1 GASTROINTESTINAL SYSTEM

1.01 ANTACIDS, ANTIULCER MEDICINES

WHO MODEL FORMULARY 2004 NOTES:

DYSPEPSIA & PEPTIC ULCER. [Edited] Patients with non-ulcer dyspepsia & peptic ulceration (involving the stomach, duodenum and lower oesophagus) should be advised to avoid smoking, alcohol and aggravating foods, and to eat small regular meals to aid digestion. Consider possibilitiy of malignant disease in all patients over 40 years old. Gastric and duodenal ulcers are healed by 4–8 weeks treatment with H_2 -receptor antagonists but there is a high rate of relapse (greater than 70% over 2 years) requiring maintenance therapy. Relapses can be prevented very sucessfully by eradicating *Helicobacter pylori* which is causally associated with most peptic ulcers (except those related to NSAID use). Eradication of *H. pylori* reduces the relapse rate to about 4-8%. This is undoubtedly cost-effective compared to the alternatives of long-term maintenance therapy with low-dose H_2-receptor antagonists or repeated treatment of recurrent ulcers. It is recommended that the presence of *H. pylori* is confirmed before starting eradication treatment, particularly for gastric ulcers. The urea breath test is used widely to test for *H. pylori* , but it may produce false negative results if used soon after proton pump inhibitors or antibacterials. [See Section below for a regimen example, consult local/national guidelines as well].

NSAID-ASSOCIATED ULCERS. Gastrointestinal bleeding and ulceration may occur with NSAID use. Stop NSAID use if possible, if not consider a proton pump inhibitor for protection against NSAID-associated gastric and duodenal ulcers (or an H_2 -receptor antagonist, but effective for protection against NSAID-associated duodenal ulcers only). Patients who must continue NSAID therapy after ulcer development may take high-dose H_2 -receptor antagonists concomitantly (but healing is slower). A proton-pump inhibitor e.g. omeprazole is more effective but more expensive. In patients who can discontinue NSAID therapy after ulcer development, treat with an H_2 -receptor antagonist (may need to treat up to 8 weeks), or a proton pump inhibitor (more rapid healing). After healing, continued prophylaxis is required.

GASTRO-OESOPHAGEAL REFLUX DISEASE (GORD). Symptoms include heartburn, acid regurgitation, sometimes difficulty in swallowing (dysphagia); oesophageal inflammation (oesophagitis), ulceration, stricture formation and there is an association with asthma. Management includes drug treatment, lifestyle changes and sometimes surgery. Treat according to severity of symptoms and adjust to response [mild – antacids, moderate – H_2 -receptor antagonist, severe - proton-pump inhibitor (short course)].

ZOLLINGER-ELLISON SYNDROME. Management requires high dose H_2 -receptor antagonist treatment. The proton pump inhibitors are more effective particularly for cases resistant to other treatment but they are more expensive.

1.01a ANTACIDSERROR! BOOKMARK NOT DEFINED.

GENERIC (TRADE) NAME	CAT.	INDICATION/DOSE
Aluminium Magnesium Hydroxide Sulphate Tab 400mg & 800mg, Gel Sachet 800mg/10g (Magaldrate)	*MSL* EML	*By mouth* Adult 400-800mg 3 times daily (chew tab with a glass of water or dilute sachet as indicated), when needed between meals and at bedtime, max 2g/DAY.
Aluminium Hydroxide 66mg/ Magnesium Carbonate 27.5mg per ml Liquid	*MSL* EML	*By mouth* Adult 10ml up to 3 times daily.
Magnesium Carbonate 80mg /Calcium Carbonate 680mg Tab (Rennie's Antacid)	*MSL*	*By mouth* adult 1-2 tablets to be sucked or chewed, max 16 tablets daily, between meals and at bedtime. Child 6-12 yo, one tablet taken as above, max 8 tablets daily. Not recommended for child < 6 yo.

COMMENT/CAUTIONS:

- **Adverse effects**: Magnesium salts may cause diarrhoea and Aluminium salts may cause constipation.
- **Antacids** may interfere with absorption of other drugs and should preferably not be taken at the same time with the following (list not exclusive): azithromycin, bisphosphonates, captopril, cefaclor, chloroquine, digoxin, dipyridamole, enalapril, fexofenadine, iron (oral), isoniazid, itraconozole, ketoconazole, lithium, nitrofurantoin, phenothiazines (e.g. prochlorperazine), phenytoin, proguanil, quinidine, quinolones (e.g. ciprofloxacin), rifampicin, tetracyclines; they may also damage enteric coatings of tablets.

1.01b H_2-ANTAGONISTS, PROTON PUMP INHIBITORS

GENERIC (TRADE) NAME	CAT.	INDICATION/DOSE
Omeprazole Cap 20mg (Losec/Mopral) **Proton Pump Inhibitor**		Benign gastric/duodenal ulcers and reflux oesophagitis not responding to H_2 antagonist or NSAID-associated: *By mouth* adult 20mg once daily, max 40mg daily, for at least 4 weeks for duodenal ulcers, *or* for 8 weeks for gastric ulcers/reflux oesophagitis. *Helicobacter pylori* eradication (with adjunct antibiotics, see Comment): 20mg twice daily for one week.
Ranitidine Tab 150mg, Oral Solution 75mg/5ml, Injection 50mg/2ml (Azantac/Zantac/Raniplex) **H_2-Antagonist**	EML	Benign gastric/duodenal ulceration, reflux oesophagitis: *By mouth* adult 150mg twice daily or 300mg at night for 4-8 weeks, max in duodenal ulcer 300mg twice daily for 4 weeks; maintenance, 150 mg at night. Oral liquid for child use, 2-4mg/kg twice daily, max 300mg/DAY. *By IM inj*, Adult 50 mg every 6-8 hours *or by slow IV inj*, 50 mg diluted to 20 ml and given over at least 2 minutes, may be repeated every 6-8 hours *or by IV infusion* 25mg/hour for 2 hours may be repeated every 6-8 hours. Prophylaxis of stress ulceration: Adult initial *slow IV inj* 50 mg diluted to 20 ml and given over at least 2 minutes *then by continuous IV infusion,* 125–250 micrograms/kg per hour (may be followed by 150 mg twice daily *by mouth* when oral feeding commences).

COMMENT/CAUTIONS:

- HELICOBACTER PYLORI: Nearly all duodenal ulcers and most gastric ulcers not associated with NSAIDs are caused by *Helicobacter pylori*. Suggested one week eradication regimen for adults (WHO): Omeprazole 20mg twice daily + Amoxicillin 500mg 3 times daily + Metronidazole 400mg 3 times daily.

1.02 ANTIEMETICS

GENERIC (TRADE) NAME	CAT.	INDICATION/DOSE
Cinnarizine Tab 25mg (Stugeron) **Antihistamine**		Antiemetic: *By mouth* Adult 25mg, 5-12 yo 12.5mg, up to 3 times daily.
Meclozine Tab 100mg [Meclizine] **Antihistamine**		Antiemetic: *By mouth* Adult 25-50mg daily, Child > 12 yo 25mg daily.
Metoclopramide HCl Tab 10mg, Suspension 5mg/5ml, Injection 10mg/2ml, Suppository 5mg & 10mg (Maxolon/Anausin/Primperan) **Motility Stimulant**	EML	*By oral/IM/IV/rectal routes*: Gastroesophageal reflux/antiemetic, Adult 10mg 3 times daily (5mg in 15-19 yo and <60kg); Child < 1yo (<10kg) 1mg twice daily; 1-3 yo (10-14kg) 1mg 2-3 time daily; 3-5 yo (15-19kg) 2mg 2-3 time daily; 5-9 yo (20-29kg) 2.5mg 3 time daily; 9-14 yo (30kg+) 5mg 3 times daily; max 0.5mg/kg/DAY. Aid to gastrointestinal intubation or diagnostic procedures, a single dose 5-10 minutes before examination: Adult 10-20mg (10mg in 15-19 yo); Child < 3 yo 1mg, 3-5 yo 2mg, 5-9 yo 2.5mg, 9-14 yo 5mg. Inject IM undiluted into a large muscle mass, inject IV undiluted slowly over 2 minutes. IV infusion dilute 10mg with 50ml of D5/NS/RL and infuse over 15-30 minutes (max 5mg/minute at conc 0.2-5mg/ml).
Prochlorperazine Maleate Tab 5mg (Stemetil) **Phenothiazine**	*MSL*	Acute nausea/vomiting: *By mouth* Adult 20mg initially, then 10mg after 2 hours. Prevention: Adult 5-10mg 2-3 times daily; Child > 10kg 250 micrograms/kg given 2-3 times daily.
Promethazine HCl Tab 25mg (Phenergan) **Antihistamine**		Motion sickness: *By mouth* Adult 25mg 0.5-1 hour before travel/sail, repeat 8-12 hours after as needed, then 25mg twice daily on succeeding days of travel/sailing as needed; Child 5-10 yo half adult dose.

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COMMENT/CAUTIONS:

- Antiemetic treatment is best administered prophylactically at least 30 minutes before the emetic stimulus. Parenteral/rectal preps may be useful if vomiting has started. Give at the very beginning of a migraine attack to relieve nausea.
- Routine pre-op use of antiemetics is not justified except in patients with history of post-op nausea/vomiting, or where emesis would endanger the result of surgery or harm the patient.
- Vertigo is often a self-limiting condition, and more commonly caused by drug therapy rather than treated by medications.
- **Metoclopramide** and **phenothiazines** may induce extrapyramidal side effects such as acute dystonic reactions with facial and skeletal muscle spasms and oculogyric crises. These are more common in the young (esp. females) and the very old. They occur soon after starting treatment and subside within 24 hours of stopping the medicine. Although **metoclopramide** is preferred when sedation is not required, restrict its use in under 20 yo for severe intractable vomiting of known cause, radio/chemotherapy, aid to gastrointestinal intubation, and as premedication, dose based on body weight.
- **Metoclopramide** is sometimes used as non-drowsy seasickness treatment at usual doses for gastroesophageal reflux (anecdotal, from E-DRUG).

1.03 ANTIHAEMORRHOIDALS

GENERIC (TRADE) NAME	CAT.	INDICATION/DOSE
Antihaemorrhoidal Suppository (various)	*MSL*	Adult insert one suppository *into the rectum* at night and/or in the morning, and/or after a bowel movement; please refer to product leaflets of current options in stock.
Antihaemorrhoidal Ointment (various)		Adult *apply* 2-3 times daily; please refer to product leaflets of current options in stock.

COMMENT/CAUTIONS:

- Suppositories containing steroid should be for short-term use unless otherwise indicated.
- Haemorrhoids are enlarged or varicose veins of the tissues at the anus or rectal outlet. They are the most frequent cause of rectal bleeding, other symptoms (also for fistulas & proctitis) include anal and perianal pruritus, soreness and excoriation. Careful local toilet with attention to any minor faecal soiling, dietary adjustments and using bran for example may be helpful.

1.04 ANTISPASMODICS

GENERIC (TRADE) NAME	CAT.	INDICATION/DOSE
Hyoscine N-Butylbromide Tab 10mg & Inj 20mg/ml (Buscopan) [Butylscopolamine] **Note: Please do not confuse with Hyoscine HYDRObromide or Scopolamine used in motion or seasickness treatments.**	*MSL*	Acute spasm or spasm in diagnostic procedures: *By IM/IVinj* Adult 20mg, repeated after 30 minutes if needed. *By mouth* Adult 20mg 4 times daily, Child 6-12 yo 10mg 3 times daily. Inject IM 20mg undiluted into a large muscle mass or dilute 20mg with D5/NS and inject IV slowly.

COMMENT/CAUTIONS:

- Consider dietary modification/counselling as primary treatment of irritable bowel syndrome (IBS). Antispasmodics may be useful adjuncts as smooth muscle relaxants in dyspepsia, IBS and diverticular disease.
- **Adverse effects**: Constipation, dry mouth, urinary retention, blurred vision. Use cautiously in Down's syndrome, children and elderly, reflux oesophagitis, diarrhoea, ulcerative colitis, acute myocardial infarction, hypertension, tachycardia, pyrexia, pregnancy and breast-feeding.
- **Contraindications**: Closed angle glaucoma, myasthenia gravis, paralytic ileus, pyloric stenosis and prostatic enlargement.

1.05 LAXATIVES

WHO MODEL FORMULARY 2004 NOTES:

A balanced diet with adequate fluid intake & fibre is of value in preventing constipation. Before prescribing laxatives, it is important to be sure that the patient is constipated and that the constipation is not secondary to an underlying undiagnosed complaint. It is also important that the patient understands that bowel habit can vary considerably in frequency without doing harm. For example some people consider themselves constipated if they do not have a bowel movement each day. A useful definition of constipation is the passage of hard stools less frequently than the patient's own normal pattern and this should be explained to the patient since misconceptions about bowel habits have led to excessive laxative use which in turn has led to hypokalaemia and an atonic non-functioning colon.

Prolonged treatment of constipation is rarely necessary except occasionally in the elderly.

There are many different laxatives. These include **bulk-forming laxatives** which relieve constipation by increasing faecal mass and stimulating peristalsis, **stimulant laxatives** which increase intestinal motility and often cause abdominal cramp, **faecal softeners** which lubricate and soften impacted faeces and **osmotic laxatives** which act by retaining fluid in the bowel by osmosis. **Bowel cleansing solutions** are used before colonic surgery, colonoscopy or radiological examination to ensure that the bowel is free of solid contents; they are **not** a treatment for constipation.

GENERIC (TRADE) NAME	CAT.	INDICATION/DOSE
Bisacodyl Tab 5mg (Dulcolax) **[onset 10-12 hours]** **Stimulant laxative**	EML	Constipation: *By mouth* Adult 5-10mg at night, max 20mg; Child < 10 yo 5mg at night.
Bisacodyl Suppository 10mg (Dulcolax/Fleet Bisacodyl) **[onset 20-60 minutes]** **Stimulant laxative**		Constipation or VVF patient: Adult insert one 10mg suppository *into the rectum* in the morning or as needed.
Docusate Cap 100mg (Dioctyl/Docusol) **[onset 1-2 days]** **Stimulant laxative**	D	Chronic constipation: *by mouth* Adult up to 500mg daily in divided doses.
Glycerol BP Suppository 4g [Glycerin] **[onset 15-30 minutes]** **Stimulant laxative**	*MSL* EML	To promote faecal evacuation: Adult insert one suppository *into the rectum* in the morning or as needed, retained for at least 15 minutes.
Lactulose Liquid 3.35g/5ml (Duphalac) **[onset may take up to 48 hours]** **Osmotic laxative**		Constipation: *by mouth* Adult 15-30ml twice daily for at least 2-3 days; Child <1 yo 2.5ml, 1-5 yo 5ml, 5-10 yo 10ml, taken twice daily. VVF patients 15-30ml twice daily.
Ispaghula/Psyllium Husk Fibre Powder (Metamucil) **[onset 12-24 hours]** **Bulk-forming laxative**		*By mouth,* Adult/Child > 12 yo, 1 rounded teaspoonful (12g) mixed in around 250ml (1 glass) of water, taken 1-3 times daily; 6-12 yo, half adult dose above in 250ml of water, up to 3 times daily.

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GENERIC (TRADE) NAME	CAT.	INDICATION/DOSE
Sodium Phosphate Oral Saline Solution, 45ml (Fleet Phospho-Soda Oral) **[onset 30 minutes-6 hours] Osmotic laxative Contains 556mg Na per teaspoon powder.**		*By mouth,* Adult/Child > 12 yo 20-45ml, 10-12 yo 10-20ml, 5-10 yo 5-10ml; purgative 45ml the day before examination and another 45ml on the day of examination. Dilute required dose in half a glass of water, give followed with another glass of water.
Senna Tablets (total sennosides content 7.5mg) (Senokot) **[onset 8-12 hours]** **Stimulant laxative**	EML	Constipation: *By mouth* Adult 2-4 tablets usually at night; initial dose should be low then gradually increased, max 4 tabs twice daily; Child (on doctor's advice only) 2-6 yo half a tablet once daily, max 1 tab twice daily; 6-12 yo 1 tab once daily, max 2 tabs twice daily.

COMMENT/CAUTIONS:

- Constipation may be defined as the passage of hard stools less frequently than the patient's own normal pattern. Drug therapy should only be used where dietary changes were insufficient.
- Laxatives should generally be avoided except where straining will exacerbate a condition (e.g. angina) or increase the risk of rectal bleeding as in haemorrhoids. They may also be useful in drug-induced constipation, for the expulsion of parasites after anthelmintic treatment, and to clear the alimentary tract before surgery and radiological procedures.
- **Lactulose** takes 1-3 days to take effect and is NOT suitable for PRN USE.
- **Bulk-forming laxatives** MUST be taken with plenty of water to avoid obstruction. They are NOT suitable for acute relief. Contraindication: gastrointestinal obstruction, colonic atony and faecal impaction.
- **Stimulant laxatives** may cause abdominal cramps, avoid if there is intestinal obstruction. Prolonged use may precipitate atonic colon and hypokalaemia.
- DRUG-INDUCED CONSTIPATION. The following drugs commonly cause constipation: calcium antagonists, anticholinergics, iron, opioid analgesics, phenothiazine/tricyclic antidepressants.
- Laxatives should be routinely prescribed for all patients on regular opiate therapy e.g. morphine.

1.06 MEDICINES USED IN DIARRHOEA

TREATMENT OF DEHYDRATION: WHO RECOMMENDATIONS:

Replacement of fluid and electrolytes orally can be achieved by giving oral rehydration salts (ORS)—solutions containing sodium, potassium and glucose. Acute diarrhoea in children should always be treated with ORS as below:

Plan A: no dehydration. Nutritional advice and increased fluid intake are sufficient (soup, rice, water and yoghurt, or even water). For infants aged under 6 months who have not yet started taking solids, oral rehydration solution must be presented before offering milk. Mother's milk or dried cow's milk must be given without any particular restrictions. In the case of mixed breast-milk/formula feeding, the contribution of breastfeeding must be increased.

Plan B: moderate dehydration. Whatever the child's age, a 4-hour treatment plan is applied to avoid short-term problems. Feeding should not therefore be envisaged initially. It is recommended that parents are shown how to give approximately 75 ml/kg of oral rehydration solution with a spoon over a 4-hour period, and it is suggested that parents should be watched to see how they cope at the beginning of the treatment. A larger amount of solution can be given if the child continues to have frequent stools. In case of vomiting, rehydration must be discontinued for 10 minutes and then resumed at a slower rate (about one teaspoonful every 2 minutes). The child's status must be re-assessed after 4 hours to decide on the most appropriate subsequent treatment. Oral rehydration solution should continue to be offered once dehydration has been controlled, for as long as the child continues to have diarrhoea.

Plan C: severe dehydration. Hospitalization is necessary, but most urgent priority is to start rehydration. In hospital (or elsewhere), if the child can drink, oral rehydration solution must be given pending, and even during, intravenous infusion (20 ml/kg every hour by mouth before infusion, then 5 ml/kg every hour by mouth during intravenous rehydration. For intravenous supplementation, it is recommended that compound solution of sodium lactate (see section 26.2) is administered at a rate adapted to the child's age (infant under 12 months: 30 ml/kg over 1 hour then 70 ml/kg over 5 hours; child over 12 months: the same amounts over 30 minutes and 2.5 hours respectively). If the intravenous route is unavailable, a nasogastric tube is also suitable for administering oral rehydration solution, at a rate of 20 ml/kg every hour. If the child vomits, the rate of administration of the oral solution should be reduced.

The solution may be prepared either from prepackaged sugar/salt mixtures or from bulk substances and water. Solutions must be freshly prepared, preferably with recently boiled and cooled water. Accurate weighing and thorough mixing and dissolution of ingredients in the correct volume of clean water is important. Administration of more concentrated solutions can result in hypernatraemia.

GENERIC (TRADE) NAME	CAT.	INDICATION/DOSE
Loperamide Tab 2mg (Imodium)	*MSL*	*By mouth* Adult 4mg followed by 2mg after each loose stool, max 16mg/DAY max 5 days. Child 4-8 yo 1mg 3-4 times daily max 3 days, 9-12 yo 2mg 4 times daily max 5 days.
Oral Rehydration Salts (ORS) WHO new standard: NaCl 2.6g, trisodium citrate 2.9g, KCl 1.5g, glucose anhydrous 13.5g, per litre (L) of clean water. **Alternative: sucrose (common sugar) 27g (5-6 teaspoonfuls), sodium bicarbonate 2.5g (half teaspoon), per litre clean water.** ***or*** **1 teaspoon salt, 8 teaspoons sugar per litre clean water.**	*MSL* EML	Dilute OR salts with one litre of clean water (see notes above), give *by mouth* according to patient needs, usually adult 200-400ml after each loose stool (or 20-40ml/kg/DAY). Infant & Child refer above to Plans A, B or C for recommendations first, usually Child 200ml after each loose stool, Infant 1-1.5 times of the usual feed volume after each loose stool (or 100-150ml/kg/DAY).

COMMENT/CAUTIONS:

- First line treatment in acute diarrhoea is management of fluid and electrolyte depletion – drug therapy is thus NOT indicated in ACUTE DIARRHOEA.
- Bloody diarrhoea is usually a sign of invasive enteric infection and should be treated with an appropriate anti-infective agent.
- Diarrhoea persisting for longer than a month is known as chronic diarrhoea. A mild malabsorption syndrome, tropical enteropathy, is apparent in most healthy indigenous populations of tropical countries. However the majority of cases of chronic diarrhoea have non-infectious causes including gluten-sensitivity, inherited metabolic disorders or inflammatory bowel disease.
- **Loperamide** should be avoided in young children, and when paralytic ileus is present or when abdominal distension develops, and in acute ulcerative colitis or pseudomembranous colitis associated with broad spectrum antibiotics. Discontinue use if no clinical improvement is observed within 48 hours in patients with acute diarrhoea.

NOTE. For Throat and Mouth Preparations, see Chapter 10 Ear, Nose & Throat.