



BULLETIN OF THE  
**PET PRACTITIONERS  
ASSOCIATION  
OF MUMBAI**  
(FOR CIRCULATION AMONGST PPAM MEMBERS)



OCTOBER - DECEMBER 2022



Honorable President Veterinary Council of India  
Dr. Umesh Chandra Sharma  
at PPAM Function



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## Editorial

### Responsible Use of Antibiotics

On 29.11.2022, ICMR issued guidelines regarding the use of antibiotics post-surgery in humans. According to ICMR prolonged use of antibiotics to prevent infection or prophylaxis is not only ineffective in reducing infections but increases microbial resistance. ICMR guidelines state antibiotics have to be chosen on the basis of their effectiveness against the pathogens most likely to be encountered rather than against every possible pathogen. Antibiotic resistance is the ability of a bacterium or other microorganisms to survive and reproduce in the presence of antibiotic doses that were previously thought effective against them.

After the introduction of antibiotics in the mid-20th century, clinicians soon witnessed clinical failures secondary to bacterial resistance. Despite scientists' efforts to synthesize more potent antibiotics during the last five decades, bacterial resistance continues to evolve. Globally, an estimated 50% of all anti-bacterial serve veterinary purposes. Bacteria that inevitably develop antibiotic resistance in animals comprise food-borne pathogens, opportunistic pathogens and commensal bacteria. Antibiotics are the integral part of medicines used to ensure human and animal health. However, the widespread use, misuse, and overuse of antibiotics in humans and animals has raised the concern about the development of resistant bacteria that possess a potential danger to animals and humans.

The treatment of several pathogens, including methicillin-resistant *Staphylococcus aureus*, penicillin-resistant *Streptococcus pneumoniae* and vancomycin-resistant enterococci, is problematic. New solutions are needed to preserve the activity of our current antibiotic armamentarium, to lower the overall risk of bacterial resistance, and to successfully treat patients with resistant bacterial infections.

Appropriate antibiotic use involves the selection of a "targeted spectrum" antibiotic, as well as an appropriate dose and duration. Antibiotics should be

for short-duration, high-compliance drug therapy with good clinical efficacy. We will need to be combined this with programs to promote rational antibiotic use, particularly targeting inappropriate prescribing for viral infections and use of agents with a broader antimicrobial spectrum than is necessary.

The non-human use of anti-bacterial (which includes use in food animals, companion animals, aquaculture and horticulture) can be divided into therapeutic, prophylactic and metaphylactic use. Therapeutic antimicrobial use is the treatment of established infections. Metaphylaxis is a term used for group-medication procedures, aimed at treating sick animals while medicating others in the group to prevent disease. Prophylaxis means the preventative use of antimicrobial in either individuals or groups to avoid the development of infections.

The World Health Organization (WHO) defines the prudent use of antimicrobial as usage of antimicrobial which maximizes therapeutic effect and minimizes the development of antimicrobial resistance. Prudent use, by definition, includes the minimisation of misuse and overuse. Antimicrobial agents are essential drugs for human and animal health and welfare of all. Careful use of antibiotics is essential for human health. The consequences of irrational use can be divided into two categories: 1) Infections that would otherwise not have occurred and 2) Increased frequency of treatment failures and increased severity of infections. Increased severity of infection includes the prolonged duration of illness, increased frequency of bloodstream infections, increased hospitalization, and increased mortality.

PPAM members let's play our role in the proper, appropriate, prudent use of antibiotics in our veterinary practice.



**Dr. S. V. Vishwasrao**

Ph.D. (Surgery),  
Editor, PPAM Bulletin.  
vishwasraodr@hotmail.com  
Mobile - 9322242184

## Mumbai Rabies Elimination Project-BMC



BRIHANMUMBAI MUNICIPAL CORPORATION  
VETERINARY HEALTH DEPARTMENT

### Mumbai Rabies Elimination Project



Dear Veterinarian,

Rabies is a major public health risk through transmission by dogs, but the true disease burden is unknown due to a lack of reporting and testing of suspect rabid dogs. BMC Veterinary Health Department (VHD) is intensifying rabies surveillance efforts so that the impact of control measures can be monitored, and Mumbai City can ultimately demonstrate Rabies Free status. To this end, all veterinarians are requested to report any animal showing possible signs of rabies, including sudden death, to the Rabies Nodal Officer.

Rabies control across India is advancing under the 'National Action Plan for Dog mediated Rabies Elimination' (NAPRE). Mumbai has an opportunity to be an early example of success in achieving 'Rabies Free' status due to its favourable geography and strong veterinary infrastructure. To achieve the aim of a rabies-free Mumbai, VHD has formed a Rabies Task Force, led by a Rabies Nodal Officer, and the project has been named the 'Mumbai Rabies Elimination Project'. However, Rabies Free status cannot be achieved unless a robust surveillance system is established to test all dogs showing possible signs of rabies.

The veterinary sector encounters a large caseload of animals presenting with signs of illness and so serves as the front-line in the detection of diseases like rabies. During 2022 BMC VHD has established capacity to investigate reports of suspect rabid dogs across the city. Following the report of a suspect rabid dog, the investigation is coordinated under the Rabies Nodal Officer to immediately assess dogs, take samples for diagnosis, and advise on post-exposure treatment for people bitten. This will provide a detailed map of where dog rabies cases occur across the city and enable changes in rabies distribution to be monitored as dog vaccination campaigns expand.

#### YOUR ROLE:

The signs of rabies vary widely in dogs and dogs may present with vague signs that vets may not consider as rabies. Animal rabies is a notifiable disease in India under the 'Prevention and Control of Infectious and Contagious Diseases in Animals Act, 2009' and so vets must report any dog presenting with **any** of the following signs. Use the acronym ALPHA to remember the clinical signs stated in the WHO case definition of rabies: **A** – Aggression (unprovoked or abnormal), **L** – Lethargy, **P** – Paralysis, **H** – Hypersalivation, **A** – Abnormal vocalisation.

All dogs with rabies will die within ten days of the onset of clinical illness and so all dogs that die following a short illness should be reported to the Rabies Nodal Officer so that samples can be taken for rabies diagnosis. Many cases of rabies are mistaken for Distemper and so all dogs that die suddenly following neurological signs should be reported for testing.

Whilst rabies is endemic, we recommend all veterinary professionals to take pre-exposure rabies vaccination due to their increased risk of rabies virus exposure during day-to-day work in close contact with dogs.

We sincerely appreciate your support in striving towards a Rabies Free Mumbai.

#### Rabies Nodal Officers:

##### Dr. Sneha Tatelu

Senior Veterinary Officer, B.M.C.  
Contact: 98926 15850  
Email: vetsu04.deonar@mcgm.gov.in

##### Dr. Dhananjay Shinde

Senior Veterinary Officer, B.M.C.  
Contact: 98925 99940  
Email: vetce.deonar@mcgm.gov.in

Thank you & Best Regards,

##### Dr. K. A. Pathan

General Manager (Veterinary Health Dept. & Deonar Abattoir)  
Brihanmumbai Municipal Corporation



## Dr. Dhananjay Bapat Recipient of Furfest Dr. J. P. Gurbuxani Award

Dr. Dhananjay Bapat received the Furfest Dr. J. P. Gurbuxani Award for the Man of the Pet Industry 2022 on 11.11.2022. He received a citation an award. He received this award in recognition of his exceptional professional contribution and dedicated services for the upliftment of the profession and the Indian Pet Industry. Dr. Dhananjay Bapat's exemplary ethical standards and Guidance to Colleagues were appreciated and termed commendable. He was truly recognized as the Man of the Pet Industry in 2022.



## Egg-bound Syndrome in a Two-year-old Budgerigar

Dr. Nihar Jayakar

A two-year-old Budgerigar 39gm presented to the clinic feeling weak and was sitting on eggs.

Her mate was feeding her till previous day but next day she came out of the nesting box and was not able to stand

On physical examination, it was diagnosed as an egg-bound syndrome. A radiograph confirmed the diagnosis.

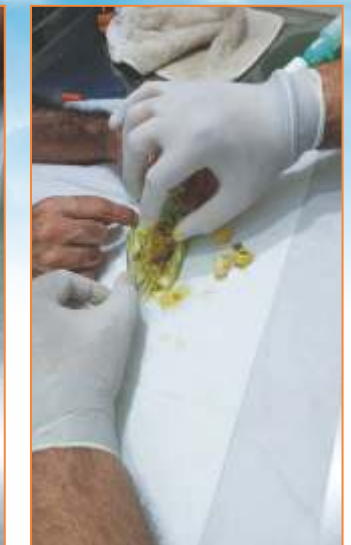
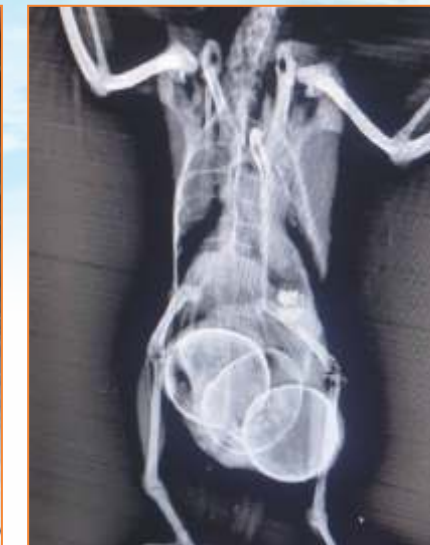
The presence of three eggs in the coelomic cavity was confirmed.

The bird was anesthetized using isoflurane and three eggs were manually removed from the cloacal opening with digital pressure.

The bird recovered uneventfully

The bird was put on meloxicam, enrofloxacin, and multivitamins. Egg binding occurs when the egg does

not pass through the reproductive system at a normal rate. Egg bound occurs when there is difficulty in laying an egg because of an inflammation of the oviduct or partial paralysis of the muscles of the oviduct and the production of a very large egg that cannot be laid physically.



## Cranial Cruciate Ligament Repair in a Dog

Dr. Barry Kalsy, Dr. Shivangi Pai and Dr. Akshta Gulvadi

Cranial cruciate ligament (CCL) disease is a relatively common disease amongst middle to old age small and large breed dogs. It involves the rupture of the CCL which is one of the stabilising ligaments of the knee joint causing increased translation within the joint during extension & flexion.

TPLO (Tibial Plateau Levelling Osteotomy) is a corrective procedure performed for CCL tears and is the gold standard. Other corrective techniques for CCL injured joints include extracapsular stabilisation, TTA (Tibial Tuberosity Advancement) and CBLO (Cora based Levelling Osteotomy). None of the techniques aim to repair the CCL but modify the functionality of the joint to negate the need for a CCL.

TPLO involves making an osteotomy on the tibial metaphysis and rotating the tibial plateau to get a post-op slope of 0-5 degrees. The flattened slope then

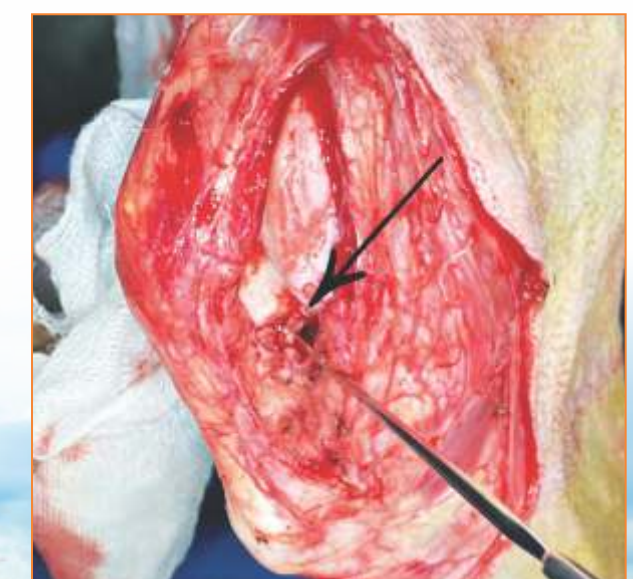
prevents excessive translation of the femur in the unstable joint thus nullifying the need for the CCL.

A 5y MI GSD presented with a h/o chronic lameness with his right hindlimb. A physical exam showed a positive drawer and tibial thrust test and medial buttressing indicative of complete cranial cruciate injury. Stifle radiographs showed increased joint effusion and caudal displacement of femoral condyles relative to the tibial plateau also indicative of a CCL tear.

A TPLO surgery was performed for the right stifle.

Points to note:

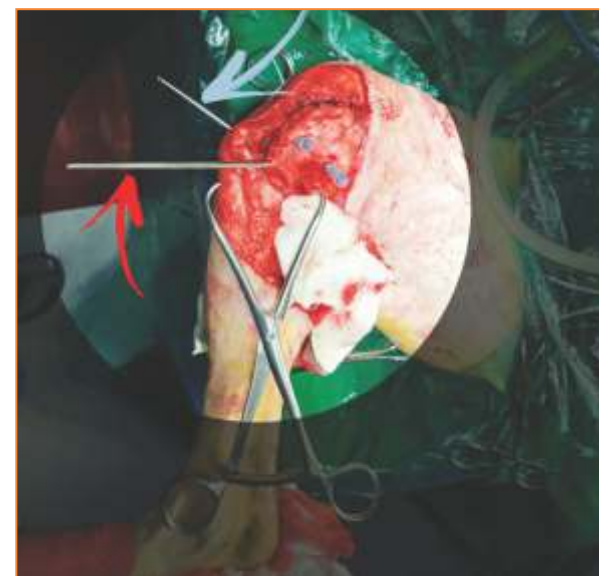
1. Pre-op sedated radiographs are important for pre-surgical planning.
2. Always perform an arthrotomy prior to corrective TPLO to check for medial meniscal injury.







arthrotomy incision. OA changes seen on femur



remnant of cranial cruciate ligament



identifying the joint space with feeler pins



red arrow - anchor pin to rotate the plateau.  
Blue arrow - transfixation pin

## Procedure for Registration of Pet Shop and Dog Breeding Registration under PCA Act 1960

Dr. Nitin Chavan

The pet animal trade and pets shops are in bloom all over India and companion animal demand is on the rise. To cater the ever increasing demand, animals are often subjected to cruelty. Prevention of Cruelty to Animals (Dog Breeding and Marketing) Rules, 2017 and Prevention of Cruelty to Animals (Pet Shop) Rules, 2018 are enacted in India in exercise of the powers conferred by section 38 of Prevention of Cruelty to Animals Act 1960. The rules are framed in consideration with five freedoms of animals viz. - Freedom from Hunger and Thirst...

Freedom from Discomfort. ...  
Freedom from Pain, Injury or Disease. ...  
Freedom to Express Normal Behavior. ...  
Freedom from Fear and Distress...

These rules mandate registration of pet shops and Dog Breeding and Marketing Establishments to be registered with State Animal Welfare Board. It is very important to understand what establishment needs to register under these rules as it's a common point of confusion among the stake holders.

The pet shops as defined in Pet Shop Rules are A shop, place or premises, including any shop, place or premises in a weekly or other market, where pet animals are sold or housed, kept or exhibited for sale, or where any retail or whole-sale business involving the selling or trading of pet animals are carried out, and includes online platforms over which the sale and purchase of pet animals is carried out wherever the context permits need such registration. Here Pet animals includes dog, cat, rabbit, guinea pig, hamster, rodents of the rat or mice category, pet birds and such other type of animals, the ownership of, and trade in which, is not prohibited by any other law, rules or regulations.

The Dog Breeding and Marketing Rules are applicable to Dog Breeders, Here the rules define Breeder as An individual or group of persons who own dogs of specific breeds for breeding and sale of dogs and pups, and includes boarding kennel operator, intermediate handler and trader.

Following is an easy guide to register pet shop / Dog Breeding establishment with Maharashtra Animal Welfare Board.

- Visit <https://ahd.maharashtra.gov.in/content/resources>.
- Download the application form, Guidelines to fill the application form, formats of records to be maintained.
- Fill the Form, Details to be filled are mentioned in Guidelines
- Demand Draft of ₹ 5000 in favour of, 'Maharashtra State Animal Welfare Board' payable at Pune
- Send the application form with DD and relevant Documents to -  
The Member Secretary,  
Maharashtra Animal Welfare Board,  
Commissionerate of Animal Husbandry,  
Maharashtra State  
Opposite to Spicer College, Aundh Pune - 411064.

The procedure of registration undergoes 3 phases

- 1) Application by the owner to Maharashtra Animal Welfare Board
- 2) Scrutiny of the application by MAWB. Upon receipt of a complete application the board will issue a provisional certificate of registration to the pet shops which is valid for 90 days.
- 3) The board will forward the application to concerned District Society for Prevention of Cruelty to Animals for inspection of the premises.
- 4) Upon receipt of the application from state board the SPCA will form a 3 member committee to inspect the establishments for their adherence to the rules. Upon inspection the SPCA committee will submit its report to the board with recommendation whether the establishment is eligible for the registration.
- 5) On recommendation by concerned SPCA, the board will either register the establishment or reject its registration with valid reasons of rejections.
- 6) The pet shop owner / breeder on rejection of registration may appeal to MAWB.
- 7) The registered pet shops have to submit annual report of details of number of animals sold, traded, bartered etc. to MAWB.

For further details please contact District SPCA.



## Feline Foundation Anti Rabies Program





## Stray Dog Vaccination Program by ARPAN on World Rabies Day

Versova, Manish Nagar, D. N. Nagar Police Station, Aram Nagar  
Total 142 dogs ARV for strays



## Fur Ball Product Story Launch



## Launch of New Product by Farmina



## PPAM and Mumbai Veterinary College Interactive Seminar

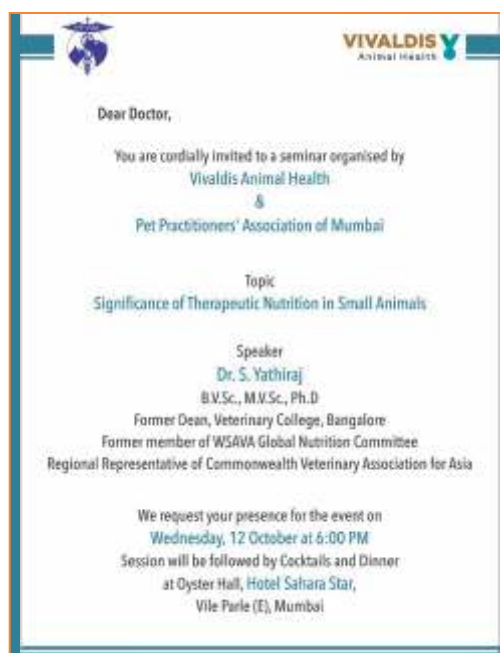
PPAM in collaboration with Mumbai Veterinary College conducted an interactive seminar at Mumbai Veterinary college on 7-11-2022 at Goregaon Campus. Speaker was Dr. Shikher Singla, a leading small Animal Practitioner, in San Fransico USA. The Topic was Guidance for Qualifying examination for small Animal Practices in USA & Canada. 220 Students 15 practitioners along with college faculty attended the seminar.







## PPAM and Vivaldis Event held on 12.10.2022



## Proud Moment for PPAM Members

**Dr. Milind Hatekar, Dr. Jairam Ramani and Dr. Hitesh Swali**



*Dr. Milind Hatekar and Dr. Jairam Ramani invited as Chief Guests at Lucknow PPA*



*Dr. Hitesh Swali*



*Dr. S. V. Vishwasrao CE at Jaipur*



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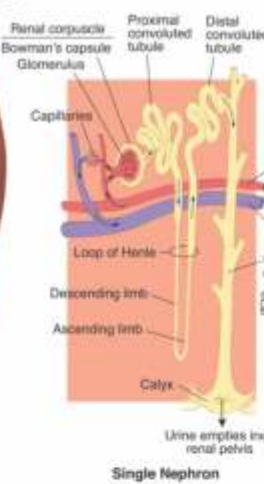
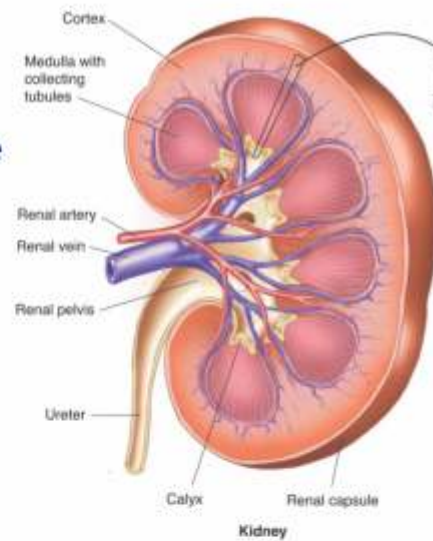
LOW SODIUM &  
ADDED COMPLEX OF  
VITAMINS

ENERGY DENSE TO  
HELP MAINTAIN BODY WEIGHT

ADDED POTASSIUM

### SYMPTOMS

- Polydipsia
- Loss of appetite
- Vomiting
- Polyuria
- Weight loss
- Halitosis
- Dull coat
- Lethargy



### PHYSIOLOGICAL CHANGES

- Hypertension
- Hyperphosphemia
- High Sodium & Water Retention
- Hypokalaemia
- Metabolic Acidosis
- Uraemia
- Osteodystrophy



**Kidneys will continue performing until  
they have lost 70-80% of function.  
Take care of your companion's kidneys!**

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436/2, IB Corporate House, Village Indamara,  
Post Pandri, Rajnandgaon Chhattisgarh 491441, India



## FSAPAI EC Meeting held on 9.10.2022 at Guwahati.



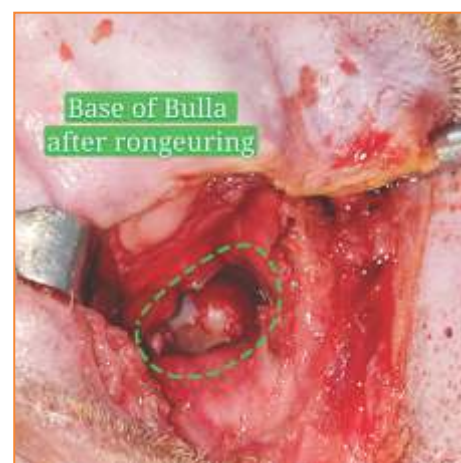
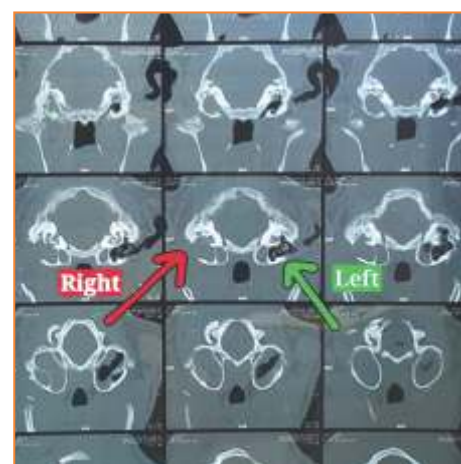
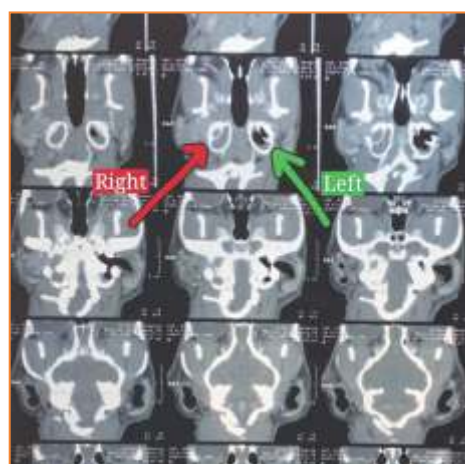


## Total Ear Canal Ablation and Lateral Bulla Osteotomy in a Cat

**Top Dog Surgery Team: Dr. Barry Kalsy, Dr. Shivangi Pai, Dr. Akshata Gulvady**

A 14-year-old Female Spayed cat presented with an ulcerated polyp in the ear canal which caused a chronic ear infection with purulent discharge. CT scan revealed -Opacity in the Right tympanic bulla and the inner half of the external ear due to fluid/soft tissue swelling - Mild to moderate fluid in the left tympanic bulla Total Ear Canal Ablation and Lateral Bulla Osteotomy was carried out in the right ear. Uneventful recovery from anaesthesia, with no post-op horner's syndrome.

Points to remember: -Be careful to avoid damage to the facial nerve which runs ventral to the horizontal canal and close to the middle ear - Feline tympanic cavity is divided into 2 compartments by a septum which needs to be perforated for complete drainage - After curettage, flush ear canal with a large amount of fluid to ensure complete removal of fluid and secretory epithelium



### Appeal to PPAM Members to Renew Membership

- |                                 |  |
|---------------------------------|--|
| 1. Renewal of Annual Membership | Rs. 1500.00 + GST (Rs. 270.00) = Total Rs. 1770.00 |
| 2. New Membership               | Rs. 1750.00 + GST (Rs. 315.00) = Rs. 2065.00       |
| 3. Life Membership              | Rs. 17500.00 (No GST)                              |

#### Bank Details :

Indian Bank; A/c name - Pet practitioners association, Branch- Santacruz (w)  
A/c no. 744946564, IFSC: IDIB000S010

(As soon as payment transfer is made please send a message to Treasurer Dr. Anil Vade on 9820016420.  
Please also mention your complete name, date of payment and transaction id)

## PPAM Speakers at India International Pet Trade Fair, Mumbai.



Dr. Dhananjay Bapat



Dr. Makarand Chavan



## PPAM Felicitates MAFSU, B.V.Sc & A.H Toppers.



**Prajwal  
Suresh Chaple**

Nagpur Veterinary College,  
CGPA 8.731



**Kanchan  
Manohar Borate**

KNP College, Shirwal,  
CGPA 8.660

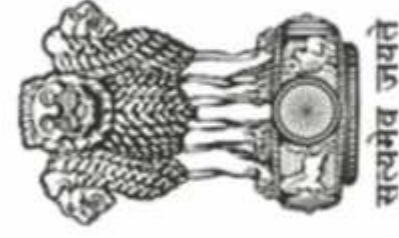


**Yogita  
Ramesh Game**

Nagpur Veterinary College,  
CGPA 8.655



## Public Notice regarding Pet Shop Registration



Society for Prevention of Cruelty to Animals, Mumbai City Districts

### Public Notice

#### **Prevention of Cruelty to Animals (Pet Shops) Rules, 2018 and Prevention of Cruelty to Animals (Dog Breeding and Marketing) Rules, 2017.**

##### 1) What is it?

Prevention of Cruelty to Animals (Pet Shops) Rules, 2018 and Prevention of Cruelty to Animals (Dog Breeding and Marketing) Rules, 2017 mandates every Pet Shop (Pet Shop is a place where pet Animals or Birds are sold or housed, kept or exhibited for sale) and Dog Breeder (whoever own dogs of specific breeds for breeding purpose and sale of dogs and pups, and includes boarding kennel operator, intermediate handler and trader) to register with Maharashtra Animal Welfare Board.

##### 2) Why is it necessary?

Buying pets from registered pet shops / Dog breeder helps in Prevention of Cruelty to Animal. The rules are formulated so as to ensure

- Healthy pets in trade
- The pets are free from cruelty.
- Prevents Inbreeding and propagation of genetic defects/disorders
- Benefits to better pet trade practices.

##### 3) How to ensure that you buy pets from registered Pet Shop/ Dog Breeder?

The Law mandates registered Pet Shop / Dog breeder should display its valid registration certificate with Maharashtra Animal Welfare Board at a prominent place in his / her premises.

For further details visit <https://ahd.maharashtra.gov.in/content/resources>.

**Always Ask For The Registration Certificate Before  
You Buy Your Next Pet Companion.**

Sd-

(Dr. Shailesh G. Pethe)  
Deputy Commissioner of Animal Husbandry,  
And, Member Secretary,  
Mumbai City District SPCA  
Mumbai Suburban District SPCA





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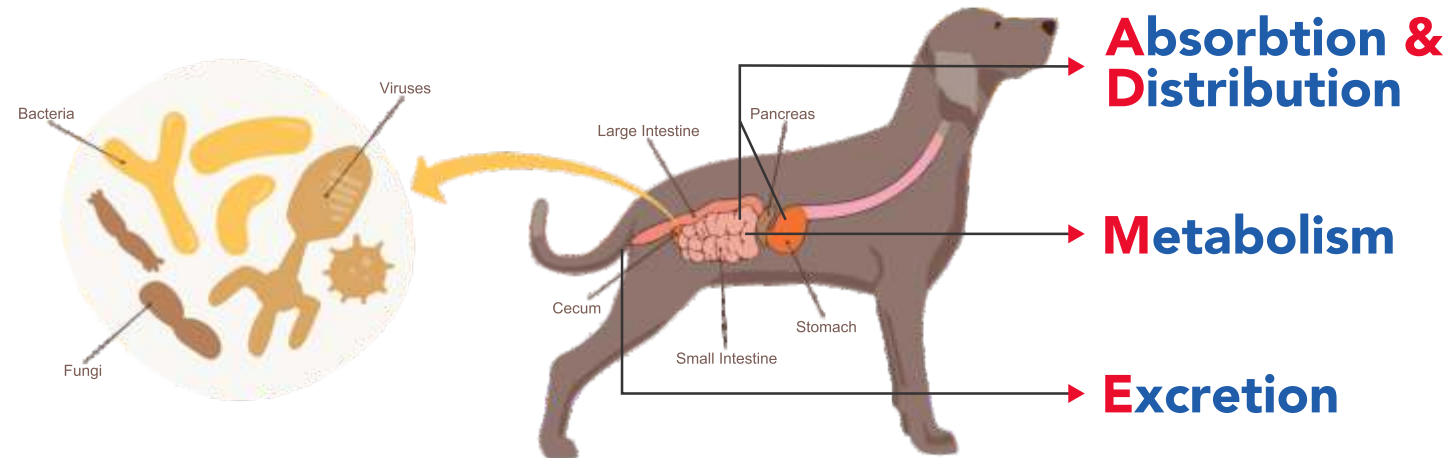
STOMACH ULCER  
PREVENTION

RENOURISHMENT

ACID REFLUX

TRANSIT TIME  
(INTESTINAL) MODIFICATION

OESOPHAGITIS



**Gastro Gravy** helps the dog in more efficient **ADME!**  
A healthy diet leads to a healthy gut and a healthy life!

## Highlights of PPAM Meet the Industry-14 held on 18.12.2022







Dr. Deepa Katyal Engineer



Dr. Nikita Pujari



Dr. Sangeeta Vengsarkar Shah



Dr. Shivali Gaikwad, Sr. Vet MCGM



Dr. Sheela Jadhav, IVA convener







Dr. Umesh Chandra Sharma,  
Honorable President Veterinary Council of India



Dr. Shivajirao Dange, IRS, Govt of India



Dr. Shashank Sinha, CEO, Drools



Dr. Shivajirao Dange, IRS, Govt of India



Dr. Tadvi, Divisional Deputy Commissioner  
Govt. of Maharashtra



Dr. Pandit



Dr. Jairam Ramani



MSVC President Dr. Ajay Poharkar



Dr. Shailesh Pethe



Dr. G. S. Khandekar



Dr. Anil Kakad, Orange Pet Nutrition



Dr. Dagdu Bhau Kadam, Zeal Pet







Mr. Yogesh Khadke, Director-Freossi



TRIKKON S. K. Team  
Ms. Shubhangi B. Kadam-Jadhav



Quiz contest winners



Registration Counter



Registration Counter



Registration Counter



Dr. Deepak Khot, Sr. Veterinarian





# A Review on Gastrointestinal Foods In Canines

Dr. Adarsh J.

Asst Techno-commercial Manager, Drools Pet Food Pvt. Ltd.

## Introduction

Dogs are the most successful canids that have been kept as pets by many people all over the world, regardless of their social standing; and the majority of these dogs have been kept as watchdogs, companion animals, and guiding dogs for handicapped people. Police and armed services have also utilized them as a search and rescue dogs. (1)

Healthy organs support the overall digestive system's function by digesting and absorbing nutrients, neutralizing and eliminating waste and undesirable products. The main issue with the majority of gastrointestinal disorders in dogs was the presence of clinical indicators such as vomiting, diarrhea, and weight loss, which are shared by many conditions that have either a primary or secondary effect on the gastrointestinal system.(2)

A metabolically active organ that is intrinsically related to pet health is the gastrointestinal (GI) microbiome of cats and dogs. The GI microbiome of cats and dogs uses food as a substrate, therefore food is crucial in determining the GI microbiome makeup and metabolism. The host's digestion of nutrients and the generation of postbiotics—compounds created from bacteria that can have an impact on pet health—are both facilitated by the microbiome(3). Consequently, through the food they choose to give their pets, pet owners can influence the GI Microbiome. Even if there is a larger incidence of digestive issues in dogs in India, the data on their prevalence is limited, and it is still unclear whether diagnostic equipment and urgent care medications are necessary in clinics. Pet foods are formulated to contain the typical nutritional building blocks of carbohydrates, proteins, and fats, but increasingly include microbiome-targeted ingredients, such as prebiotics and probiotics. Each of these categories, as well as their relative proportions in food, can affect the composition and/or function of the microbiome.

## 2. Clinical importance and prevalence

GI issues are the common causes of morbidity in dogs and cats. Estimated Digestive problems are: Vomiting 13.6 - 24.1%, Diarrhea 19.1 - 33.1%, Vomiting and Diarrhea 10.1 - 17.8%, and Anorexia 19.2 - 23.2%.(4) Gastrointestinal diseases can happen in all ages and it can be lethal if not treated and mortality in these cases are mainly because of loss of fluids from the body. Diarrhea is defined as a change in the frequency, consistency or volume of bowel movements and stools. Diarrhea is the most common manifestation of small intestine Diarrhea. The diarrhea associated with small intestinal conditions differs from that typically associated with large intestinal disorders. A

multitude of factors, including trophic hormones, adequate blood flow, neurologic input and nutrient composition of digesta, are involved in maintaining intestinal integrity (mass and function). The presence or absence of certain nutrients and ingredients can positively or negatively affect the bowel.

## 3. Causes of Acute & Chronic Intestinal Disease

Extragastrintestinal (Metabolic) Causes:

1. Hepatic disease (portosystemic shunt)
2. Hyperthyroidism
3. Hypoadrenocorticism (Addison disease in dogs)
4. Renal insufficiency
5. Pancreatitis (acute or chronic)
6. Exocrine pancreatic insufficiency (EPI)

## Gastrointestinal Causes:

1. Intestinal parasites (Giardia infection, Tritrichomonas infection in cats)
2. Chronic partial obstruction of the small intestine
3. Lymphangiectasia
4. Neoplasia: lymphosarcoma
5. Food intolerance/food allergy
6. Chronic enteropathies/IBD
7. Eosinophilic enteritis
8. Lymphoplasmacytic enteritis

## 4. GASTROINTESTINAL FOODS

Several commercial veterinary therapeutic foods have been specially formulated for managing gastrointestinal (GI) disease in dogs and cats. Typically, these products are highly digestible and have consistent ingredient and nutrient profiles.

Highly digestible isn't specifically defined in a regulatory sense. However, products with protein digestibilities of 87% and 90% and those with fat and carbohydrate digestibilities have traditionally been considered highly digestible. For popular commercial foods, the average digestibility coefficients for crude protein, crude fat, and crude carbohydrate are 78 to 81%, 77 to 85%, and 69 to 79%, respectively.(5)

In order to promote digestibility, commercial veterinary therapeutic meals designed for GI disorders frequently include highly refined meat and carbohydrate components. The main non-water component of diets designed to treat GI problems is carbohydrate. The supply and processing of pet foods affect the digestion of carbohydrates. (5) Cooked

starches, particularly those found in corn, rice, barley, and wheat, are very well digested by dogs. Other carbohydrates, such as potato and tapioca, are less easily digested, especially when prepared incorrectly.

While it is true that cats can also digest carbohydrates effectively, some medical professionals believe that cats with small intestinal diseases are less tolerant of dietary carbohydrates than dogs with comparable malassimilation reasons.

The ability of moist foods to digest carbohydrates is correlated with their particle size. Therefore, before they are added to moist recipes, carbohydrate ingredients (such as rice, corn, etc.) should be chopped or ground. Evidently, this association does not affect extruded dry products. When dogs eat extruded grains, their ileal carbohydrates are almost entirely digestible (dry products). (6)

Many macro and micro-mineral needs in the context of GI illness are poorly known. However, vomiting and diarrhoea are likely to cause losses in salt, potassium, and B vitamins. As a result, meals designed to manage GI illnesses should have more sodium, potassium, and B vitamins than is necessary for maintenance. Patients at risk of developing deficits in fat-soluble vitamins have problems absorbing fat. Thus, fat-soluble vitamins should be added to highly digestible diets designed for patients with steatorrhea.

Because fibre diminishes pancreatic enzymatic activity in vitro and affects dry matter digestibility, GI meals rarely have crude fibre contents higher than 5% dry matter (DM). More recently, soluble or mixed fibres have been added in tiny amounts (5% DM) to several highly digestible commercial veterinary therapeutic meals because short-chain fatty acids produced by intestinal microbial fermentation of fibre may benefit the large intestine mucosa.(7)

When treating acute gastroenteritis, malassimilation brought on by small bowel disease, or exocrine pancreatic insufficiency, veterinarians most frequently advise GI meals. Anecdotal reports and the use of highly digestible diets in clinical trials involving animals with spontaneous and experimental exocrine pancreatic insufficiency have both shown the value of these foods. To lessen exposure of the colonic mucosa to ingesta, some gastroenterologists also advise patients with certain colonic diseases to eat these foods. This course of treatment has been recommended for the control of constipation and inflammatory colitides.

## FIBER-ENHANCED FOODS

Soluble fibers (e.g., pectins and gums) increase the viscosity of intestinal contents, which delay gastric emptying and slow small bowel transit time. Viscosity markedly affects the extent of intraluminal mixing of digesta and digestive enzymes, which can shift sites of absorption and subsequently the rate of nutrients entering the

bloodstream. (8) Bacteria in the colon ferment soluble fiber to short-chain fatty acids, including acetic, propionic and butyric acids. Colonocytes apparently use butyrate, whereas propionic and acetic acids are absorbed.

Short-chain fatty acids are nutritive to the colonic mucosa and foster normal colonic flora while discouraging pathogenic flora. These properties result in an acidic colonic pH and increased colonic bacterial numbers, colonic mucosal mass and fecal dry matter and water content. Soluble fiber may bind and decrease macronutrient absorption and decrease protein digestibility. Certain fiber types, especially gels and gums, may be of benefit in GI disease because they bind toxins and irritating bile acids. This binding effect prevents these substances from further damaging the intestinal mucosal surface.

Insoluble fiber is primarily composed of cellulose and structural polysaccharides that are relatively resistant to digestion and that ferment slowly, increase intestinal residue and normalize intestinal transit time. These fibers have little or no effect on gastric emptying, mineral absorption, or colonic microflora unless fed in high concentrations (>20% DM). One of the most profound effects of fiber on the GI tract is the normalization of gut motility, particularly in the stomach, proximal small bowel and colon. This effect appears to be greatest for insoluble fibers such as cellulose. In general, increasing the insoluble fiber content of the food resolves or modulates most cases of colitis. There are several plausible mechanisms by which insoluble fiber controls large bowel diarrhea. (5) Undigested residues absorb water and increase bacterial mass, which increases fecal bulk. Fecal bulk provides physical intraluminal stimulation to reestablish neuromuscular-endocrine co-ordinations and normalize intestinal transit times.

## RESTRICTED- AND MODERATE-FAT FOODS

In general, dietary fat is more digestible than digestible carbohydrate and protein and provides 2.25 times more calories by weight.

Average fat digestibility in commercial dog food is approximately 90%. Average fat digestibility of commercial cat foods ranges from 74 to 91%. Patients with GI or pancreatic disease may not tolerate high-fat foods (>25% DM), which may contribute to diarrhea and steatorrhea. Foods containing moderate amounts of fat (12 to 15% DM for dogs and 15 to 22% DM for cats) are generally tolerated and have sufficient caloric density for most patients. Commercial veterinary therapeutic foods containing less than 10% DM fat need to be fed in larger volumes to meet the patient's caloric requirement. Some patients may not tolerate this volume of food. (8)

Restricted-fat foods are often recommended for patients with gastroenteritis in which the complex process of fat digestion and absorption may be disrupted. Unabsorbed fat



in the bowel lumen may cause secretory diarrhea. Dietary fat should be reduced when fat maldigestion or malabsorption is present due to exocrine pancreatic insufficiency or reduced bowel surface area. The latter occurs in short bowel syndrome and other conditions in which inflammation, infectious agents, neoplasia or surgery markedly reduces the intestinal villus surface area.

#### GLUTEN-AND GLIADIN-FREE FOODS

Several potential antigens are found in flour when cereal grains are processed. One polypeptide, gliadin, is found in wheat, barley, rye, buckwheat and oat flours. Gliadin is responsible for gluten-sensitive enteropathies in people and dogs. Homologous gliadin polypeptide are not present in whole grains and flours produced from rice and corn. (9)

Gluten-induced enteropathy or celiac disease is an important malabsorptive disorder. An analogous condition, termed wheatsensitive enteropathy, has been identified in Irish setter dogs and is suspected to affect dogs of other breeds as well. Affected animals develop small bowel diarrhea due to malabsorption, secondary to villous atrophy. Gluten- and gliadin-free foods are most commonly recommended for managing dogs suspected of having wheat-sensitive enteropathy. (10)

#### 5. Key Nutritional factors for dogs suffering from Gastrointestinal tract diseases

Factors	Dietary recommendations
Water	Offer water free of choice always Recommend Moist food
Protein	20–23%
Phosphorous	0.8–1.0%
Sodium	≤0.5%
Chloride	1.5 x sodium levels in foods for dogs
Potassium	0.7–1.0%
Dietary fibre	6.5–8.2%
Vitamin E	≥400 IU vitamin E/kg of food

- Probiotics help the movement of food particles and as an influence on transit time
- Fibre enhances the bulkiness of the food and also reduces the overall stress on intestinal tract
- Prebiotic such as FOS helps in the nourishment of Microbiome in the food as such.

#### 6. Conclusion

The prognosis for dogs and cats with gastric motility disorders varies with the underlying cause. Mechanical obstructions often can be managed effectively through surgical or endoscopic (e.g., foreign body retrieval) means, resulting in an excellent prognosis. Occasionally, dogs and cats with longstanding gastric outflow obstruction with gastric distention may have residual gastric motility abnormalities. In this regard, Veterinary colleges, institutions and practicing vets should research on gastro diseases and explore the changes of new drugs and therapeutic diets.

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## A Review on Therapeutic Renal Diets

Dr. Punitha G.

MVSc (Animal Nutrition), Asst. Product & Techno commercial Manager, Drools Pet Food Pvt. Ltd.

#### 1. Introduction

Chronic kidney disease (CKD) is the most common disease affecting the kidneys of dogs. It may be recognized by reduced kidney function or the presence of kidney damage. CKD is defined as kidney damage present for at least three months, with or without decreased glomerular filtration rate (GFR) or greater than 50% reduction in GFR persisting for at least three months (Polzin et al., 2005).

When dogs have CKD, the kidneys cannot perform their function well as they used to be, like filtering and reabsorbing nutrients. This condition is not reversible, but the progression can be slowed down. Dietary therapy has remained the cornerstone of management of chronic renal failure for decades. The goals of dietary modification are to (1) meet the patient's nutrient and energy requirements, (2) alleviate clinical signs and consequences of the uremic intoxication, (3) minimize disturbances in fluid, electrolyte, vitamin, mineral, and acid–base balance, and (4) slow progression of the renal failure (Elliot et al., 2006). Recommendations regarding dietary therapy and other components of conservative medical management must be individualized based on clinical and laboratory findings. Chronic renal failure is progressive and dynamic, and therefore serial clinical and laboratory assessment and modification of therapy in response to changes in the patient's condition are integral to successful therapy. Therapeutic foods for kidney conditions are designed to help reduce workload on the kidneys, enabling them to function more effectively. This review article will throw a light up on clinical importance of CKD, causes for CKD, nutritional management recommendations & key nutritional factors for dogs during CKD.

CKD : Chronic kidney disease, CRF : Chronic renal failure, GFR : Glomerular filtration rate

#### 2. Clinical importance

CKD is a common cause of morbidity and mortality in dogs and cats. Estimated prevalence of CKD is 0.5% to 7% in dogs and 1.6% to 20% in cats. With the exception of cancer, kidney disease was the most common cause of death (Bronson et al., 1982). CKD occurs in dogs and cats of all ages, but it is frequently a disease of older pets. In a 1995 survey of private practices, the mean ages of dogs and cats with kidney disease were 10.2 and 13.2 years, respectively (Kirk et al., 2001). Prevalence of CKD was reported to be nine cases/1,000 dogs of all ages examined, 12.5 cases/1,000 in dogs between seven and 10 years old, 24 cases/1,000 in dogs between 10 and 15 years old and 57 cases/1,000 in dogs over 15 years old (Polzin et al., 2005).

International Renal Interest Society (IRIS) divided CKD in to four stages based on stable serum creatinine concentrations (Table 1). This classification scheme emphasizes the continuum of severity of renal injury in dogs and cats.

Table. 1 International Renal Interest Society Stages of chronic kidney disease in dogs and cats

Stage	Serum creatinine values (mg/dL)	
	Dogs (mg/dL; mmol/L)	Cats (mg/dL; mmol/L)
IRIS CKD stage 1	<1.4; <125	<1.6; <140
IRIS CKD stage 2	1.4-2.0; 125-179	1.6-2.8; 140-249
IRIS CKD stage 3	2.1-5.0; 180-439	2.9-5.0; 250-439
IRIS CKD stage 4	≥5.0; ≥440	≥5.0; ≥440

#### 3. Causes of kidney diseases

Juvenile kidney disease increases suspicion of a familial nephropathy; however, juvenile kidney disease may be due to non-genetic causes. The specific term juvenile nephropathy has been used to describe disorganized nephrogenesis including kidney failure in young dogs. The term renal dysplasia describes abnormal differentiation of the kidneys. Specific histologic findings in renal dysplasia include foetal glomeruli, atypical tubular epithelia and persistent mesenchyme. Hereditary nephropathy has been reported to occur in several breeds of dogs including Samoyeds, English cocker spaniels and bull terriers.

CKD may result from a variety of systemic conditions that cause kidney damage or there may be no apparent underlying cause. Infectious, inflammatory and immune-mediated diseases (e.g., leptospirosis, rickettsial diseases, pyelonephritis, amyloidosis) may cause inflammation of the renal interstitium or glomeruli. Glomerulonephritis secondary to systemic infectious, inflammatory or neoplastic diseases may be a common cause of CKD, especially in dogs. Drugs that may cause nephrotoxicosis include antimicrobials (aminoglycosides), antifungals (amphotericin B), analgesics (aspirin, ibuprofen and phenylbutazone), immunosuppressive agents (penicillamine) and chemotherapeutic drugs (cisplatin, methotrexate and daunorubicin) (Grauer, 2005). Geriatric patients may be at greater risk for drug-induced nephrotoxicity.

#### 4. Importance of kidney disease in dogs

The primary functions of the kidneys are to excrete metabolic wastes (e.g., urea, creatinine), regulate fluid, electrolyte and acid-base balance and produce or activate



several hormones including erythropoietin, calcitriol and renin. Anatomically, these functions occur in glomeruli (i.e., glomerular filtration and membrane permselectivity), renal tubules (i.e., urine concentration and tubular resorption) and other areas of the kidney (i.e., erythropoietin, calcitriol, renin). CKD may be associated with generalized renal dysfunction or it may involve only one function. Loss of body weight due to muscle loss is commonly seen in dogs cats suffering from CKD and it is likely multifactorial, related to (1) sarcopenia, an age-related loss of muscle; (2) cachexia, muscle loss affected by inflammatory cytokines; and/or (3) decreased protein and amino acid (AA) intake, whether owing to specific dietary manipulation and/or decreased caloric intake (Mak *et al.*, 2011 & Wang *et al.*, 2014). Protein-energy wasting, a cachectic state characterized by nutritional and metabolic derangements, is commonly identified in people with CKD, and it contributes to decreased quality of life and increased morbidity and mortality (Obi *et al.*, 2015 & Carrero *et al.*, 2018).

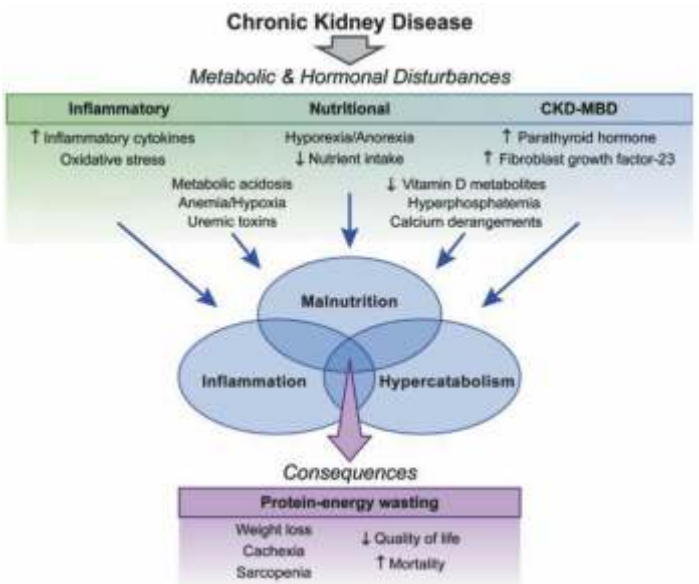


Fig. 1. Contributors and consequences of protein-energy wasting (PEW) syndrome associated with CKD.

## 5. Nutritional management

### 5.1 Energy

Sufficient energy must be provided to prevent endogenous protein catabolism, which results in malnutrition and exacerbation of azotaemia. Dogs should be fed 132 kcal\* (body weight in kilograms) 0.75 of energy per day. Energy intake should be customized based on serial determinations of body weight and body condition score. A typically diets designed for managing CRF are formulated with a high fat content because fat provides approximately twice the energy per gram than carbohydrate. This formulation results in an energy-dense diet that allows patients to obtain nutritional requirements from a smaller volume of food. A smaller volume of food minimizes gastric distention, which reduces the likelihood of nausea and vomiting (Elliott *et al.*, 2006).

### 5.2 Protein

Azotemia and uremia are caused by the accumulation of nitrogenous metabolites derived from excessive dietary protein, or degradation of endogenous protein. Studies have shown that modifying dietary protein intake can reduce blood urea nitrogen (BUN) and provide clinical benefits to dogs and cats with CRF (Polzin *et al.*, 1983). The restriction of protein alters progression of renal failure in dogs and cats is less uncertain (Finco *et al.*, 1985). The dietary protein intake should be adjusted to minimize excesses in azotemia, while simultaneously avoiding excessive restriction of dietary protein because of the risk for protein malnutrition.

### 5.3 Phosphorous

The primary nutrient of concern for CKD is dietary phosphorus. Decreasing dietary phosphorus intake slowed the progression of renal disease and prolonged survival in dogs with induced CKD. Hyperphosphatemia is related to reduced survival in cats with CKD (King *et al.*, 2007). The plasma phosphate concentration is a potent stimulator of fibroblast growth factor-23 (FGF-23), a phosphatonin that affects the development of CKD mineral and bone disorder (CKD-MBD). Feeding a reduced phosphorus diet decreased plasma phosphate and FGF-23 in patients with CKD. (Geddes *et al.*, 2013). Feeding a veterinary therapeutic renal diet can prolong survival and decrease the risks of uremic crises in dogs and cats with naturally occurring CKD (Elliott *et al.*, 2006).

The 2019 International Renal Interest Society treatment guidelines suggest maintaining plasma (or serum) phosphate concentrations in dogs and cats with CKD between 2.7 and 4.6 mg/dL (0.87–1.49 mmol/L), although a target of less than 5.0 mg/dL (1.62 mmol/L) for patients with stage 3 CKD and less than 6.0 mg/dL (1.94 mmol/L) for patients with stage 4 CKD was deemed more realistic. Controlling the circulating phosphate concentrations is first addressed by decreasing the dietary phosphorus intake, then adding oral phosphate binders in therapeutic renal foods, if needed (Kidder *et al.*, 2009).

### 5.4 Potassium

It is reported that 20% to 30% of dogs with CKD will develop hypokalaemia. Hypokalaemia may result in muscle weakness, polyuria, polydipsia, and constipation. (Philips *et al.*, 1998). Thus, if hypokalaemia is present, it may be helpful to offer a higher potassium-containing diet or oral potassium supplementation with either potassium gluconate or potassium citrate (Bartges *et al.*, 2012). Dogs with CKD can develop either hypokalaemia or hyperkalaemia. Medications that influence the renin-angiotensin-aldosterone system (e.g., angiotensin-converting enzyme inhibitors, angiotensin receptor antagonists) may contribute to hyperkalaemia and the doses may need to be adjusted (Brown *et al.*, 2013).

### 5.5 Sodium

The role of dietary sodium restriction for dogs and cats with CKD is controversial. Studies in people and experimental canine models suggest that high sodium intake contributes to hypertension, nephrotoxicity, and progression of proteinuria (Ritz *et al.*, 2009). In 1 study that included 6 cats with renal insufficiency, feeding a high sodium diet (2.9 g/Mcal; 290 mg/100 kcal), increased the serum concentrations of creatinine, urea nitrogen, and phosphorus. There was no effect noted on blood pressure (Kirk *et al.*, 2006). Given these findings, it has generally been recommended to avoid high sodium intake in dogs and cats with CKD.

### 5.6 Fatty acids

Long-chain omega-3 fatty acids compete with arachidonic acid and alter eicosanoid, thromboxane, and leukotriene production. Remnant kidney studies in dogs have reported that omega-3 fatty acid supplementation (fish oil) reduces inflammation, lowers systemic arterial pressure, alters plasma lipid concentrations, and preserves renal function (Bauer *et al.*, 1999). omega-3 fatty acid supplementation with eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) has also shown anti-inflammatory properties.

### 5.7 Vitamin D

Derangements in vitamin D metabolism are commonly identified in dogs and cats with CKD. Dogs with both CKD and nonazotemic PLN tend to have lower serum 25-hydroxy vitamin D (25[OH]D) and 1,25-dihydroxy vitamin D (1,25[OH]2D; calcitriol) concentrations than healthy dogs. Additional research is needed to determine the manner in which supplementation with various forms of vitamin D influences vitamin D repletion, parathyroid hormone, and FGF-23 concentrations, quality of life, preservation of renal function, and survival.

## 6. Key Nutritional factors for dogs suffering from CKD

Factors	Dietary recommendations
Water	Offer water free of choice always Recommend Moist food
Protein	14 – 20%
Phosphorous	0.2 – 0.5%
Sodium	≤0.3%
Chloride	1.5 x sodium levels in foods for dogs
Potassium	0.4 – 0.8%
Omega 3 fatty acids	0.4 – 2.5%; omega-6: omega-3 ratio 1:1 to 7:1
Vitamin E	≥400 IU vitamin E/kg of food

- Low phosphorous - Reduces kidney overload
- High quality protein - Reduces kidney overload
- Added potassium & reduced sodium - Good for renal filtration

- Low levels of sodium: Eases the renal filtration and improves electrolyte balance.
- Yucca extract: Helps to reduce stool odour
- Antioxidants: Neutralize free radicals and promote healthy immune system.

**All these above-mentioned nutritional corrections are mandated in Drools Vet pro Renal dry food in order to therapeutically solve Renal issues in dogs.**

## 7. Conclusion

Dogs and cats are affected by different forms of kidney disease, and nutritional management will vary accordingly. It is best practice, when determining a nutritional plan for any dog or cat, to consider that animal as an individual. The animal's energy needs and specific nutrients of concern should be determined first. With that in consideration, appropriate diet options can be chosen and offered. Maintaining adequate energy intake is of utmost importance in CKD patients. Concurrent medical management may be required in many cases, and assisted enteral nutritional support can offer sustenance for hyporexic patients.

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## SHORT COMMUNICATION

# A Case Study on Community Engagement for Preventive Healthcare of Stray-owned Dogs and Cats by Veterinarians



Dr. Gauri Thade

**Keywords;** Indian stray dogs, community dogs and cats, preventive care

**Dr. Rashmi Gokhale<sup>1</sup>, Dr. Gauri Thade<sup>2</sup> and Ms. Vinita Kalgutkar<sup>3</sup>**

(1) Project consultant, Project Meher, gokhalers92@gmail.com; +91-90041 38180  
(2) Veterinary consultant, Project Meher, thadegauri@gmail.com; +91-99690 07468  
(3) Founder, MAW foundation, Thane, Maharashtra - 615, vini@meheranimalwelfare.org; +91-83692 71469



Dr. Rashmi Gokhale

## Abstract:

*Dogs and humans share unique relationship ranging from companionship to conflicts. After twenty years of implementation of Animal Birth Control (Dogs) rule, 2001 in India, stray dog population management (DPM) issue is yet to be fully addressed. Local municipal corporation, NGOs and general public are three major stakeholders as per the ABC rule. [6] Project Meher focuses on two key stakeholders- individuals (stray dog caregivers) and private veterinarians who are often under rated in an ABC program. The scientific backbone for developing this local model is ICAM's Dog population management guidelines. [1]*

*MAW foundation is working for welfare of community dogs and cats in Thane and nearby districts. Project Meher is one of the initiatives under MAW foundation to instill a sense of complete preventive care within caregivers of community dogs and cats. Project Meher aims at creating a "Responsible Community dog and cat care model" suitable to implement in an Indian metropolitan scenario.*

## Abbreviations:

1. ICAM: International Companion Animal Management Coalition
2. DPM: Dog Population Management
3. WSAVA: The World Small Animal Veterinary Association
4. JMICAWE: Jeanne Marchig International Centre for Animal Welfare Education
5. ABC: Animal Birth Control
6. BCS: Body condition scoring

## Experimental procedure

A study by Morters M et al. (2014) ruled out the possibilities of free-roaming dogs being unowned, further proving influence of human action driven migrations. [7] Such animals belong to the community. Keeping this in mind, we have established a preventive health care model for community dogs and cats in Thane, India.

Our target community consists of feeders, foster carers and adopters of community dogs and cats (referred as "Caregiver" henceforth). We promoted animal caregivers from Thane to think beyond feeding community animals as a duty of care. [1] We provide low-cost services for preventive healthcare of stray-owned/ fostered/ adopted community dogs and cats. Preventive healthcare services include primary health examination by a qualified veterinarian, anti-parasitic

treatment, immunization against core dog and cat diseases and rabies. Moreover, we counsel the caregiver for early age sterilization of community dog and cat during preventive healthcare through one-to-one interactions at our clinic or ambulatory appointments.

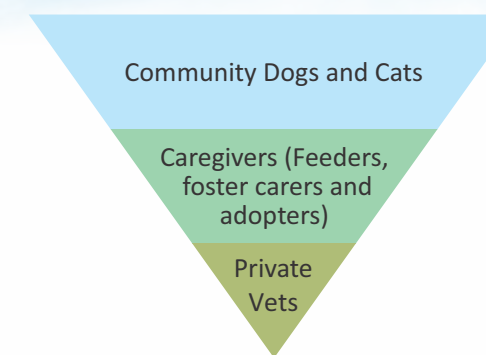


Figure 1: Stakeholder mapping

Caregivers generally brought dogs and cats from their residential or industrial areas (societies/ lanes/ workplaces) in a private vehicle using leash and neck collar. Community dogs and cats were very low in lower stress in their caregivers' presence. The veterinarian demonstrated low stress, easy, behaviour-based methods of cat and dog handling techniques enlisted by JMICAWE to the caregivers to ensure humane handling. Dogs were generally restrained on floor by caregiver using arm lock technique.[3] Cats are generally restrained on flat, raised surfaces by caregiver using towel wrapping technique.[4] Use of scientific handling techniques by caregivers eliminates need of handler for minor, preventive care procedures of dog and cat management. There was zero incidence of injury to the caregiver or veterinarian during scientific handling.

Primary health examination of dogs and cats involved recording of body temperature and body condition score. Absence of purulent and smelly discharge from natural orifices, normal body temperature and BCS above 2 was considered as "apparently healthy animal". ICAM's dog body condition scoring training for dogs and Royal canine's body condition scoring chart for cats were referred by veterinarians for BCS.

WSAVA's vaccination guidelines for Asian small animal practitioners were used to design the vaccination

regime for community dogs and cats. [5] The programme ran for a day in a week at a stationery clinic or on an ambulance. All the appointments were scheduled prior and coordinated throughout by a delegated Coordinator. Mass vaccination strategies helped balance the costs of operations. Dogs and cats were brought to the venue by their respective caregivers, who also handled the animals at the time of examination and vaccination. All preventive care procedures except vaccination are non-invasive. Subcutaneous administration of vaccines is not very painful and animals were more comfortable when handled by their caregivers.

## Results and Discussion:

103 caregivers, 378 community dogs and 154 community cats were registered under Project Meher between November 2021 to February 2022. These animals have received anti-parasitic treatment, first or booster dose of core dog or cat vaccine, rabies vaccine and guidance on taking general care of community dogs and cats. The same program will be repeated next year to repeat the preventive vaccination schedule.

The preventive care not only helped us protect community dog and cat health, but also gave an opportunity for frequent caregiver interactions. This interaction helped to imbibe the importance of 'Responsible community dog and cat care' on animal caregiver. 31 out of 103 caregivers stated that they sterilised their intact community dog/s and cat/s through ABC agencies after preventive care appointments at Project Meher.



Figure 2: The preventive care process for community dogs and cats



Overall, Project Meher engages the stray-owned dog and cat caregiver community in preventive care of dogs and cats. It helps local authorities in humanely vaccinating dogs and cats against deadly, zoonotic diseases like rabies by direct veterinary intervention. Such changes in practices demand veterinarians to act as technically competent yet compassionate frontiers.



The World Health Organisation, Food and Agricultural Organisation, World Organisation for Animal Health and Global Alliance for Rabies Control launched the global strategic plan to eliminate human deaths due to dog-mediated rabies by 2030. [1] The WOA has identified the importance of 'responsible dog ownership' to attain this goal. [9] Responsible community dog and cat care will play a major role in India to eliminate human deaths by dog-mediated rabies. Local municipal corporations of metropolitan cities have a scope to explore applicability of this model in their ward or zone for vaccination programs.

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#### Conflict of interest

Project Meher has not received any financial support for operations from organisations mentioned above. We have accessed their publically available, online technical resources. Project Meher is a financially self-sustaining community intervention. There is no conflict of interest.

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