock solution of 20 gms per litre a. As bath: 1ml of stock solution in 20-30 liters of water (1-2mg/litre) for 30-60mins, repeat alternate days for maximum of four treatments a. Prolonged immersion: 1ml in 80-200 liters of water (0.1-0.25mg/litre), repeat every after 3 days, for maximum of three treatments	

	a. Topical treatment: apply directly stock solution on the affected part, avoid gills and eyes.
Note: Causes respiratory irritation and is carcinogen, wear protective gears in well ventilated areas while using malachite green. Avoid usage of malachite green fishes meant for human consumption.	

g) Eco Marine tablet

Indication	1. Digestion of organic waste in the pounds and converts it into micronutrients and reduces toxic gases, and prevents bad odour. 2. Prevention of growth of unwanted algae, sludge and unwanted micro-organisums	
Presentation	Tablets	80 tablets/jar
Dosage	40 tablets for one hectare of one meter depth of pond every 15 days	
Note: NA		

h) V5 powder

Indication	To maintain algal bloom, absorb toxic gases, improve survival rate, increase dissolved oxygen, maintain water quality, water color and balance pH	
Presentation	Powder	1 Kg bag
Dosage	Add 1 kg of V5 in 20 litres of water and activate with aerators for 1-2 hours and then sprinkle in one hectare of pond water. Repeat after every 15 days at different sites	
Note: NA		

i) Malefix

Indication	Treatment of bacterial infections, wounds, tail rot, eye cloud and mouth fungus. Promotes regrowth of damaged fin rays and tissue.

Presentation	Solution	1% Melaleuca
Dosage	Wound treatment: Add 5ml per 39 Litres of water, repeat daily for 7 days. After the 7th day, change 25% of medicated water with fresh water and continue treatment if necessary. Prevention of infection while introducing new fish: Add 5ml per 39 Litres of water, repeat daily for 3 days.	
Note: Wear protective gears while handling the product, avoid direct eye and skin contact.		

6. Antiseptics/Disinfectants for Aquaculture

a) Copper sulphate

Indication	Treatment of external parasites and to control phytoplankton bloom.
Presentation	Minimum assay 98.5%, Iron 0.08%, Chloride 0.005%, Alkalis 0.5%, 450gm packet.
Dosage	Ichthyophthirius multifilis: 0.4-1 ppm once daily for 5-11 consecutive days. Saprolegniasis: 20 ppm of copper sulphate bath Tail and Fin rot: Copper sulphate bath 1:2,000 for 3-4 days To control Phytoplankton bloom: 0.5 ppm
Note: Must be stored between 10 - 30 C in a tightly closed container and away from bright light.	

b) Potassium Permanganate

Indication	Treatment against anchor worms, fish lice, flukes, cotton mouth, fungus and bacterial infections.	
Presentation	Powder/ crystals	Minimum assay 98.5%, 450gm packet
Dosage	Pond treatment: 2ppm four times a week Topical application on external wounds.	

	Prophylactic bath: 3-5 ppm potassium permanganate for 15 seconds during stocking or shifting fish.
Note: Wear protective gears while handling the product, avoid direct eye and skin contact.	

c) Povidone Iodine

Indication	Disinfecting of Equipment and to dress open wound	
Presentation	Powder/ crystals	Contain 5% povidone iodine, 100ml/500ml bottle
Dosage	Topically application	
Note: NA		

d) Ovadine (PVP Iodine)

Indication	OVADINE® (PVP Iodine) is a buffered 1% Iodine solution (Iodophor) specifically formulated for use in disinfecting fish eggs. OVADINE® is a non-staining, non-corrosive buffered 10% polyvinylpyrrolidone-iodine complex (PVP Iodine) which provides 1% available iodine. OVADINE® is widely used as a fish egg disinfectant to reduce the transmission of diseases between generations of fish. OVADINE® (PVP Iodine) fish egg disinfectant is an important part of a complete Biosecurity program.	
Presentation	Solution	1 gal, 4 x 1 gal Cases, 5 gal Buckets, 55gl Drums
Dosage	**During water hardening of fish eggs:** - Immerse eggs in a solution of 50 ppm available Iodine for 30 minutes. To achieve a 50 ppm available iodine solution, mix 1 part Ovidine to 200 parts clean water. This is a 1:200 dilution. **After Water Hardining of eggs:** ● Immerse eggs in a solution of 100 ppm available iodine for 10 minutes. To achieve a 100 ppm available iodine solution, mix 1 part Ovidine to 100 parts clean water. This is a 1:100 dilution.	

Note: Store at room temperature between 15°C and 30°C (59°F and 86°F). Protect from direct sunlight.

7. Fish Antibiotics

a) Oxytetracycline LA

Indication	Treatment for Fin rot and Dropsy/Kidney bloat.	
Presentation	Injection	Each ml contains oxytetracycline equivalent to 200mg of anhydrous oxytetracycline, 30ml vial.
Dosage	75mg/kg /day, IM q 10 days	
Note: NA		

XLII. VACCINES AND BIOLOGICALS

1. Anthrax Spore Live vaccine

Indication	For immunization of cattle, buffalo, pigs, sheep and goat against anthrax disease	
Composition	Each dose of vaccine (1ml) contains not less than 10million of encapsulated avirulent *Bacillus anthracis* spores, strain 34F2 Weybridge suspended in physiological saline and glycerine.	
Vaccination regimen	Primary vaccination is given at the age of 3-4 months during the month of March/April. Vaccination is not required in a particular area if there has not been outbreak for three years after the last outbreak.	
Presentation	Injectable	25 & 50ml
Dosage	Cattle & Buffalo	1ml SC
	Pig, Sheep & Goat	0.5ml SC

Note: Store between $2^0 – 8^0$ C. Do not freeze. Precaution: Since the vaccine contains the live spores, persons with abraded hands should not handle the vaccine. After vaccination, the syringes and the needles should be thoroughly sterilized in boiling water for 1 hour. *The vaccine should not be used during an outbreak.*

2. Hemorrhagic septicemia and Black quarter combined vaccine (HS + BQ)

Indication	Recommended for prophylactic vaccination against HS and BQ in cows and buffaloes.	
Vaccination regimen	Primary vaccination – Six months of age and above Revaccination - To be done annually. Revaccination is recommended in case of adverse climatic conditions like unseasonal rains, cyclones etc. since it can also cause stress in animals	
Presentation	Injectable	90ml
Dosage	Cattle, Buffalo & Calf	3ml SC at mid-neck region
Note: Store between $2^0 – 8^0$ C. Antigenicity of the vaccine deteriorates if the temperature is allowed to fluctuate beyond this range. At no stage should the vaccine be allowed to freeze. Precaution: Generally, no adverse reactions are noticed. A slight swelling may appear at the site of inoculation which disappears quickly. In rare cases hypersensitivity may occur, immediate treatment with antihistaminic is advocated		

3. Classical swine fever vaccine

Indication	For active immunization of pigs against Classical swine fever disease	
Composition	It contains attenuated Lapinised strain of Classical swine fever virus in freeze dried form.	
Vaccination regimen	Primary vaccination is given at 45-60 days of age. Subsequent vaccination is to be done annually	
Presentation	Injectable	10 doses vial. Diluents are supplied separately
Dosage	Pig	1ml of reconstituted vaccine SC

Note: Store at -20^0 C. Transport between 2^0 – 8^0C. Precaution: After vaccination the animals should be observed for about an hour for any hypersensitivity reaction. *If hypersensitivity occurs, immediate treatment with antihistaminic is advocated.*

4. *E. coli* oral vaccine

Indication	The vaccine is used for protection of susceptible pigs against *E. coli* infection.	
Presentation	Suspension	
Dosage	Pig	One vial broth culture vaccine is mixed with 1.5 kg of feed and fed per sow. The vaccine should be given for 3 consecutive days starting from 75 days of gestation.
Note: Store between 2^0 – 8^0 C. Do not freeze.		

5. Foot and Mouth disease vaccine (FMD oil)

Indication	For active immunization of cattle, buffalo, pigs, sheep and goat against Foot and Mouth disease	
Vaccination regimen	Ruminants: Primary vaccination: 4 months of age and onwards First revaccination (booster): 9 months after primary vaccination Subsequent vaccination is to be done annually	
Presentation	Injectable	100ml vial.
Dosage	Cattle & Buffalo	2ml deep IM
	Pig, Sheep & Goat	1ml deep IM
Note: Store between 2^0 – 8^0 C. At no stage should the vaccine be allowed to freeze Precaution: Injection with mineral oil into humans can produce serous localized reactions and care should be taken to avoid accidental inoculation. The vaccine should not be used during an outbreak.		

6. Rabies Vaccine

Indication	Active immunization of Dogs, Cats, Cattle and Horses, and in principle all mammals against Rabies.	
Composition	Contain inactivated VP12 Rabies strain and adjuvant with 10% v/v Aluminium hydroxide gel.	
Vaccination regimen	*Carnivores* – a single injection from 3 months of age, *Herbivores* – a single injection from 6 months of age. Primary vaccination can be administered at an early age, but a repeat injection must be given at 3 or 6 months of age depending of the species. Annual vaccination is recommended.	
Presentation	Injectable	10ml vial.
Dosage	All species	1ml SC, IM
Note: Store between 2^0 – 8^0 C. Do not freeze. Precaution: Only healthy and de-wormed animals should be vaccinated.		

7. Fowl pox vaccine

Indication	It is recommended for active immunization of chicks in production at farm level.	
Vaccination regimen	Vaccination is recommended at 8^{th} and 16-18^{th} weeks age birds.	
Presentation	Injectable	1000 doses per vial.
Dosage	Chick	Wing web method -0.02 ml per chick Intramuscular route - 0.2 ml per chick For route of administration please refer the leaflet that comes along with the vaccine. In case of re-current Fowl pox problematic flocks, vaccination by

		intramuscular method is preferred
Note: Store between 2^0 – 8^0 C preferably in the deep freeze and transport through cold chain system.		

8. Marek's disease vaccine

Indication	This vaccine is recommended for active immunization of chicks in production at hatchery level against Marek's disease.	
Vaccination regimen	Vaccination is done at day old age by subcutaneous route in the lower neck region. In case of disease outbreaks at late stages, the chicks should be boosted with 0.2 ml dose at 12-14 days of age.	
Presentation	Injectable	1000 dose per vial.
Dosage	Chicks	0.2ml SC
Note: Store between 2^0 – 8^0 C preferably in the deep freeze and transport through cold chain system. Reconstitution Store the diluents in the refrigerator overnight, to chill before use. Allow the pellet to dissolve completely with diluents. Reconstituted vaccine should be stored on ice and used completely within one hour.		

9. Infectious Bursal Disease (Gumboro) disease vaccine

Indication	This vaccine is recommended for active immunization of chicks in production at farm level against IBD against infections.	
Presentation	Eye drop, orally	200 dose per vial.
Dosage	Chicks	Eye drop method: 0.03ml per chick Eye drop method should be used for primary vaccination. Instill one drop into the eye per chick. Use reconstituted vaccine immediately. Drinking water method: sufficient vaccine mixed with water for birds to be vaccinated. Liters of water to be added: Age of birds | 200 doses

		14-18 days: 2-3 liters 21-28 days: 3-4 liters

Note: Store between 2^0 – 8^0 C preferably in the deep freeze and transport through cold chain system.

For drinking water method

For drinking water method, before giving the vaccine, withhold the birds from drinking water for at least two hours to allow birds to get thirsty. Do not use chlorinated water. Vaccination should always be conducted during cool hours.
Store the vaccine between 2^0 – 8^0 C preferably in the deep freeze and transport through cold chain system. Diluents must be stored and transported at room temperature.

Reconstitution

Store the diluents in the refrigerator overnight, to chill before use. Allow the pellet to dissolve completely with diluents. Reconstituted vaccine should be stored on ice and used completely within one hour.

10. Newcastle disease vaccine (lentogenic B1)

Indication	It is recommended for active immunization of different age group chicks and layer flock in production against field strains of Newcastle disease virus and this vaccine is more suitable for priming of young chicks during their first week of life.	
Vaccination regimen	This vaccine is recommended for young chicks between 1-6 days of age	
Presentation	Nasal or eye drop	200 dose per vial.
Dosage	Chicks	Nasal instillation/eye drop method: 0.03 ml per chick

Note: Store between 2^0 – 8^0 C preferably in the deep freeze and transport through cold chain system.

Reconstitution

Store the diluents in the refrigerator overnight, to chill before use. Allow the pellet to dissolve completely with diluents. Reconstituted vaccine should be stored on ice and used completely within one hour.

11. Newcastle disease vaccine mesogenic (R2B/Mukteswar)

Indication	It is recommended for active immunization of birds and layer flock in production against field strains of Newcastle disease viruses.	
Vaccination regimen	Vaccination is recommended for birds at the age of 8-9 weeks & 16-18 weeks	
Presentation	Injectable	100 & 200 dose per vial.
Dosage	Chicks	Intramuscular / subcutaneous route: 0.5 ml per chick
Note: Store between 2^0 – 8^0 C preferably in the deep freeze and transport through cold chain system. Reconstitution Store the diluents in the refrigerator overnight, to chill before use. Allow the pellet to dissolve completely with diluents. Reconstituted vaccine should be stored on ice and used completely within one hour.		

12. Peste des petits ruminants (PPR) vaccine

Indication	Recommended for vaccination against Peste des petits ruminants (PPR).	
Vaccination regimen	Vaccine is recommended for use in goats above 4 months age. Annual vaccination shall be carried out to cover new young flocks. Animals that received vaccination in the previous year shall not be revaccinated	
Presentation	Injectable	25, 50 & 100 dose per vial.
Dosage	Chicks	Inject 1 ml of reconstituted vaccine per animal with subcutaneous injection at mid neck region.
Note: Store between 2^0 – 8^0 C preferably in the deep freeze and transport through cold chain system. Reconstitution The freeze-dried vaccine vial is reconstituted along with the respective dose pack diluents bottles provided. Mixing is carried out by drawing small quantities of diluents from respective diluents bottles in the sterile syringe and then injecting this diluent in a freeze-dried vaccine vial. Shake the vial well and allow rehydrating the freeze-dried pellet and then drawing rehydrated vaccine and transferring it to the diluents bottle. Rinse the vaccine vials 2 times with the diluents in a similar manner. Reconstituted vaccine should be used immediately.		

XLIII. CHEMICAL DRUG FORMULATION

1. Antiseptics

Si No	Chemical drug	Constitution
1	Boric acid	1-2 %
2	Hydrogen peroxide	1:5 to 1:10
3	Potassium permanganate	1:1000 to 1:5000

2. Mouth washes

Si No	Chemical drug	Constitution
1	Alum	1-2 %
2	Boric acid	1:5 to 1:10
3	Copper sulphate	0.5%
4	Potassium permanganate	1:2000
5	Sulphanilamide	1%

3. Collutoria (mouth wash)

Chemical drug	Constitution
Tannic acid	30g
Glycerin	150ml

*Mix well and smear in buccal mucosa

4. Skin antiseptic (anti-pruritic)

Si No	Chemical drug	Constitution
1	Magnesium sulphate	2-4 %
2	Sodium carbonate	2-5%

5. Disinfectants

Si No	Chemical drug	Constitution
1	Alcohol	70%
2	Formalin	5%
3	Sodium carbonate	4%
4	Sodium hypochlorite	4%
5	Tincture iodine	5-7%

6. Antiseptic Ointment

	Chemical drug	Constitution	Remarks
Whitfield Ointment	Benzoic acid	6 parts	For external application for fungal infections. Apply topically to the affected area daily.
	Salicylic acid	3 parts	
	Paraffin jelly	100 parts	
Boric acid ointment	Boric acid	10gm	For treatment of mange. Apply topically to the affected area daily
	Paraffin	90gm	
Zinc oxide ointment	Zinc oxide	15gm	
	Paraffin	85gm	
Sulphur ointment	Sulphur sublimate	10gm	
	Paraffin	90gm	
Salicylic ointment	Salicylic acid	20gm	Used in treatment of wound
	Paraffin jelly	980gm	

7. Lotion

	Chemical drug	Constitution	Remarks

Boric acid eye lotion	Boric acid	2gm	
	Distil water	98ml	
Salicylic lotion	Salicylic acid	2gm	
	Tannic acid	2gm	
	Spirit	30ml	

8. Urinary antiseptics

Hexamine	4-8gm
Sodium acid Phosphate	30gm

9. Universal antidote

Chemical drug	Constitution	Remarks
Activated charcoal	50gm	Divide into 5 parts and given in a day stomach tubes.
Magnesium oxide	25gm	
Kaolin	25gm	
Tannic acid	25gm	

10. Hematinic

Drugs or agents which increases the number of red blood cells and hemoglobin content in blood.

Si No	Chemical drug	Constitution	Remarks
1.	Ferric sulphate	50gm	Mft. pulv. Sig 1/10 daily orally (indicate divide the above drug into 10 equal parts and give each part daily).
	Copper sulphate	20gm	
	Cobalt sulphate / chloride	2gm	

	Calcium lactate	150gm	
1.	Ferric sulphate	5gm	Mix and make 20 suck packets, administer 1 dose orally twice for 10 days (use water to drench)
	Cupric sulphate	500gm	
	Cobalt sulphate	100gm	
2.	Ferric sulphate	40gm	Mix and make 10 equal parts administer 1 dose daily for 10 days as drench.
	Cupric sulphate	10gm	
	Calcium lactate	100gm	
	Cobalt sulphate	200gm	

11. Stomachic

Drugs which increase the secretion of gastric juice.

1	Sodium bicarbonate	15gm	Prepare 12 packets of such powder and give one packet twice daily orally. Note: Indicate you have to make 12 such powder each containing above ingredients in the quantity as given above.
	Sodium chloride	15gm	
2	Sodium bicarbonate	30gm	Note: indicate that the above drug is to be made into mixture and divided into two equal parts and be given each half two times in a day. You can also give equivalent amount of drug for another day or two if the condition of animal warrants it.
	Magnesium sulphate	200	
	Aqua (water)	560ml	
	Sodium chloride	125gm	

12. Carminative

Drugs which prevent the formation and help in expulsion of gases from gastro-intestinal tract.

Formalin	5ml	Mft. Administer ½ BID PO	Note: indicate that the above drug is to be made into mixture and divided into two equal parts and be given each half two times in a day. You can also give equivalent amount of drug for another day or two if the condition of animal warrants it.
Sodium chloride	150ml		
Water	500ml		

13. Antizymotic

Drugs or agents which arrest / control fermentation

Formalin	15ml	Mft. Administer ½ BID PO
Aqua	1000ml	

14. Purgative for cattle

Drugs or agents which will cause watery evacuation of bowels.

Magnesium sulphate	250gm	Mft. Administer OD PO
Sodium chloride	150gm	
Water	1000ml	

15. Febrifuge

Drugs which reduce the temperature in fever

Sodium salicylate	60gm	Mft. Administer ½ BID PO
Sodium bicarbonate	60gm	

.

16. Antiseptic and absorbent

Magnesium sulphate	20gm	Mft. as paste and administer at the infected wound or apply on region of edema.
Glycerin	Equal parts	

XLIV. ANNEXURE

DOSE CALCULATIONS AND UNITS

Accurate dosing is critical to the proper utilization of all pharmaceuticals. To calculate the correct dose of drug you need to know the concentration of the drug, the weight of the animal, and the recommended dose rate of the drug in question for the specific animal you are administering the drug to.

Units of measurements

SI unit is another name for the metric system of measurement. The aim of metrication is to make calculations easier than with the imperial system (which includes ounces, pounds, stones, inches, pints etc.). SI stands for *Systeme Internationale* and it is now recognized as the standard system for measurement in most disciplines around the world. The SI system defines a base unit for a particular measurement (for example the gram for measuring weight) and a prefix (e.g. kilo, milli) when the actual numbers in the measurement become very large or very small. For example, one millionth of a gram could be written as 0.000001g or 1mcg. The second version is easier to read than the first and easier to work with once you understand how to use units and prefixes. It is also less likely to lead to errors, especially when administering drug doses.

Conversion table:

Kilogram	Hectogram	Decagram	Gram	Decigram	Centigram	Milligram
1	0	0	0	0	0	0
	1	0	0	0	0	0
		1	0	0	0	0
			1	0	0	0
				1	0	0
					1	0

1 gram = 1000 milligrams and 1 milligram =1000 Micrograms

300mg = 0.3g, 0.5g = 500mg, 750micrograms = 0.75 mg, 2500ml = 2.5l, 0.025m = 25mm, 0.05mg = 50 micrograms

Common routes of drug administration include:

a) Oral administration
b) Parenteral administration
   - ❖ Intravenous
   - ❖ Intramuscular

- ❖ Subcutaneous
- ❖ Intraperitoneal
- ❖ Intrathoracic
- ❖ Intradermal

c) Inhalation (pulmonary route)
d) Topical administration (local application)

Pharmaceutical preparations are often expressed as:
Percentage: It simply means per hundred. 5% means 5 parts of the active ingredient in 100 parts of the preparation. For example, a 10% solution of xylazine is 100mg/ml and a 2% solution of xylazine is 20mg/ml. Percentage concentration of the drug is expressed in 3 ways.

- ❖ Weight in weight (w/w): Is the percentage of solids in solids. E.g. Ointments and powders. However, percentage solutions of solids in liquids are rarely made weight in weight (e.g. when both solids and liquids are taken in weight).
- ❖ Weight in volume (w/v): Percentage solutions of liquids are usually made weight in volume. These types of percentage solutions are common in pharmacy where solids are taken by weight and liquids are taken by volume. Eg. Mixtures and lotions. Mg/ml - Manufacturers usually provide concentrations of their product in milligrams (mg) of drug per (ml) of solvent.
- ❖ Volume in volume (v/v): Percentage solutions of liquids are usually made volume in volume. Since both solute and the solvent liquid are taken by volume, use of same subunit of volume for both is essential. Eg. Emulsions and spirits.

Parts per million (ppm): This is the way of expressing strength particularly concentrations of very dilute preparations. A 1 ppm solution contains one part of the solute in one million parts of solution. It is important that two parts must have same units except in metric system where 1gm = 1ml.

International unit (IU):

International Units per ml of solvent are used for some preparations like penicillin and some of the fat-soluble vitamins. This is actually a measurement of activity and doses use the same unit of measure to make calculations easier.

Powders:

You may receive drugs in a powdered form and be given the milligram/gram of active drug in the vial. For example, Dicrysticin sulfate comes in powdered form with 2.5gm (2500mg) per vial.

Percent solutions:
One part of a substance solid or liquid mixed with 99 parts of a solvent to make a total of 100 parts of the prescribed formulation makes 1-% solution. In metric system 1gm of solid or 1ml of a liquid dissolved in 99 ml of solvent to make 100 ml of prepared solution makes 1-% solution.
Examples of solution of various strength. Strength percentage
1 in 1 100%

1 in 10 10%
1 in 100 1%
1 in 1000 0.1%
1 in 10,000 0.01%

To convert into percentage
1 in 400 = 1/400 X 100 = 0.25% 1 in 700 = 1/700 X 100 = 0.143%
1 in 2500 = 1/2500 X 100 = 0.04%
3 in 1000 = 3/1000 X 100 = 0.3%

Some examples of calculations:
Anesthetics

Thiopentone sodium injection: Calculate the total dose for a dog weighing 12kg at the dose rate of 25mg/kg body weight! For safety reasons the drug should be administered as 2.5% solution.

Comes as 0.5gm vial, dose rate is 25mg/kg as 2.5% solution and body weight of animal is 12kg.

To prepare 2.5% solution 2500mg in 100ml 2.5%
Solution
500mg in? 2.5% solution =100 X 500/2500 = 20ml = 25mg/ml

Total dose required
=12 X 25
=300mg

Therefore, total dose will be 300/25 =12ml

Xylazine hydrochloride:

Comes as 2% solution, required dose rate is 2mg/kg (IM) To be given for 10 kg dog
Total dose required 2X10 = 20mg Solution contains
20mg/ml = 1ml

Antibiotics

Example:
The conc. of antibiotic is 50 mg/ml Dose rate is 5-mg/kg body weight The weight of the animal is 300 kg. Calculation:
The animal weighing 300 kg @ dose rate of 5 mg/kg body wt. = 1500 mg the conc. of antibiotic is 50 mg/ml,
Therefore, the animal of 300 kg requires = 1500/50 =30 ml of antibiotic.

Deworming drugs

Example:

A cow suffering with chronic diarrhea is found to have 500 epg of fasciola. Using Triclabendazole 900 mg bolus, find the quantity of bolus to be given to the animal weighing 430 kg at the dose rate of 10-mg/kg body wt.

olution:

Dosage = 430 kg x 10mg/kg body wt = 4300 mg

As one bolus contains 900 mg of triclabendazole, 4300 mg will be in = 4300/900 = 5 bolus approximately.

Dilution of liquids

The basic formula

Concentration of final solution (% or ratio)

Total quantity of stock solution = X Total quantity of Concentration of stock Final soln.

Example:

We have cythion with stock concentration of 50%. Making a total of 5 litres of diluted solution, how much quantity of cythion we need to mix with water to make a final concentration of 2%?

Solution:

Concentration of stock cythion… 50%

Concentration of final solution… 2 %

Total quantity of final solution… 5 litres (5000 ml)

Substituting in the above formula:

2/50X(?) = X 5000 ml = 2/50 x 5000 = 200 ml. Of stock cythion i.e. add 200 ml of stock cythion in 4800 ml of water to make 2% final concentration of cythion.

Example:

Make a 1/200 dilutions of a neat sample in a final volume of 4 ml. 4000 = 200 x X (4ml = 4000 µl) X= 4000/200 = 0.02 ml (20 µl) i.e. 0.02 ml of neat sample in 3.98 ml water or 20 µl in 3980 µl of water.

Intravenous Drips:

The rate of flow of fluid down intravenous infusion lines must be regulated and this is often controlled by a device known as an infusion controller. The controller measures precise volumes of liquid and releases tiny droplets, each of exactly the same volume, down the IV line (tube) at precise intervals. The infusion controller has a thumb-wheel which allows the operator to alter the flow of liquid. Some controllers require you to set the Flow Rate, which is measured in Millilitres per Hour. Others require you to set the Drip Rate, measured in Drips per Minute. It is important that you know which you are dealing with. This will be written on the machine itself. To calculate the Flow Rate, this is simply the volume in millilitre divided by the duration in hours. Both these values will be prescribed.

Example: A dog requires 500ml IV infusion over twelve hours. What is the flow rate?
Answer: 500 divided by 12 is 41.66ml/hr = 42ml/hr (Round off).
FLUID THERAPY AND ITS CALCULATION

Body Fluid Compartment

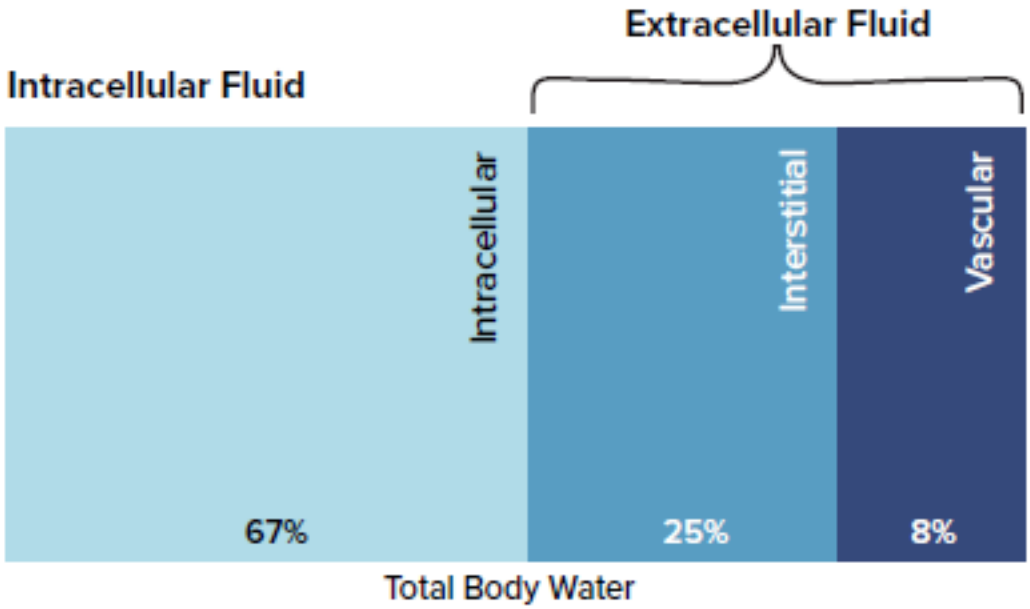


Figure 9*: Normal body fluid compartment*

Why Fluid Therapy?
Fluid therapy is given for following reason:

1. Resuscitation fluid: to replace fluid loss from intravascular fluid compartment (hypovolemic shock)
2. Rehydration fluid: to replace fluid loss from interstitial fluid compartment (Dehydration)
3. Maintenance fluid: to provide water and major electrolytes to replace the physiologic losses that occur through urine, feces, and evaporation.

Small Animals

Table 11: *Stages and Clinical Signs of Hypovolemic Shock*

	CRT	Heart rate	Pulse	MM	Extremities	Behaviour
Compensatory						
Dogs	1 - 2s	Increased	Pounding	Normal or Red	Normal	Mild anxiety
Decompensatory						
Dogs	>2s or absent	Increased or decreased	Weak	Pale to white	Cool to touch	Signs of confusion, unresponsiveness, lethargy
Cats	>2s or absent	Decreased	Weak	Pale to white	Cool to touch	Signs of confusion, unresponsiveness, lethargy

Note: MM: Mucous membrane, CRT: Capillary refill time; Compensatory: *a compensatory mechanism is activated through increased heart rate and systemic vascular resistance; Decompensatory: As shock progresses, compensatory mechanisms begin to fail, leading to inadequate perfusion and potential organ dysfunction. In compensation, the signs are rarely observable for cats.*

Fluid resuscitation plan

Fluid resuscitation can be done using Ringer's lactate and 0.9% saline. The details of treatment are given below (Figure 1).

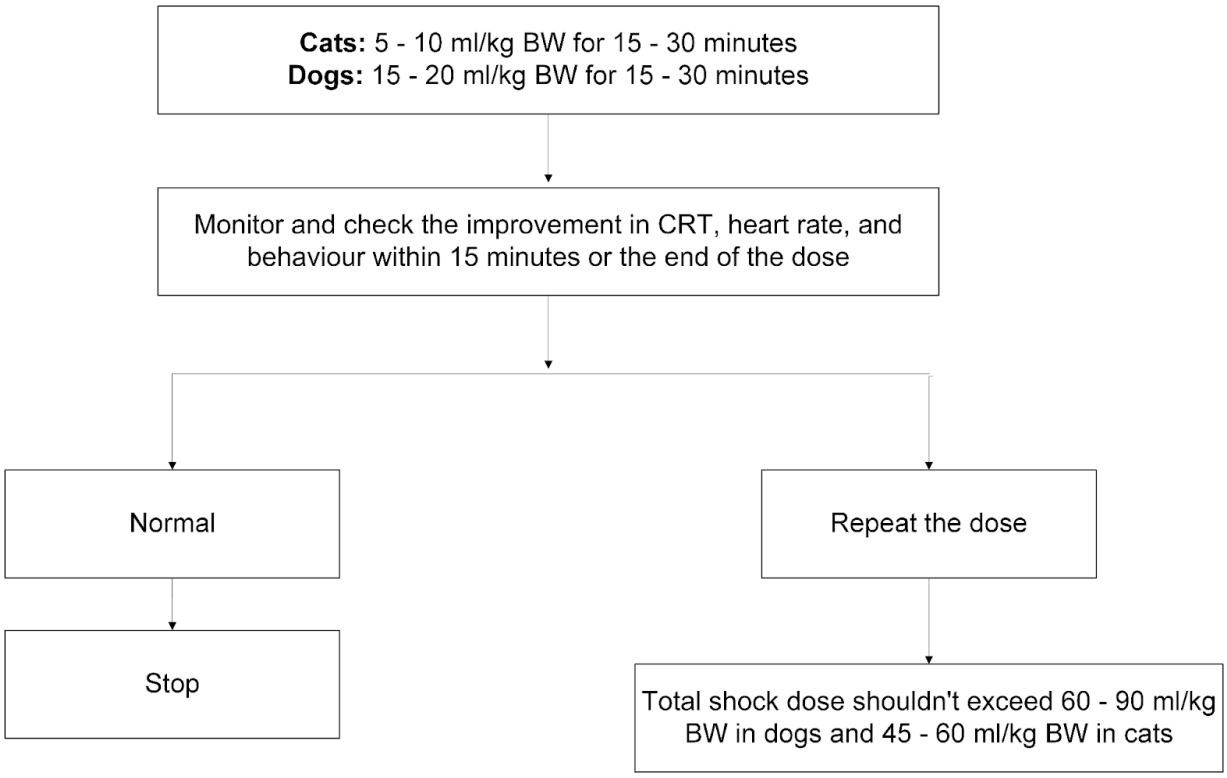


Figure 10: *Treatment plan for hypovolemic shock.*

Table 12: Assessment of dehydration

Estimated % Dehydration	Physical examination finding
< 5%	Not detectable
6 - 8%	Dry mucous membranes Decreased skin tent (>2 sec)
8 - 10%	Retracted globes within orbit
10 - 12%	Persistent skin tent Dull cornea

*Note: It is important to note that there is substantial clinical variation in the correlation between clinical signs and degree of dehydration, so this is an estimate only

Calculation of fluid deficit

Fluid Deficit (L) = % Dehydration (in decimal) x Body Weight (kg)
OR
Fluid Deficit (ml) = % Dehydration (number) x Body Weight (kg) x 10

Example:
A 10 kg dog is presented with dry mucous membranes and a prolonged skin tent with eyeball in normal position. Calculate the fluid deficit for rehydration.

Determine % dehydration based on physical examination findings: 7%

Fluid Deficit (L) = 7/100 x 10
= 0.7 L
Fluid Deficit (ml) = 7 x 10 x 10
= 700 ml

Use online calculator here: https://digital.dechra.com/Fluid_Calculator/index.html

Maintenance fluid requirement

Dog: 60 ml/kg BW/ day.
Cat: 40 ml/kg BW/ day.

Table 13: Fluid of choice for common clinical conditions

Clinical Condition	Change in water/electrolyte/pH	Need to supply	Fluid of choice	Comments
Diarrhoea	Loss of water and elctrolyte	Water and electrolye		
	Loss of K + through GI tract	K +	Ringer's Lactate	
	Metabolic acidosis	Bicarbonate/Lactate		
Vomiting	Loss of water and elctrolyte	Water and elctrolyte	0.9 % NS1	If vomiting progress K+ will be lost and must be replaced by administration of RL.
	Metabolic Alkalosis			
Anorexia	Primary water loss	Water	5% Dextrose2	Prolonged anorexia leads to K + loss; RL must be given
Urinary Tract Obstruction	K+ accumulation (Hyperkalemia)	Water and electrolyte	Normal Saline3	Hyperkalemia is life threatening; ensure fluid administered doesn't contain K+

Fluid therapy during anesthesia

Fluid therapy is recommended in patients undergoing general anesthesia primarily to counteract the vasodilation and decreased cardiac output induced by the anesthetics, as well as to uphold catheter patency.
Administer balanced isotonic crystalloid fluids using the following guidelines:

- Dog: 5-10 ml/kg/hr (In dogs with normal cardiac and renal function).

- Cat: 3–5 mL/kg/hr (in cats with normal cardiac and renal function)

Hypoglycemia

Clinical signs:
- Lethargy
- Ataxia
- Seizure
- Weakness

50% Dextrose, 0.5 -1 ml/kg diluted in normal saline (1:2-1:4) over IV 5–10 minutes.

Final dextrose concentration required in saline solution	Volume of 50% dextrose Required (ml)	Volume of 0.9% saline required (ml)
25%	250	250
10%	100	400
5%	50	450
2.5%	25	475

*Best made up in a 500 ml bottle of 0.9% saline; remove volume of dextrose to be added; then add the 50% dextrose and mix well before setting up the CRI.

Precaution: Hypertonic solution (10% or 25%) may result in phlebitis so administer only via peripheral veins (e.g. cephalic) in emergency situations and flush with adequate amounts of saline.

Large Animals Fluid Therapy
Dehydration

Table 14: *Estimation of dehydration of calves using eyeball recession and skin tent*

% dehydration	0	2	4	6	8	10	12	14
Eyeball recession (mm)	0	1	2	3	4	6	7	8
Skin-tent duration (s)	2	3	4	5	6	7	8	10

Calculation of fluid deficit

Fluid Deficit (L) = % Dehydration (in decimal) x Body Weight (kg)

Note, generally, the Ringers' lactate and 0.9% saline is recommended at 100 - 150 ml/kg BW (for the duration of first 4 to 6 hours).

Maintenance fluid requirement

The maintenance fluid can be given at 60 - 80 ml/kg BW per 24 hours.

Calculation of fluid deficit

Fluid Deficit (L) = % Dehydration (in decimal) x Body Weight (kg)

Fluid Therapy Plan for calves

- Total fluid=Fluid Deficit + Maintenance Requirement

The total fluid can be administered IV with continuous monitoring of vital parameters.

Fluid therapy plan for Adult Cattle

For adult cattle the total calculated dose of fluid can be given orally with a stomach pump. However, if the animal is recumbent quarter dosing modality presented in the flow chart below must be used as orogastric tubing is not recommended in large animals.

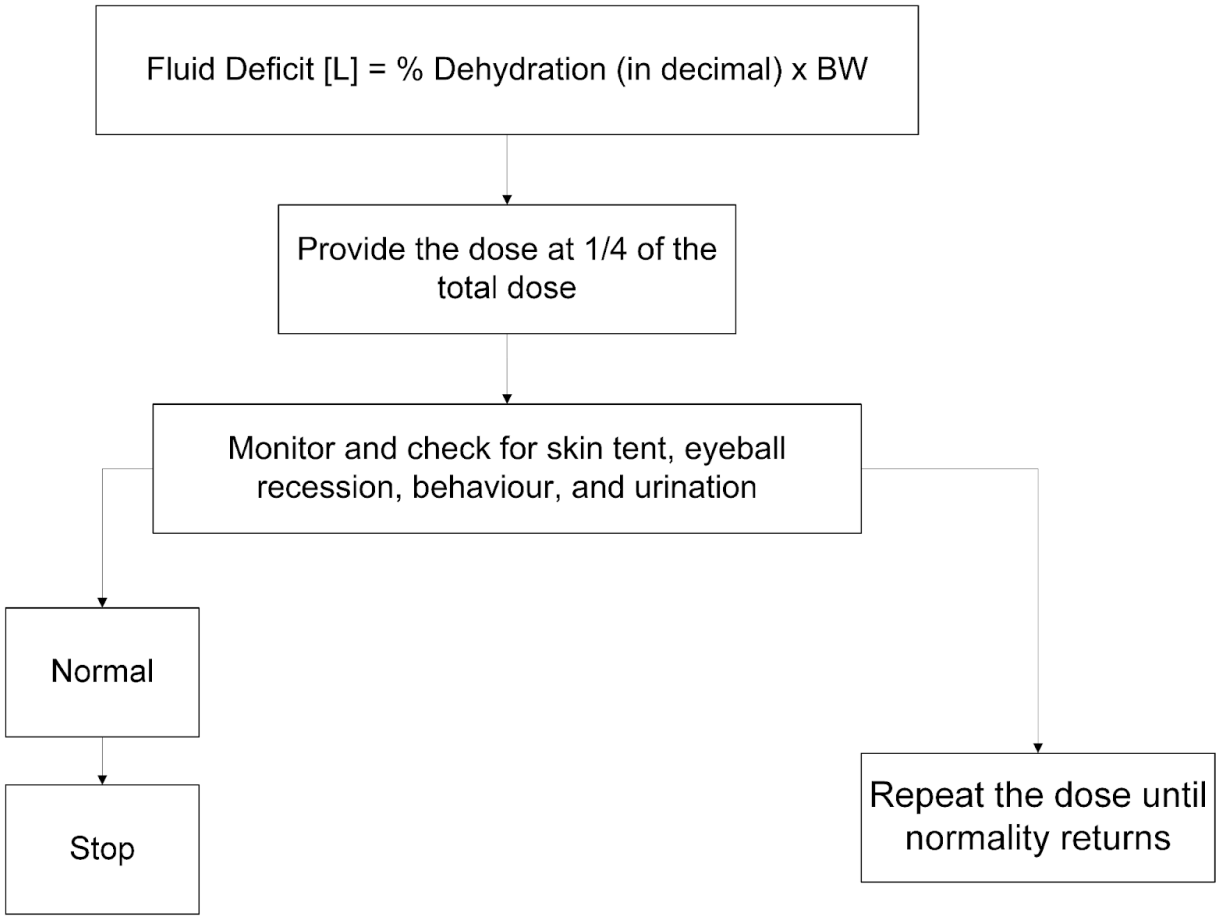


Figure 11. *Flowchart for fluid therapy for recumbent adult cattle.*

Horse

Table 15: *Fluid therapy dosing recommendation for adult horses*

Indication	Fluid type	Dose	Comments
Resuscitation	Ringers' lactate, 0.9% saline	10 - 20 ml/kg repeated as necessary to stabilize	At each dose, check the perfusion markers or physiology of the animal. Caution is required for anuric or oliguric renal failure or heard disease.
Maintenance	Ringers' lactate, 0.9% saline	40 - 60 ml/kg/day	

Fluid Overload

The assessment of dehydration is simply an estimate, therefore continuous monitoring of the patient for fluid overload is very important.

Clinical signs of fluid overload

- Increased body weight (>10%)
- Tissue edema (intermandibular area, limbs, paws, dependent regions, chemosis)
- Serous nasal discharge
- Serous discharge from endotracheal tube in anesthetized patients
- Increased respiratory rate or
- Reduced SPO2
- Gastrointestinal signs (abdominal distention, vomiting, diarrhea, inappetence, anorexia)

Management of fluid overload

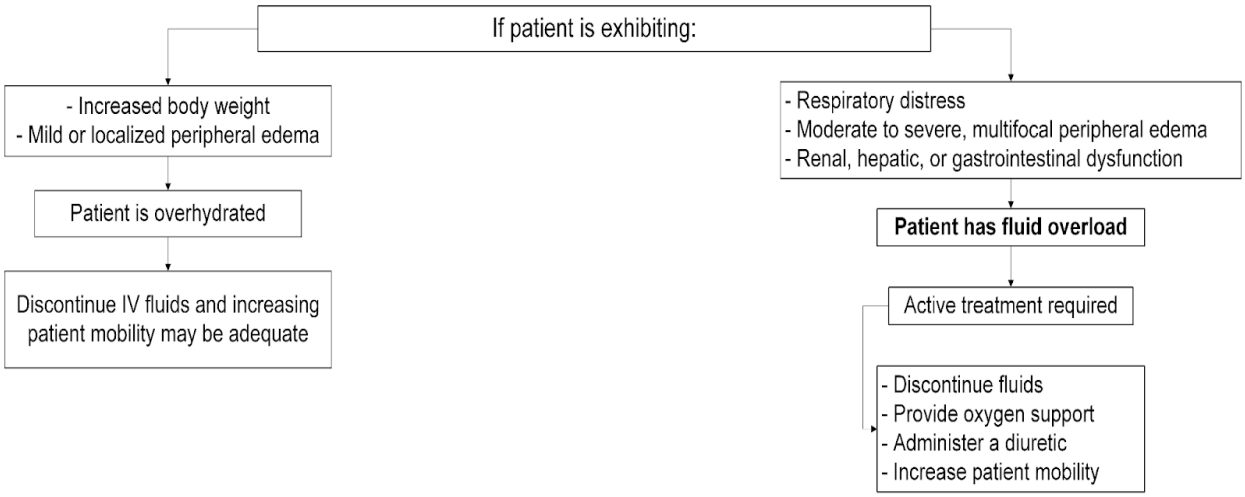


Figure 12: *Management of fluid overload*

We would like to express our deepest gratitude to the following officials for their valuable contributions:

1. Dr. Meena Devi Samal,
2. Dr. Karma Choezang
3. Dr. Rinchen Tshering
4. Mr. Bikash Rai,
5. Mr. Dhan Bahadur Tamang,
6. Dr. Tshering Choden
7. Dr. Kinzang Chedup
8. Mr. Sonam Chophel