DIAGNOSIS AND MANAGEMENT OF GASTROINTESTINAL DISORDERS

FOR CATS

FOR DOGS
INTRODUCTION

You can use this booklet as a concise reference to aid in the diagnosis and management of gastrointestinal (GI) problems in cats and dogs, brought to you by Hill’s Pet Nutrition, your partner in education and nutritional excellence.

CONTENTS INCLUDE:

• A broad overview of the normal anatomy and function of the GI tract.
• The signalment, symptoms and clinical signs, diagnostic tests, treatment and nutritional management of commonly encountered GI disorders.

GENERAL POINTS:

This booklet does not attempt to cover all GI diseases and is not a full diagnostic and management overview. For more detailed information, please refer to veterinary text books. GI symptoms are concerning for caring owners and are a common reason for seeking a veterinary consultation. GI disorders account for 10–15% of cases European veterinarians see. Cases can vary from only mildly affected pets to those presenting in a life-threatening state. This guide only deals with those disorders originating in the GI tract itself. GI symptoms, such as vomiting and diarrhoea may be caused by many disorders outside the GI tract (such as kidney disease, prostatic and liver disease, etc.). See the section on differential diagnosis.

HILL’S is here to support you to help your patients

You can visit our professional website (www.hillsvet.co.uk or www.hillsvet.ie) for a wealth of useful information:

PRODUCTS – Detailed product information, nutritional profiles, indications and contra-indications of Hill’s products.

QUICK RECO – Do you want to make a written (or email) recommendation for a particular patient? You can do so in just a few clicks.

ENQUIRIES – Our team of dietary consultants and Hill’s Veterinary Staff Clinicians are available to answer questions from veterinary staff and pet owners:
• Hill’s Customer Services Department 0800 282 438 / 1-800 626 002 (ROI)
• Technical enquiries 01483464641

HILL’S VETERINARY NUTRITION ACADEMY is a unique online educational experience and is available at no cost to every member of the veterinary health care team.

HILL’S DIGESTIVE INDEX APP - Score the severity of the signs of chronic enteropathy (CE) / inflammatory bowel disease (IBD) by completing one of the scoring systems for dogs – the chronic inflammatory bowel disease activity index (CIBDAI) or the canine enteropathy clinical activity index (CCECAI). For cats, complete the stool grading.

WEBINARS - Hill’s frequently runs or sponsors live and on-demand webinars, with free access to recordings of all major events – like the Hill’s Global Symposium. Ask your Hill’s representative for a schedule.

1 A good example of a ‘GI textbook’ is: Canine & Feline Gastroenterology. Washabau RJ and Day MJ (eds.) Elsevier Saunders 2013.

Notice: This booklet is designed for consideration of veterinary healthcare professionals only. Each veterinary healthcare professional needs to apply their own expertise and judgment in his/her veterinary practice. Hill’s assumes no responsibility for patients’ outcomes if managed based on information provided in this booklet.
FOOD – Depending on the severity of the clinical situation:

• Food is vital for recovery of the mucosal wall so prolonged fasting may delay GI recovery.

• Cats may develop hepatic lipidosis from prolonged fasting or refusal to eat, especially if previously overweight.

• Once the pet is able to tolerate oral fluids, provide small, frequent meals of a highly digestible, low-fibre food. Gradually increase feeding amounts over several days.

WATER – Once vomiting has ceased:

• Offer frequent sips of tepid fluid or ice cubes from a bowl, spoon or orally by syringe.

• Electrolyte formulas can be bought at the veterinary clinic and prepared for home use.

• Owners should be advised to visit the clinic if vomiting persists for several hours and the pet still cannot tolerate oral fluids. Dehydration can occur quickly so intravenous fluid therapy may be warranted.

TEMPERATURE CONTROL

• Pets exhibiting GI signs may become hypothermic; comfortable, dry bedding and a warm, draught free room should be provided.

• Owners should be reminded that hot water bottles must only be used with extreme caution due to the risk of thermal injury/burns.

• Pets with a fever require a well-ventilated environment and cooling fans.

HYGIENE AT HOME

Remind owners:

• Ill animals often have accidents indoors, and should not be punished.

• Confine the patient to an easily cleaned area away from other pets, children, and pregnant or immunocompromised family members.

• Don’t use the same cleaning or health care materials for pets and people.

• Replace wet or dirty bedding.

• Wash hands carefully after touching the pet, using an appropriate disinfectant.

Patients may get worse rapidly without prompt veterinary intervention.
Digestion, Absorption, Elimination

**GASTROINTESTINAL MICROBIOME**

Plays an important role in digestive health and overall well-being.

**LARGE INTESTINE:**
Site of further water/electrolyte uptake and mucus production for lubrication. Here is where fermentation takes place by the gut bacteria. Loss of control of defaecation results in faecal incontinence.

**SMALL INTESTINE:**
Secretion and reabsorption of fluid, brush border cells produce mucus and enzymes for nutrient digestion. Absorption of water and end products of digestion occurs via surface villi. End products of fat digestion are absorbed by enterocytes and enter the lymphatic circulation via lacteals.

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Secretion and absorption of fluid, brush border cells produce mucus and enzymes for nutrient digestion. Absorption of water and end products of digestion occurs via surface villi. End products of fat digestion are absorbed by enterocytes and enter the lymphatic circulation via lacteals.

**END PRODUCTS OF FAT DIGESTION:**
- Monoglycerides
- Absorbed
- Fatty acids
- Absorbed
- Monosaccharides
- Absorbed
- Disaccharides
- Absorbed
- Polyols
- Absorbed
- Proteins
- Absorbed
- Amino acids
- Absorbed
- Fatty acids
- Absorbed
- Monosaccharides
- Absorbed
- Disaccharides
- Absorbed
- Polyols
- Absorbed
- Proteins
- Absorbed
- Amino acids
- Absorbed

**DIGESTION (SIMPLIFIED):**
- **DIGESTION:**
  - **PROTEINS:**
    - Amino acids
    - Absorbed
  - **CARBOHYDRATES:**
    - Disaccharides
    - Absorbed
    - Monosaccharides
    - Absorbed
    - Polysaccharides
    - Absorbed
  - **LIPIDS:**
    - Triglycerides
    - Absorbed
    - Monoglycerides
    - Absorbed
    - Fatty acids
    - Absorbed
  - **FIBERS:**
    - Absorbed
    - Fermentation

**ANATOMY & PHYSIOLOGY**

Ingestion, propulsion, digestion, absorption and elimination, as well as protecting the body in conjunction with its associated lymphoid tissue.

**Principal functions of the GI tract:**

- **ORAL CAVITY:**
  - Mastication, mixing with saliva and mucus.
- **OESOPHAGUS:**
  - Transports ingesta from the mouth to the stomach.
- **STOMACH:**
  - Mixing with hydrochloric acid, pepsin and gastric lipase.
- **GALL BLADDER:**
  - Bile salts emulsify fats, bilirubin-derived pigments colour faeces.
- **EXOCRINE PANCREAS:**
  - Secretes proteases, amylases, lipases and bicarbonate to facilitate digestion.
- **SMALL INTESTINE:**
  - Secretion and reabsorption of fluid, brush border cells produce mucus and enzymes for nutrient digestion. Absorption of water and end products of digestion occurs via surface villi. End products of fat digestion are absorbed by enterocytes and enter the lymphatic circulation via lacteals.
- **LARGE INTESTINE:**
  - Site of further water/electrolyte uptake and mucus production for lubrication. Here is where fermentation takes place by the gut bacteria. Loss of control of defaecation results in faecal incontinence.
  - Absorption of water and end products of digestion occurs via surface villi.
  - End products of fat digestion are absorbed by enterocytes and enter the lymphatic circulation via lacteals.

**GASTROINTESTINAL MICROBIOME**

Plays an important role in digestive health and overall well-being.

**ORAL CAVITY:**
Mediation, mixing with saliva and mucus.

**OESOPHAGUS:**
Transports ingesta from the mouth to the stomach.

**STOMACH:**
Mixing with hydrochloric acid, pepsin and gastric lipase.

**GALL BLADDER:**
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**LARGE INTESTINE:**
Site of further water/electrolyte uptake and mucus production for lubrication. Here is where fermentation takes place by the gut bacteria. Loss of control of defaecation results in faecal incontinence.
A new approach to gastrointestinal and systemic health: the GI microbiome

First, a few definitions to understand the most common terms. The gastrointestinal (GI) microbiome refers to the ecosystem consisting of billions of microorganisms (bacteria, protozoa, archaea, fungi, viruses) that live within an individual's gastrointestinal tract. It is impacted by several factors including genetics, age, environment, GI disease and nutrition. The term microbiota refers to the specific community of microorganisms found within an environment. If there is an imbalance in microbiota within the microbiome, it is called dysbiosis.

Dietary fibres are not digested in the small bowel and therefore reach the colon. Soluble fibres are an important substrate for the colonic bacteria within the GI microbiome. They are metabolised by processes called saccharolysis and fermentation to form end products, otherwise known as postbiotics. Many of these postbiotics can be beneficial for the host; short-chain fatty-acids (SCFA) are commonly used examples. Polyphenols are naturally occurring phytochemicals found in plants with antioxidant and anti-inflammatory activity when consumed in the food. Fibre-bound polyphenols are released and activated by bacteria in the colon, providing postbiotic effects.

Groundbreaking new research highlights the critical role a dog’s or cat’s GI microbiome can play in not only their response to GI disease but also in determining their overall well-being. GI microbiome balance influences the transition between health and acute or chronic disease. Nutrition has the ability to use the power of the pet’s own GI microbiome to support digestive health, and because dogs and cats have to eat every day, choosing complete and balanced foods specifically designed to promote healthy fermentation is the most practical and lasting strategy to positively influence the GI microbiome.

Hill’s ActivBiome+ Technology is a proprietary blend of active fibres that work synergistically to nourish the pet’s gut microbiome. The desirable bacteria ferment the fibres and produce gut-nourishing compounds, as well as release and activate antioxidant and anti-inflammatory polyphenols. These postbiotics benefit the gut, as well as other organs and tissues.
Taking a thorough history and performing a complete physical exam are critical in determining the likely primary location of the GI problem.

**Signalment & clinical history:** helps establish the duration, progression, frequency and severity of signs, as well as providing clues to aetiology.

**ESSENTIAL PATIENT INFORMATION**

**SPECIES, GENDER AND REPRODUCTIVE STATUS**
- Tritrichomonas foetus enteritis: in cats at breeding catteries
- GI signs may also be present in cases of pyometra and benign prostate hyperplasia
- Feline immunodeficiency virus (FIV): diarrhoea in young intact male cats

**BREED PREDISPOSITIONS**
- Histiocytic ulcerative colitis (HUC): Boxer
- Exocrine pancreatic insufficiency (EPI) and antibiotic-responsive diarrhoea (ARD): German Shepherd
- Gastric dilatation volvulus (GDV): large, deep-chested dogs

**AGE**
- GI foreign bodies and adverse food reactions (AFR): usually younger patients
- Congenital hiatal hernia: young Shar Pei
- Neoplasia: usually adult or elderly pets

**VACCINATION:** Unvaccinated or poorly vaccinated animals are at risk for diseases like Parvoviral enteritis

**ENDOPARASITE CONTROL:** Inefficacious/overdue anthelminthic prophylaxis increases risk of parasitism e.g. Toxocariasis

**MEDICATION:** Suspicion aroused if pet is currently receiving treatment for co-morbidity if that drug is associated with risk of GI side effects e.g. doxycycline, non-steroidal anti-inflammatory drugs (NSAIDs)

**PREVIOUS CLINICAL HISTORY:** Animals may present with recurrence of a previously diagnosed disorder or with recurring symptoms, e.g. adverse food reactions (AFR), ingestion of a foreign body, previous treatment for diarrhoea post scavenging

**PRE-EXISTING CONDITION:** Non-GI causes of GI signs can be caused by a complication of a pre-existing condition e.g. uraemic gastritis in chronic kidney disease (CKD) or chronic liver disease

**FOOD:** A complete feeding history is important e.g. pancreatitis triggered by fatty food, AFRs starting early in life

**Taking a thorough history and performing a complete physical exam are critical in determining the likely primary location of the GI problem.**
**SYMPTOMS AND SIGNS**

**PRIMARY GI SYMPTOMS & SIGNS**

- Regurgitation
- Vomiting
- Abdominal Pain
- Diarrhoea

**SECONDARY SYMPTOMS & SIGNS**

- Appetite (anorexia, inappetance, polyphagia, pica, coprophagia)
- Demeanour (dullness, lethargy, depression, weakness, collapse)
- Malnutrition (loss of weight, body condition, lean body mass, coat quality)

- Tenesmus
- Gas Accumulation (eructation, bloat, borborygmi, flatulence)
- Constipation, obstipation, colonic impaction

**SCORE the severity of the signs of chronic enteropathy (CE). Complete the stool assessment for dogs and cats. Download today from Google Play or the App Store.**

**Vomiting and Diarrhoea**

Predominant clinical signs depend on the structure affected:

- Regurgitation: oesophageal
- Vomiting: gastritis and colitis, may also be present in enteritis, especially in cats
- Small bowel diarrhoea: enteritis
- Large bowel diarrhoea: colitis, proctitis

**Differentiating between small & large bowel signs:**

<table>
<thead>
<tr>
<th>SYMPTOM/SIGN</th>
<th>SMALL BOWEL</th>
<th>LARGE BOWEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight Loss</td>
<td>Common</td>
<td>Uncommon</td>
</tr>
<tr>
<td>Vomiting</td>
<td>May be present</td>
<td>May be present</td>
</tr>
<tr>
<td>Increased borborygmi</td>
<td>Common</td>
<td>Uncommon</td>
</tr>
<tr>
<td>Increased flatulence</td>
<td>Very common</td>
<td>Common</td>
</tr>
<tr>
<td>Defaecation</td>
<td>Controlled</td>
<td>Often uncontrolled</td>
</tr>
<tr>
<td>Frequency</td>
<td>Slightly increased</td>
<td>Largely increased</td>
</tr>
<tr>
<td>Tenesmus</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Faeces</td>
<td>Watery</td>
<td>Porridge/Mucoid</td>
</tr>
<tr>
<td>Blood</td>
<td>Melena</td>
<td>Haematochezia</td>
</tr>
<tr>
<td>Mucus</td>
<td>If present, mixed through faeces</td>
<td>If present, on top of faeces</td>
</tr>
<tr>
<td>Faecal volume</td>
<td>Normal to increased</td>
<td>Normal to decreased</td>
</tr>
</tbody>
</table>

**Abdominal Pain**

- Can be dull and diffuse making detection difficult
- Pets are often depressed, anorexic and adopt a hunched or ‘praying’ posture
- Pain may be peritoneal, mesenteric, GI, visceral or spinal in origin

**DIGESTIVE INDEX**

Score the severity of the signs of chronic enteropathy (CE). Complete the stool assessment for dogs and cats. Download today from Google Play or the App Store.
## Stool Grading Chart

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Dog Image</th>
<th>Cat Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Very loose, watery stools</td>
<td>![Dog Stool Image]</td>
<td>![Cat Stool Image]</td>
</tr>
<tr>
<td>2</td>
<td>Mostly unformed stools</td>
<td>![Dog Stool Image]</td>
<td>![Cat Stool Image]</td>
</tr>
<tr>
<td>3</td>
<td>Some formed cylindrical shape</td>
<td>![Dog Stool Image]</td>
<td>![Cat Stool Image]</td>
</tr>
<tr>
<td>4</td>
<td>Formed and firm, but not hard stools with some segmentation</td>
<td>![Dog Stool Image]</td>
<td>![Cat Stool Image]</td>
</tr>
<tr>
<td>5</td>
<td>Formed, dry and too hard stools</td>
<td>![Dog Stool Image]</td>
<td>![Cat Stool Image]</td>
</tr>
</tbody>
</table>

### Differential Diagnosis

**Vomiting – Numerous Causes and Mechanisms**

- **Activation of receptors in ‘vomiting centre/chemoreceptor trigger zone’**: e.g. CKD, toxins, motion sickness, brain neoplasia
- **Pharynx/larynx**: foreign body
- **GI tract**: e.g. gastritis, IBD, foreign bodies, GDV, AFR, neoplasia, parasitism, obstruction, pyloric stenosis, etc.
- **Abdominal organs**: liver, uterus, pancreas, prostate

**Acute Diarrhoea**

- **Non-infectious**: dietary change, dietary indiscretion, AFR/food sensitivity, toxins, stress colitis, ‘Irritable bowel syndrome’
- **Infectious**:
  - **Bacterial**: e.g. Salmonella
  - **Parasitic**: e.g. Isospora (Coccidia)
  - **Viral**: e.g. Parvovirus

**Chronic Small Bowel Disease**

- **Dietary indiscretion, excess/poor quality food**
- **Infectious**:
  - **Bacterial**: e.g. Salmonella
  - **Parasitic**: e.g. Giardia
  - **Viral**: e.g. FeLV, FIV
- **AFR/food sensitivity**
- **Antibiotic-responsive diarrhoea (ARD)**
- **Steroid-responsive enteropathy (SRE)**
- **Protein-losing enteropathy (PLE)**, which may be due to:
  - Lymphangiectasia (LGE), IBD, parasites, malignant lymphoma, etc.
- **Neoplasia**

**Chronic Large Bowel Disease**

- **Infectious**:
  - **Parasitic**: e.g. Trichuris
  - **Bacterial**: e.g. Clostridium perfringens
  - **IBD** (histiocytic ulcerative colitis)
  - **Fibre-responsive diarrhoea**
  - **Stress colitis, ‘Irritable bowel syndrome’**
- **Food-responsive enteropathy (FRE)**
- **Antibiotic-responsive diarrhoea (ARD)**
- **Steroid-responsive enteropathy (SRE)**
- **AFR/food sensitivity**
- **Neoplasia**
- **Faecal statis** (perineal hernia and obstruction)
Owners may mistake regurgitation (passive reflux of undigested food from the pharynx/oesophagus) for vomiting (forceful ejection of partially digested stomach/small intestinal contents).

**IMPORTANT GI DISEASES BY ANATOMICAL LOCATION**

**OESOPHAGEAL DISEASE**

Oesophageal problems are less common than problems affecting the stomach and intestines.

Diagnostic Tests

- Radiography
- Contrast Studies (barium, fluoroscopy)
- Endoscopy (oesophagus and stomach)

Types of Oesophageal Disorders

- Inflammation: oesophagitis, ulceration
- Motility disorder: megaesophagus, myasthenia gravis, dysautonomia
- Obstruction: foreign body, stricture, neoplasia, vascular ring anomaly, hiatal hernia

**Patient management depends on the diagnosis:**

**SURGICAL/BY ENDOSCOPY**

- Depends on aetiology: e.g. balloon dilatation of strictures, removal of a foreign body by endoscopy

**MEDICAL**

- Symptomatic: e.g. H₂ antagonists, analgesics, mucosal protectants, prokinetics

**NUTRITIONAL MANAGEMENT**

- Feed a/d or blenderised stew products (See Nutritional Support section for more information)
- Upright oral feeding, maintain vertical posture postprandially
- Modify food consistency to suit the individual e.g. meat-ball versus gruel
- Provide small, frequent meals of palatable, energy-dense food, balanced to meet the patient’s overall nutritional requirements
ACUTE GASTROENTERITIS
A common presentation in small animal practice.

- Vomiting
- Diarrhoea (often a combination of small and large bowel signs)
- Abdominal pain
- Tenesmus
- Anorexia/inappetance
- Dehydration
- Blood loss
- Gas accumulation
- Lethargy/collapse
- Hypersalivation
- Blood loss
- Dehydration
- Hypersalivation

PRIMARY SIGNS

SECONDARY SIGNS

ACUTE GI DISEASE

Diagnostic Tests

- Faecal Analysis: parasitology, bacteriology and virology e.g. Campylobacter, Clostridium, Parvovirus
- Serology e.g. Distemper
- Radiography (plain/contrast) e.g. distended intestinal loops, mineral densities (‘gravel sign’), ‘double bubble effect’ in gastric torsion
- Ultrasonography e.g. identification of masses, foreign bodies, fluid, lymphadenopathy, intussusception
- Minimum database (haematology, biochemistry and urinalysis)
  - Required in emergency cases, helps identify patient requirements for emergency stabilisation (electrolytes, acid/base balance, etc.)
  - Rule out GI signs due to other causes such as systemic infection (e.g. canine distemper virus) or metabolic disorders (e.g. uraemic crisis, liver disease, vestibulitis/vestibular disease, urethral obstruction, hyperthyroidism, hypoadrenocorticism/Addison disease)
  - Provide a useful ‘benchmark’ for future reference

Causes of Acute Gastroenteritis

- Mild:
  - Dietary (scavenging, dietary indiscretion, food spoilage)
  - Parasitic
  - Toxic (drugs such as NSAIDs, plants e.g. Taxus spp., Dieffenbachia)
- Severe:
  - Enteric infections (Parvovirus, Coronavirus, Clostridium, Campylobacter, Salmonella, haemorrhagic E. coli, etc.)
  - GDV
  - Foreign body
  - Intussusception

Radiography is key in confirming foreign bodies
Patient management depends on the diagnosis

**SURGICAL**
- Surgical cases (e.g. foreign body, intussusception, GDV) require prompt recognition, the appropriate surgical procedure, and appropriate post-operative nutritional management.

**MEDICAL**
- Empirical therapy e.g. rehydration (IV fluids), anti-emetics, analgesics, prokinetics
- Treat underlying cause or condition e.g. discontinue NSAID
- Hygienic precautions/isolation is important if cause is possibly infectious
- Treat secondary problems e.g. antacid and mucosal protectants (if GI ulceration is suspected), antibiotics (to prevent bacterial translocation/septicaemia if GI haemorrhage is present)

**NUTRITIONAL SUPPORT – principal treatment for acute GI disease (vomiting <3 days of duration)**
- GI rest: withhold food and fluid while vomiting persists for 12 hours max – see First Aid over the telephone
- Emergency IV fluid therapy is required in severely affected cases presenting with marked electrolyte and acid-base disturbance, shock, dehydration or when vomiting/refusal to drink is persistent
- After vomiting has ceased, offer ice cubes or small amounts of water (or rehydration solution) frequently
- Once able to tolerate oral fluids start nutritional support. Offer small, frequent meals (4–6 per day) for several days. Assist feeding patients with poor appetite. Gradually increase food amount over 3 days. Provide highly digestible, low-fibre, palatable food, balanced to meet the patient’s nutritional requirements for recovery and containing increased level of electrolytes.

**CHRONIC GASTRITIS**

**PRIMARY SIGNS**
- Vomiting
- Haematemesis

**SECONDARY SIGNS**
- Nausea/salivation
- Polydipsia
- Gas accumulation (eructation/bloat)
- Anorexia/malnutrition

**Diagnostic Tests**
- Minimum database rules out non-GI causes (e.g. CKD, pancreatitis), identify complications, provide ‘benchmark’
- Imaging aids identification of masses, FB/obstruction and motility disorders
  - Plain radiography
  - Contrast radiography employs barium swallows
  - Fluoroscopy produces real time moving image (e.g. aids hiatus hernia diagnosis)
  - Ultrasonography
  - Gastroscopy/Exploratory Laparotomy
  - Biopsy

Endoscopy confirms severe gastritis.
Causes of Chronic Gastritis

- Gastric mucosal changes (inflammation, ulceration): AFR, chronic gastritis/IBD, neoplasia, bilious vomiting syndrome, gastric spiral bacteria (GSP)
- Gastric outflow obstruction/delayed emptying: Pyloric stenosis in Siamese cats, hair balls, foreign body, neoplasia
- Secondary to diffuse GI disease: IBD, malignant lymphoma, etc.
- Secondary to intestinal disease: Obstruction, peritonitis, constipation
- Secondary to non-GI disease: CKD, etc.

Patient management depends on the diagnosis:

**SURGICAL/BY ENDOSCOPY**

- Remove foreign body
- Partial gastrectomy
- Pyloroplasty

**MEDICAL**

- Pro-kinetics, antiemetics, gastroprotectants, H₂ antagonists
- Remove possible cause, e.g. NSAIDs
- Anti-inflammatory/immunosuppressive drugs
- Specific medical therapy if appropriate e.g. ‘triple therapy’ for Helicobacter
- Chemotherapy (neoplasia)

**NUTRITIONAL MANAGEMENT** (vomiting >3 days of duration)

- Correct fluid, electrolyte, acid-base imbalances
  - Start nutritional support immediately. Consider nasoesophageal (NE) or nasogastric (NG) tube placement and start constant rate infusion of a liquid food or small frequent boluses of a semi-liquid food, such as a/d or blenderised stew products. Introduce parenteral nutrition if enteral feeding not tolerated.
  - When vomiting is controlled, introduce ice cubes, water (or rehydration solution) for voluntary intake, followed by small, frequent meals (4–6 per day) of special food for several days. Feed a highly digestible, palatable, low-fibre food, which is balanced to meet the patient’s nutritional requirements for recovery and contains increased electrolyte levels.
  - Gradually increase food amount over 3 days.
- Conduct an elimination food trial if appropriate

**CHRONIC SMALL BOWEL DISEASE**

**PRIMARY SIGNS**

- Small bowel diarrhoea
  (see Symptoms and Signs)
- Vomiting (especially in cats)

**SECONDARY SIGNS**

- Weight loss, loss of lean body mass
- Poor coat
- Oedema/ascites/thromboembolism
  (in case of PLE)
**Diagnostic Tests**

**Faecal examinations**

**Collection/examination techniques:**

- **Direct smear:** e.g. for Tritrichomonas and Giardia
- **Faecal flotation:** most Nematodes and Cestodes
- **Other methods:** endoscopy (Spirocerca), IFT (Giardia, Cryptosporidium), PCR (Tritrichomonas, Giardia)
- **Complete faecal analysis of consecutive samples:** (at least 3 days) aids diagnosis of parasitism (e.g. Giardia, Trichuris, Cryptosporidium, Isospora). Faecal flotation aids in the diagnosis of various parasitic diseases, e.g. Coccidia and Giardia.

Some specialists advise empirically treating with a broad-spectrum anthelmintic in case of suspected parasitic disease.

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**Bacterial & viral disease**

Quite a few bacterial species can be commensals, so additional tests have to be performed to confirm that the bacterium cultured plays a role in the disease.

- **Salmonella spp:** Culture or PCR
- **E. coli spp:** Culture and virulent species-specific molecular assays
- **Campylobacter spp:** Culture and virulent species-specific molecular assays
- **Clostridium perfringens:** PCR for C. perfringens enterotoxin producing species, combined with ELISA for the enterotoxin
- **Clostridium difficile:** Culture plus ELISA for toxins A and B
- **Helicobacter spp:** True role in pathogenesis of gastritis unclear Gastroscopy – visualisation, PCR
- **Parvo virus:** Immunoassay or PCR Coccidia and Giardia
- **Imbalances in the gut microbiome (dysbiosis):** To detect sophisticated techniques are required, such as Illumina or 454 pyrosequencing

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**Most common parasite eggs**

- **Ancylostoma caninum**
- **Toxocara canis**
- **Trichuris vulpis**
- **Angiostrongylus vasorum**
- **Taenia spp**
- **Dipylidium caninum**
- **Giardia spp**
- **Isospora spp**
Minimum haematology and biochemistry database:

- Helps rule out non-GI disease (e.g., kidney and liver disease, EPI, pancreatitis (PLI, TLI)
- Helps identify malabsorption and PLE (hypoalbuminaemia)
- Total triglycerides (hyperlipidaemia)
- Theoretically, serum folate and cobalamin concentrations may provide clues as to the site of predominant damage and/or the presence of ARD. However, the sensitivity of these tests seems to be rather low. Subnormal serum folate and cobalamin levels may also warrant supplementation.

<table>
<thead>
<tr>
<th>CAUSE</th>
<th>FOLATE</th>
<th>COBALAMIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximal small intestinal damage</td>
<td>Decreased</td>
<td>—</td>
</tr>
<tr>
<td>Distal small intestinal damage</td>
<td>—</td>
<td>Decreased</td>
</tr>
<tr>
<td>Antibiotic-responsive diarrhoea</td>
<td>Increased</td>
<td>Decreased</td>
</tr>
</tbody>
</table>

Diagnostic imaging

- Plain/contrast radiography
- Ultrasonography
- Endoscopy & histological examination (oesophagus, stomach, duodenum, colon, rectum)
  - Visualise macroscopic mucosal changes
  - Identify masses, foreign bodies, etc.
  - Collect biopsy samples
  - Diagnosis of neoplasia
  - Diagnosis and assessment of disease severity and staging of IBD (type and severity of inflammatory cell infiltration, villus atrophy, widening of lacteals, etc.)

With the sponsorship of Hill’s, WSAVA has established international guidelines to ensure the highest diagnostic yield of GI histology. See http://www.wsava.org/guidelines/gastrointestinal-guidelines for details.
HOW TO MANAGE CHRONIC ENTEROPATHY/DIARRHOEA – SMALL BOWEL ORIGIN

CHRONIC LARGE BOWEL DISEASE

PRIMARY SIGNS

- Without faecal stasis
  - Large bowel diarrhoea (see Symptoms and Signs)
- With faecal stasis
  - Constipation/obstipation
  - Inappetance
  - Vomiting, dehydration

Diagnostic Tests (as appropriate)
Confirm the signs are GI in origin e.g. rule out urethral obstruction.

- Abdominal palpation & rectal examination: helps differentiate between cases with faecal stasis (e.g. feline obstipation) and those without (e.g. colitis), rule out non-GI disease e.g. BPH, perineal hernia and identify rectal masses
- Faecal analysis: (see small bowel diarrhoea)
- Haematology & biochemistry: identifies metabolic causes e.g. cats with CKD may present constipated, complications (e.g. anaemia, dehydration), provides a benchmark for future reference
- Radiography: especially in constipation e.g. to assess degree of faecal retention, rule out pelvic narrowing
- Ultrasonography: (e.g. for BPH)
- Colonoscopy & histological examination: (see small bowel diarrhoea)
HOW TO MANAGE CHRONIC ENTEROPATHY/DIARRHOEA
WITHOUT FAECAL STASIS – LARGE BOWEL ORIGIN

1. Rule out non-primary GI disease and parasites
   - No signs of stress
   - Signs of stress

   RECHECK SIGNS AFTER 2-4 WEEKS OF FEEDING
   - IMPROVEMENT
   - Continue feeding recommended nutrition

   NO IMPROVEMENT

2. Rule out food-responsive enteropathy (FRE) by feeding
   - GI Biome
   - No signs of stress
   - Signs of stress

   RECHECK SIGNS AFTER 2-4 WEEKS OF FEEDING
   - IMPROVEMENT
   - Continue feeding recommended nutrition

   NO IMPROVEMENT

3. Rule out fibre-responsive colitis/proctitis by feeding
   - GI Biome
   - No signs of stress
   - Signs of stress

   RECHECK SIGNS AFTER 2-4 WEEKS OF FEEDING
   - IMPROVEMENT
   - Continue feeding recommended nutrition

   NO IMPROVEMENT

4. Rule out antibiotic-responsive diarrhoea (ARD) by feeding
   - GI Biome
   - No signs of stress
   - Signs of stress

   RECHECK SIGNS AFTER TRIAL PER SPECIALIST PROTOCOLS
   - IMPROVEMENT
   - Continue feeding recommended nutrition

   NO IMPROVEMENT

5. Rule out steroid-responsive enteropathy (SRE) by feeding
   - GI Biome
   - No signs of stress
   - Signs of stress

   RECHECK SIGNS AFTER 2-4 WEEKS OF FEEDING
   - IMPROVEMENT
   - Continue feeding recommended nutrition

   Steroid or appropriate immunosuppressant

   NO IMPROVEMENT

6. Rule out adverse reactions to food (AFR) by feeding
   - z/d

   RECHECK SIGNS AFTER 2-4 WEEKS OF FEEDING
   - IMPROVEMENT
   - Continue feeding z/d or consider d/d

   NO IMPROVEMENT

Consider sulfasalazine, spasmolytics and colonoscopy

IBD (lymphocytic/plasmacytic, eosinophilic, etc.)
HUC
Antibiotics
Immunosuppression
Chemotherapy
Surgery

HOW TO MANAGE CHRONIC ENTEROPATHY/DIARRHOEA
WITH FAECAL STASIS – LARGE BOWEL ORIGIN

1. Rule out non-primary GI disease and parasites

2. Constipation/obstipation
   - Megacolon - Colonic impaction

   Management, depending on severity: surgery, manual removal of faeces under general anaesthesia

3. Colonic motility present

   Laxatives (e.g. lactulose)
   +
   High-fibre food

   a/d
   i/d
   for dogs only

4. Colonic motility impaired

   Laxatives (e.g. lactulose)
   +
   Low-residue highly-digestible food
   Short term:
   Long term:

   GI Biome

   a/d
   i/d
Patients affected by GI disease are often anorexic and malnourished.

**Fasting**

Even in the absence of enteritis, can cause:

- Deterioration of the GI mucosa
- Decrease in villous height and/or crypt depth
- Impairment of mucosal cells
- Reduction of activity and expression of certain digestive enzymes
- Decreased gastric and pancreatic secretions

Ultimately, fasting can lead to:

- Loosening of tight junctions between enterocytes
- Bacterial translocation
- Septicaemia
- Hepatic lipidosis (cats)

**Did you know?**

- Nutritional support should be started in all patients as soon as possible in the form of enteral or parenteral feeding. Prolonged fasting may delay recovery.
- Enteral feeding (orally or feeding tube) is preferred as it is vital for the recovery of the GI mucosal wall. It is also safer, more economical and physiological. Additional benefits of feeding tubes include administering fluids and medications.
- Some pets (especially cats) develop an aversion to food eaten during illness, so it is helpful not to use the patient’s usual food during illnesses.
- Inflammation within the GI tract can impair the gut barrier function, allowing potential food antigens to break the oral tolerance mechanism. Therefore, avoidance of common food allergens, and feeding formulations of very high digestibility during the GI illness is warranted.
- Clinical status of the patient helps determine the optimal nutritional profile and caloric needs for each individual. An individual patient may respond better to one type of product formulation over another, so follow-up appointments and serial food trials may be necessary.

**Appropriate nutritional management can obviate the need for medical treatment.**

**Nutritional support is an important consideration in all cases**

It helps patients feel better quickly, sometimes removing the need for further investigation.

**How the right food can help**

- High overall digestibility helps improve digestion & nutrient absorption. Moderate fibre intake supports regular bowel movements.
- Prebiotic fibres help promote healthy gut bacteria.
- Enriched with psyllium to support healthy stools & promote regular bowel movements.
- High levels of electrolytes & B-Vitamins help compensate for mineral loss due to vomiting and diarrhoea.
- Omega-3 fatty acids from fish oil help break the cycle of inflammation.
- Moderate fat levels help ensure adequate intake with small portions of food.
- Proprietary anti-stress formula with hydrolysed milk protein hydrolysate (α-casozepine) to help manage stress.
- Hypoallergenic (limited ingredients/hydrolysed or single novel protein/single carbohydrate) helps reduce adverse reactions to food.
- Clinically proven antioxidants support a healthy immune system and limit oxidative stress.
- β-Glucan sources help provide energy to colonocytes.
- Enriched with psyllium to support healthy stools & promote regular bowel movements.
- S+OXSHIELD seal added to identify foods that reduce the risk of struvite and calcium oxalate stones.
- Not artificially preserved. No synthetic colours. No artificial flavours.
- Ginger added to help soothe the GI tract.

High energy density allows for small portions to reduce digestive workload.

Nutritional support should be started in all patients as soon as possible in the form of enteral or parenteral feeding. Prolonged fasting may delay recovery.

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### Key Nutritional Characteristics

<table>
<thead>
<tr>
<th>Aspect</th>
<th>i/d Stress</th>
<th>i/d Stress</th>
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<tbody>
<tr>
<td>Overall digestibility</td>
<td>High</td>
<td>High</td>
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<tr>
<td>Rich in fibre</td>
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<tr>
<td>Fat level</td>
<td>Moderate</td>
<td>Low</td>
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<tr>
<td>Microbiome technology</td>
<td>Prebiotic</td>
<td>Prebiotic</td>
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<tr>
<td>High levels of electrolytes &amp; B vitamins</td>
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<tr>
<td>Omega-3 fatty acids</td>
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<tr>
<td>Main protein source</td>
<td>Chicken</td>
<td>Chicken</td>
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<tr>
<td>Main carbohydrate source</td>
<td>Maize</td>
<td>Rice</td>
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<tr>
<td>Limited ingredients/Hypoallergenic</td>
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<td>Anti-stress technology (α-casozepine)</td>
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<td>β-glucan sources</td>
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<td>Enriched with psyllium</td>
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<td>Ginger added</td>
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<td>Suitable for growth</td>
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<td>S+Oxshield seal</td>
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<td>Clinically proven antioxidants</td>
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<td>No artificial flavors. No synthetic colours. No preservatives.</td>
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<td>Irresistable taste</td>
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<td>Dry food range</td>
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<td>Wet food range</td>
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<td>• Canned wet foods</td>
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<td>• Canned stews</td>
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<td>• Pouches</td>
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### Targeted GI Solutions

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<thead>
<tr>
<th>i/d Low Fat</th>
<th>i/d Sensitive</th>
<th>GI Biome</th>
<th>z/d</th>
<th>d/d</th>
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<td>High</td>
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<td>Low</td>
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<td>Breakthrough ActivBiome+ Technology</td>
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<td>Prebiotic</td>
<td>Prebiotic</td>
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<tr>
<td>Chicken</td>
<td>Single - Egg</td>
<td>Chicken</td>
<td>Hydrolysed Chicken</td>
<td>Single protein source (Duck or Salmon)</td>
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<tr>
<td>Rice</td>
<td>Single - Rice</td>
<td>Rice</td>
<td>Single - Potato</td>
<td>Single - Rice (dog) or Green Pea (cat)</td>
</tr>
</tbody>
</table>

* Not applicable for dry dog food  1 For cats only  2 For dogs only
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<thead>
<tr>
<th>Oesophageal disorders</th>
<th>i/d</th>
<th>i/d Stress</th>
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<tbody>
<tr>
<td>Acute gastroenteritis (diarrhoea or vomiting)</td>
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<td>Acute gastrointestinal disorders in puppies</td>
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<td>Recovery from gastrointestinal surgery</td>
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<tr>
<td>Tube feeding</td>
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**Chronic gastritis**

| Tube feeding                                  |     |            |
| Longer term                                   |     |            |

**Gastric dilatation & volvulus (GDV)**

**Chronic small bowel diarrhoea**

| Initial management                           |     |            |
| Chronic enteropathy (diarrhoea or vomiting) - cause unknown |     |            |
| Chronic enteropathy (diarrhoea or vomiting) in puppies       |     |            |
| Food-responsive enteropathy (form of inflammatory bowel disease) |     |            |
| Antibiotic-responsive enteropathy (form of inflammatory bowel disease) |     |            |
| Steroid-responsive enteropathy (form of inflammatory bowel disease) |     |            |
| Adverse food reactions (AFR) & elimination diet             |     |            |
| Protein-losing enteropathy (PLE) without lymphangiectasia   |     |            |
| Protein-losing enteropathy (PLE) with lymphangiectasia      |     |            |
| Pancreatitis (acute, chronic recurrent) with or without hyperlipidaemia |     |            |
| Exocrine pancreatic insufficiency (EPI)                     |     |            |

- First recommendation
- Alternative recommendation
- Blenderised stews
**LET’S STAY AHEAD**  
**OF EVERY GI ISSUE**

<table>
<thead>
<tr>
<th>Condition</th>
<th>i/d</th>
<th>i/d Stress</th>
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<tbody>
<tr>
<td>GI neoplasia, especially malignant lymphoma</td>
<td>First recommendation</td>
<td>Alternative recommendation</td>
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<tr>
<td><strong>Chronic large bowel diarrhoea</strong></td>
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<td>Initial management</td>
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<td>Food-responsive enteropathy (form of inflammatory bowel disease)</td>
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<td>Steroid-responsive enteropathy (form of inflammatory bowel disease)</td>
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<tr>
<td>Adverse food reactions (AFR) &amp; elimination diet</td>
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<td>Fibre-responsive enteropathies</td>
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<td>Colitis (acute or chronic)</td>
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<td>Flatulence</td>
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<td>GI neoplasia, especially malignant lymphoma</td>
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<td>Histiocytic ulcerative colitis</td>
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<td>Stress colitis in dogs &lt;14 kg</td>
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<td>Stress colitis</td>
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<td><strong>Chronic large bowel disease with faecal stasis</strong></td>
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<td>Constipation (motility present)</td>
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<td>Constipation (motility impaired)</td>
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**Legend:**  
- First recommendation  
- Alternative recommendation  
- Blenderised stews
### Oesophageal disorders

Acute gastroenteritis in kittens & adult cats (diarrhoea or vomiting)

Recovery from gastrointestinal surgery

**Tube feeding**

### Chronic gastritis

**Tube feeding**

**Longer term**

### Chronic small bowel diarrhoea

Chronic gastrointestinal disorders in kittens

Initial management

Chronic enteropathy (diarrhoea or vomiting) - cause unknown

Food-responsive enteropathy (form of inflammatory bowel disease)

Antibiotic-responsive enteropathy (form of inflammatory bowel disease)

Steroid-responsive enteropathy (form of inflammatory bowel disease)

Adverse food reactions (AFR) & elimination diet

Exocrine pancreatic insufficiency (EPI)

Pancreatitis

GI neoplasia, especially malignant lymphoma

### Chronic large bowel diarrhoea

Initial management

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- First recommendation
- Alternative recommendation
- Blenderised stews
### Food-responsive Enteropathy (Form of Inflammatory Bowel Disease)

### Antibiotic-responsive Enteropathy (Form of Inflammatory Bowel Disease)

### Steroid-responsive Enteropathy (Form of Inflammatory Bowel Disease)

### Adverse Food Reactions (AFR) & Elimination Diet

### Colitis (Acute or Chronic)

### Fibre-responsive Enteropathies

### Flatulence

### GI Neoplasia, Especially Malignant Lymphoma

### Chronic Large Bowel Disease with Fecal Stasis

<table>
<thead>
<tr>
<th>Condition</th>
<th>i/d</th>
<th>GI Biome</th>
<th>w/d</th>
<th>z/d</th>
<th>d/d</th>
<th>a/d</th>
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<tbody>
<tr>
<td>Food-responsive enteropathy</td>
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<td>Antibiotic-responsive enteropathy</td>
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<td>Steroid-responsive enteropathy</td>
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<td>Adverse food reactions (AFR) &amp; elimination diet</td>
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<td>Colitis (acute or chronic)</td>
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<td>GI neoplasia, especially malignant lymphoma</td>
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</table>

**First recommendation**

**Alternative recommendation**

**Blenderised stews**
Recommended methods for feeding Hill’s Prescription Diet foods during recovery

For greatest acceptance, ensure food is between room and body temperature (20–40 degrees C); do not feed straight from the refrigerator.

Discard any open tins or pouches after 36 hours.

For syringe and tube feeding, refer to table.

In patients with reduced gastrointestinal function, a 3-day transitional feeding strategy may be required when reintroducing any Hill’s food:

- **Day 1** - a third of recommended total intake and twice that amount of water;
- **Day 2** - two-thirds of recommended total intake and half that amount of water;
- **Day 3** - full recommended intake, undiluted.

How to blend the stew

1. Transition stew from the can to a blender (no additional water needed)
2. Blend for a few minutes (until it becomes liquid)
3. Use syringe or tube to administer

Enteral feeding utilising Hill’s Prescription Diet a/d

<table>
<thead>
<tr>
<th>Preparation</th>
<th>Kcal/ml</th>
<th>Tube size</th>
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</tr>
<tr>
<td>0.8</td>
<td>0.8</td>
<td>●</td>
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</table>

- Not recommended
- Acceptable
- Easy
- Very easy
- Water

Enteral feeding utilising Hill’s Prescription Diet Stews*

<table>
<thead>
<tr>
<th>Product</th>
<th>Preparation</th>
<th>Kcal/ml</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
<th>16</th>
<th>18</th>
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<tbody>
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<td>k/d</td>
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</tr>
<tr>
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<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

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- Acceptable
- Easy
- Very easy

*Hill’s Data on File; Prescription Diet Stews could be used in a 10 Fr red rubber catheter or larger.
Enteral feeding utilising Hill’s Prescription Diet Stews*

<table>
<thead>
<tr>
<th>Product</th>
<th>Preparation</th>
<th>Kcal/ml</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
<th>16</th>
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