# Provincial Pediatric Abdominal Pain Primary Care Pathway

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**1. Suspected Pediatric Functional Abdominal Pain/ Disorder of brain-gut interaction (DGBI):**
- Recurrent abdominal pain at least one day per week (on average) in the last three months in the absence of alarm features

**2. Baseline investigations:**
- Medical history, physical exam (growth parameters), assess secondary causes of symptoms
- CBC, ferritin, CRP, albumin, ALT, GGT
- Consider fecal calprotectin, stool for infectious diseases if diarrhea present
- Celiac screen

**3. Alarm features:**
- Family history (first degree relative) of IBD or peptic ulcer disease
- Unintended weight loss
- Deceleration of linear growth
- Delayed puberty
- Visible blood in stool unrelated to constipation
- Nocturnal diarrhea
- Persistent right upper or right lower quadrant pain
- Dysphagia
- Unexplained fever
- Arthritis
- Perianal disease

Refer for consultation; if concern for underlying IBD, please refer directly to peds GI

**4. Pain predominant symptoms:**

- Paroxysmal episodes
  - Associated with two of the following:
    - Anorexia
    - Headaches
    - Photophobia
    - Nausea
    - Vomiting
    - Pallor
  - Abdominal migraine
- Abdominal pain associated with bowel movements or change in nature of stools
  - Is there associated constipation?
    - Yes
    - Does the pain resolve with effective treatment of constipation?
      - Yes: Pediatric constipation pathway
      - No: IBS
    - No: IBS
  - Are symptoms associated with bowel movements or change in nature of stools?
    - Yes: Is there associated constipation?
    - No: Functional Dyspepsia
- Postprandial fullness
- Early satiety
- Epigastric pain
- Insufficient criteria for IBS, functional dyspepsia or abdominal migraine
  - Functional abdominal pain not otherwise specified

**5. Management:**
- Patient reassurance: provide positive diagnosis and education to establish therapeutic relationship.
- Lifestyle modifications: stress reduction may include physical activity, mindfulness, meditation, hypnotherapy, acupuncture, and sleep hygiene.
- Dietary modifications: assess common food triggers and recommend a food and symptom journal. Consider referral to a Registered Dietitian.
- Psychological therapy: education and reassurance, good evidence for cognitive behavioural therapy, gut-based hypnotherapy, consider psychiatry referral if relevant.
- Pharmacological therapy: various options depending on abdominal pain syndrome.

Consider using an advice service before referring

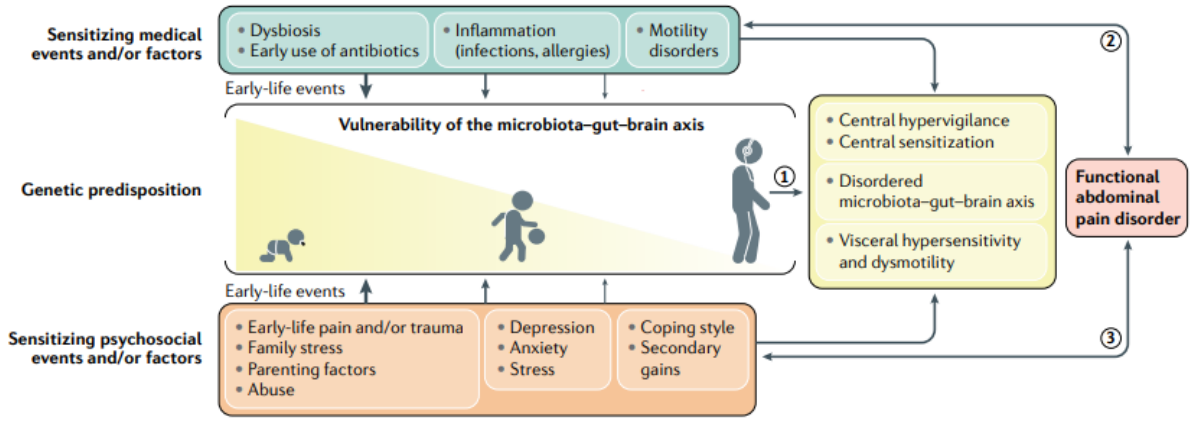
This primary care pathway was co-developed by primary and specialty care and includes input from multidisciplinary teams. It is intended to be used in conjunction with specialty advice services, when required, to support care within the medical home. Wide adoption of primary care pathways can facilitate timely, evidence-based support to physicians and their teams who care for patients with common low-risk GI conditions and improve appropriate access to specialty care, when needed. To learn more about primary care pathways, check out this short video.

## PEDIATRIC CHRONIC ABDOMINAL PAIN PATHWAY PRIMER

- Pediatric chronic abdominal pain is a common condition in children and is often related to a disorder of brain-gut interaction (DGBI) characterized by recurrent abdominal pain/discomfort.
- Abdominal pain-predominant DGBIs were previously called functional abdominal pain.
- DGBI is one of the most common GI disorders affecting approximately 10% of the general population and can have a significant impact on a child's quality of life.[1, 2]
- In the past, diagnosing functional GI disorders occurred only when organic disease had been excluded, however now there is evidence to support a **symptom-based positive diagnosis**.
- The diagnosis of DGBIs can be challenging but is primarily based on clinical symptoms and exclusion of other organic causes, with an emphasis on **avoiding unnecessary invasive diagnostic procedures**
- The Rome IV criteria are the current recommended diagnostic criteria for various functional GI disorders.[3]
    - They provide symptoms-based guidelines by which child and adolescent functional abdominal pain is diagnosed after appropriate medical evaluation and the symptoms cannot be attributed to another medical condition.
    - The common pain predominant functional GI disorders affecting children include functional dyspepsia, irritable bowel syndrome, abdominal migraines, functional constipation, and functional abdominal pain not otherwise specified.
- DGBIs are a group of disorders associated with altered mind-body connection. It is a symptom-based diagnosis with no "test" that confirms the diagnosis. Investigations may be done to exclude specific diseases based on the constellation of symptoms of DGBI being manifested. As many as 20% of the pediatric population worldwide have gastrointestinal symptoms compatible with DGBI. These disorders are never "in your head' and have biological, psychological, and social origins.
- DGBIs are under study globally by many health care providers with varied backgrounds including gastroenterology and psychiatry.

## EXPANDED DETAILS

**Pathophysiology of functional abdominal pain disorders**




- Functional abdominal pain disorders [FAPDs] are often characterized by the presence of **visceral hypersensitivity** leading to disability as the final outcome. Visceral hypersensitivity occurs as a result of sensitizing medical factors that are superimposed on a background of genetic predisposition and early life events.

- Early life events likely include all childhood and adolescent stages where growth, structural and functional development of organs occurs, although the vulnerability of the gut–brain–microbiota axis seems to be highest during the perinatal period and first years of life.
- Visceral hypersensitivity describes a perceived response to peripheral signals and can be a result of changes in visceral afferent signal processing from the gut to the brain or due to changes in descending modulation of pain (i.e., central sensitization). Visceral hypersensitivity in children is often manifested by a **decreased sensory threshold for pain** compared with control children.
- Visceral hypersensitivity may be related to the child's psychological distress (anxiety, depression, impulsiveness, anger). Increased mucosal proinflammatory cytokines may be induced as a result of acute infectious gastroenteritis (post-infectious IBS). Alterations in the gut microbiome have been demonstrated, although not clear if these changes are cause or result of IBS and its symptoms. Noxious early life events (e.g., surgery) have been associated with higher risk of developing functional abdominal pain disorders in childhood, including IBS.
- **Central sensitization** refers to the amplification of pain sensitivity via the enhancement of neuronal function and neural signaling within the central nervous system that elicits pain hypersensitivity. Central sensitization is a well-described mechanism in chronic pain development and maintenance.
- FAPDs have been recognized to coexist with other medical conditions, such as lactose intolerance, or to coexist with different FAPDs in the same patient.
- Risk factors:
    - Studies from across the world have reported a predominance of FAPDs in girls, both in adolescents and in younger children.
    - Data pool from studies across the world show that there is no significant difference in prevalence of FAPDs in children aged <12 years and >12 years.
    - Up to 50% of children with FAPD are reported to have clinically relevant anxiety or depression. Social contextual factors such as parental chronic pain have also been linked to increased episodes of pain in children.
    - There is an increased incidence of abdominal symptoms in children with mothers who have IBS. This may be due to genetic factors, but may also be due to social factors, including attentive parental response to child pain behaviour.[4]

## 1. Suspected Functional Abdominal Pain/DGBI

- Recurrent abdominal pain at least one day per week (on average) in the last 3 months in the absence of alarm features.
- Are symptoms consistent with a specific pain-predominant DGBI? (Refer to Rome IV criteria for full diagnostic criteria)
    - Postprandial fullness, early satiety, epigastric abdominal pain or burning not associated with defecation (functional dyspepsia).
    - Paroxysmal episodes of abdominal pain associated with 2 of the following: anorexia, headaches, photophobia, nausea, vomiting, pallor (abdominal migraine).
    - Abdominal pain associated with bowel movements or change in form or frequency of stools (irritable bowel syndrome).
    - Chronic abdominal pain with insufficient criteria for irritable bowel syndrome, functional dyspepsia, or abdominal migraine (functional abdominal pain-not otherwise specified (NOS)).
- It is vital to understand a patient's predominant symptom (pain, constipation, or diarrhea) as this influences treatment selection.

Table 1. Differential diagnoses to consider for pediatric patients presenting with chronic abdominal pain (can vary depending on location and characteristics of pain):

| Condition | Notes |
|---|---|
| Disorders of gut-brain interaction (Functional Abdominal pain disorders) | • Includes irritable bowel syndrome, functional dyspepsia, abdominal migraines, functional abdominal pain NOS<br>• Common conditions to consider if no alarm features and normal investigations |
| Somatic Symptom Disorder (SSD) | • For some patients, their abdominal pain results in significant worry and/or dysfunction that may meet DSM-V criteria for a somatic symptom disorder. Psychiatry review is helpful |
| Constipation | • Rome IV criteria for functional constipation for pediatric patients 4 years and older:<br>Must include 2 or more of the following occurring at least once per week for a minimum of 1 month with insufficient criteria for a diagnosis of IBS:<br>1. 2 or fewer defecations in toilet per week<br>2. at least 1 episode of fecal incontinence per week<br>3. History of retentive posturing or excessive volitional stool retention<br>4. History of painful or hard bowel movements<br>5. Presence of a large fecal mass in the rectum<br>6. History of large diameter stools that can obstruct the toilet<br>• Refer to Provincial Pediatric Pathway for Constipation assessment and management<br>• If abdominal pain resolves with constipation treatment, the patient has functional constipation<br>• If the abdominal pain does not resolve with constipation treatment, then the patient may have IBS with constipation |
| Celiac disease | • Various intestinal and extra-intestinal symptoms reported for celiac disease<br>• Screen with anti-TTG IgA<br>• Patient must be eating gluten for the test to be accurate<br>• Refer to Provincial Celiac disease pathway |
| Inflammatory bowel disease (including Crohn's disease and ulcerative colitis) | • Concerning features: persistent RLQ abdominal pain, hematochezia, growth delay, perianal disease, unexplained fevers<br>• In addition to screening bloodwork, include fecal calprotectin |
| Hepatic-pancreatic-biliary | • Depending on location and characteristics of patient's pain<br>• Liver enzymes, lipase +/- abdominal US if relevant symptoms |
| GERD | • Besides epigastric abdominal pain, patient may have other symptoms such as acid regurgitation, retrosternal chest discomfort<br>• Daily, chronic, and continuous abdominal pain is unlikely to be related to GERD |
| Non-GI | **Consider non-GI causes of chronic abdominal pain if relevant symptoms include:**<br>• **Gynecologic**<br>• **Hematologic** - porphyria, sickle cell, angioedema, familial Mediterranean fever<br>• **Musculoskeletal** - bony pain, muscular strain or spasm, abdominal wall pain, costochondritis |

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|---|---|---|
| | ● **Psychological** - somatic disorders, anxiety, depression, post-traumatic stress disorder (PTSD), eating disorders<br>● **Spleen** - splenomegaly<br>● **Urogenital** - kidney stones | |
| Medications/ supplements | ● Cannabinoid hyperemesis syndrome<br>● NSAID-related gastropathy, enteropathy, colonopathy | ● At risk for iron, potassium, calcium deficiency. May need to assess serum levels and consider supplementation<br>● Antidiarrheals<br>● Antibiotics |
| Allergens/ sensitivities | ● Consider food allergies if other associated symptoms (respiratory, skin etc.) and clear temporal association with food exposure | ● Food and symptom journal to identify food sensitivities/intolerances<br>● Referral to allergist if suspect IgE-mediated food allergy and Registered Dietitian if at risk of nutrient deficiency |

| **Checklist to guide in-clinic review of your pediatric patient with chronic abdominal pain** | |
|---|---|
| ☐ | Recurrent abdominal pain at least 4 times per month in the last 2 months:<br>Episodic or continuous abdominal pain that does not occur solely during physiologic events (e.g., eating, menses). |
| ☐ | Complete detailed medical history, physical examination, and review of medications. |
| ☐ | Complete baseline investigations confirming no abnormal results (CBC, ferritin, CRP, albumin, ALT, GGT, TTG).<br>Consider sending fecal calprotectin if patient has red flags for IBD such as weight loss, diarrhea, anemia. |
| ☐ | Confirm absence of alarm features (see algorithm Box 3).<br>If alarm features are identified, refer for specialist consultation. |

## 2. Baseline investigations

- A detailed medical history and physical examination should be performed at presentation to assess for alarm symptoms and other conditions presenting with chronic abdominal pain.
- Initial laboratory investigations to consider include:
    - CBC, ferritin, CRP, ALT, GGT, albumin, celiac screen (patient must be eating gluten for at least 8 weeks to be accurate).
    - Anemia or other alarm features (see Section 3) increase the likelihood of organic disease. If present, the patient will require further investigation.
    - Minimize testing if no alarm features as recurrent negative testing may lead to parental anxiety regarding an underlying rare condition.
    - Do not test for *H. pylori* in children with non-specific gastrointestinal symptoms as current pediatric guidelines do not support a “test-and-treat” approach. Treatment of *H. pylori* is not expected to resolve symptoms in children with DGBIs.[5]
- Additional testing can be considered based on patient history
    - *C.difficile* or ova and parasites if there has been recent travel and diarrhea is the main concern.
- A significant percentage of patients with chronic abdominal pain or DGBIs have a history of mental health disorder(s). These conditions may worsen symptoms through the brain-gut axis and affect coping, so it is important to manage mood disorders if present.

**Fecal calprotectin**

- Consider ordering a fecal calprotectin in IBS-D patients if there is a high clinical suspicion of IBD.
- Calprotectin is a protein released into the gastrointestinal tract when it is inflamed and can be detected in the stool by laboratory assay.

- Elevated levels of fecal calprotectin are found in inflammatory bowel disease (Crohn's disease and ulcerative colitis). Mid-range levels can also be found in several benign conditions, such as in patients on NSAIDs or PPIs or those with GI infections, and celiac disease. By contrast, in functional disorders such as IBS, fecal calprotectin levels are normal.[6]

Interpretative Guidance[7]:

| Age | Indication for testing | Result | Interpretive Guidance |
|---|---|---|---|
| ≥4 years | Investigation of patients with GI symptoms | <50 ug/g | **Normal.** |
| | | 50-120 ug/g | **Indeterminate.** If symptoms persist, repeat testing should be considered in 4-6 weeks. If the repeat result is still indeterminate, the patient should be referred for consultation or physician advice. |
| | | >120 ug/g | **Elevated.** The patient should be referred for consultation or physician advice. |
| | Monitoring of known IBD patients | >250 ug/g | Result suggests active inflammation. |
| <4 years | • Elevated levels of fecal calprotectin are commonly observed in pediatric patients less than 4 years of age. Robust pediatric reference intervals have not been established for this age group. Clinical correlation is required.<br>• However, for evaluation of patients with GI symptoms, results >200 ug/g warrant discussion with Pediatrics GI. | | |

## 3. Alarm features

If any of the following alarm features are identified, refer for consultation.

Include any and all identified alarm features in the referral to ensure appropriate triage.

Clinical judgment should be exercised in considering an alarm feature's relevance based on the patient's history and physical exam.

Evidence suggests that the greater the number of alarm signs present, the higher the likelihood of organic disease.

- Family history (first degree relative) of IBD or peptic ulcer disease (patients with DGBIs often have a family history of IBD, which could be attributed to hypervigilance of symptoms from their parents)
- Anemia
- Unintended weight loss
- Deceleration of linear growth
- Delayed puberty
- Visible blood in stool unrelated to constipation
- Nocturnal diarrhea
- Persistent right upper or right lower quadrant pain: could be a sign of biliary disease (right upper abdominal pain) or terminal ileal Crohn's disease (right lower abdominal pain)
- Dysphagia
- Unexplained fever
- Arthritis
- Perianal disease

## 4. Pain Predominant symptoms

The Rome IV diagnostic criteria for **functional dyspepsia** include[8]:

1 or more of the following bothersome symptoms at least 4 days per month for at least 2 months:

- postprandial fullness
- early satiety
- epigastric pain or burning not associated with defecation
- after appropriate evaluation, the symptoms cannot be fully explained by another medical condition

Within functional dyspepsia, there are 2 subtypes now adopted:

| **Postprandial distress syndrome:** | **Epigastric pain syndrome:** |
|---|---|
| ● bothersome postprandial fullness or early satiety that prevents the child from finishing a regular meal.<br>● supportive features include upper abdominal bloating, postprandial nausea, or excessive belching. | ● bothersome (severe enough to interfere with normal activities) pain or burning localized to the epigastrium.<br>● the pain is not generalized or localized to other abdominal or chest regions, and not relieved by defecation or passage of flatus.<br>● supportive criteria include (a) burning quality of the pain but without a retrosternal component and (b) the pain commonly induced or relieved by ingestion of a meal but may occur while fasting. |

The Rome IV diagnostic criteria for **IBS** include[3]:

Must include ALL of the following for <u>at least 2 months</u> before diagnosis:

1. Abdominal pain <u>at least 4 days per month</u> associated with one or more of the following:
    - related to defecation
    - a change in stool frequency
    - a change in stool form (appearance)
2. In children with constipation, the pain does not resolve with resolution of the constipation.
3. After appropriate evaluation, the symptoms cannot be fully explained by another medical condition.

Pediatric IBS can be divided into subtypes similar to adults according to the predominant stool consistency:

- Constipation-predominant (IBS-C, > 25% hard stools and < 25% loose stools)
    - Children in whom the pain resolves with improved bowel management have functional constipation, not IBS.
        - As many as 75% of children with constipation report pain, and IBS patients often receive an incorrect diagnosis of functional constipation.
        - Children with constipation and abdominal pain should be initially treated for constipation only, but if the pain does not resolve with appropriate constipation treatment alone, then the patient likely has IBS with constipation.
    - Diarrhea-predominant (IBS-D, > 25% loose stools and < 25% hard stools)
    - Mixed bowel habits (IBS-M, > 25% loose stools and > 25% hard stools)
    - Unclassified (IBS-U, < 25% loose stools and < 25% hard stools)

- IBS is considered a disorder of the brain-gut axis, and a child's individual symptoms reflect which components of the brain-gut axis are affected and to what degree.

| The Rome IV diagnostic criteria for **abdominal migraine**[3]**:** |
|---|
| Must include ALL of the following with <u>at least 2 episodes within 6 months</u> before the diagnosis: |
| 1. Paroxysmal episodes of intense, acute periumbilical, midline or diffuse abdominal pain lasting 1 hour or more (should be the most severe and distressing symptom)<br>2. Episodes are separated by weeks to months.<br>3. The pain is incapacitating and interferes with normal activities<br>4. <u>Stereotypical</u> pattern and symptoms in the individual patient<br>5. The pain is associated with 2 or more of the following:<br>a. Anorexia, nausea, vomiting, headache, photophobia, pallor.<br>6. After appropriate evaluation, the symptoms cannot be fully explained by another medical condition. |

- Abdominal migraines are common in children, between 1-23%, depending on the criteria used for diagnosis.
- Abdominal migraines, cyclic vomiting syndrome and migraine headache likely share pathophysiologic mechanisms. These episodes are episodic, self-limited, and stereotypical, with symptom-free intervals between attacks.
- They are characterized by paroxysmal prolonged episodes of intense, acute periumbilical, midline or diffuse abdominal pain. These painful episodes are typically incapacitating, interfere with normal activities, and occur in a stereotypical pattern for the individual patient (e.g., the presence or form of aura and the escalation of symptoms, severity, and frequency). The episodes are often but not always associated with other symptoms (such as anorexia, nausea, vomiting, headache, photophobia, and pallor), which might precede or coincide with the duration of pain, and such symptomatic episodes may be separated by weeks to months.
- Children with abdominal migraines may have vomiting but it should not be the main presenting feature. If nausea and vomiting are the predominant symptoms, cyclic vomiting syndrome is likely the diagnosis. The vomiting is often intense (i.e., vomiting multiple times per hour at the peak) and can lead to dehydration.
- Children with abdominal migraine and classic migraine report similar triggers (e.g., stress, fatigue, travel), associated symptoms (e.g., anorexia, nausea, vomiting) and relieving factors (e.g., rest and sleep).
- Abdominal migraines may evolve into migraine headaches into adulthood.

| The Rome IV diagnostic criteria for **functional abdominal pain - NOS** [3]**:** |
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| Must fulfill ALL the following criteria <u>at least 4 times per month</u> for <u>at least 2 months</u> before diagnosis: |
| 1. episodic or continuous abdominal pain that <u>does not occur solely</u> during physiologic events (eg. eating, menses)<br>2. insufficient criteria for IBS, functional dyspepsia, or abdominal migraines<br>3. after appropriate evaluation, the abdominal pain cannot be fully explained by another medical condition |

- Children who do not fit criteria for the above functional disorders associated with abdominal pain would fit the term functional abdominal pain - not otherwise specified (NOS).
- A mean 35-38% of elementary school children report abdominal pain weekly, only about ⅓ of these children meet Rome criteria for diagnosis of any functional abdominal pain disorders (FAPD).

- Children with FAPDs may have worsening symptoms during physiologic events, such as eating and menses, but also have pain at other times.
- Chronic abdominal pain is associated with stressful life events, such as parental divorce, hospitalization, bullying and childhood abuse. How a child and their family copes with pain influences outcomes of FAPDs.
- Often children with FAP-NOS report nonspecific and extraintestinal somatic symptoms that do not necessarily require lab or radiologic investigation.
- Some patients with abdominal pain that causes excessive worry may meet DSM-5 criteria for a somatic symptom disorder (SSD), which is a manifestation of one or more physical symptoms accompanied by excessive thoughts, emotion and/or behavior related to the symptoms which causes significant distress and/or dysfunction. The symptoms have been lasting for more than 6 months. SSD arises from a heightened awareness of various bodily sensations, which are combined with an inclination to interpret these sensations as indicative of a medical illness. SSD have a higher female representation [female-to-male ratio 10:1] and can occur in childhood, adolescence, and adulthood. In these patients, the primary objective is to help the patient cope with the physical symptoms, including health anxiety and maladaptive behaviours, as opposed to eliminating the symptoms, and early psychiatric treatment is helpful.

## 5. Management

<table>
<tr><th colspan="2">Treatment Options</th></tr>
<tr><td colspan="2">Patients with DGBIs will benefit from a multipronged, individualized approach to treatment, including dietary modifications, psychological, and pharmacological therapies.[1,9] A combination of more than one modality of therapy may be needed.</td></tr>
<tr><td>Psychological therapy</td><td>
• Patient counselling and reassurance. A key to effective long-term management of disorders of gut-brain interaction is to provide patient education and reassurance after their initial diagnosis and offer points of reassessment and reappraisal to establish a therapeutic relationship.<br>
  ○ Provide a positive diagnosis. Reassurance regarding lack of concern for other conditions based on normal investigations and absence of red flags.<br>
  ○ Offer to arrange follow-up for ongoing management and reassessment.<br>
• Cognitive-Behavioral Therapy and gut-directed hypnotherapy may help with stress management and gastrointestinal symptoms.[10] It is recommended that therapy be provided by a regulated health professional such as a registered psychologist. Gut-based hypnotherapy, while not widely available, can also be accessed through recorded sessions (https://hypnosis4abdominalpain.com)<br>
• Screening for, and treating, any underlying sleep or mood disorders may be important. Consider mental health referral if relevant.<br>
  ○ Given the complex interaction between the gut-brain axis, it is not surprising that there is an increased association between DGBI and neuropsychiatric disorders. Psychotherapy may be helpful to map out the origins of the brain-gut interactions and to provide treatment strategies.
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<tr><td>Dietary Modifications[11,12,13]</td><td>
• The goal is to identify food triggers for the patient's symptoms using a food and lifestyle symptom journal.<br>
• Common food triggers include:<br>
  ○ High fat meals<br>
  ○ Alcohol<br>
  ○ Caffeine<br>
  ○ Poorly absorbed carbohydrates (e.g., sugar alcohols, lactose, wheat, fructose)<br>
  ○ Excessive consumption of carbonated beverages (e.g., pop) and high sugar foods.
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| | • It is recommended that General Healthy Eating for IBS be attempted prior to an elimination diet as studies have found these to be as effective, easier to advise, and easier to follow.<br>• General Healthy Eating for IBS:<br>  ○ Eat according to Canada's Food Guide<br>  ○ Slowly increase foods high in soluble fibre like psyllium, flaxseed, barley, oats, and chia seeds. Refer to Nutrition Education (search 'soluble fibre').<br>  ○ Eat less processed foods and high fat foods<br>  ○ Increase fluid throughout the day to soften stool (IBS-C) and replace fluid losses (IBS-D)<br>  ○ Limit alcohol and caffeine due to stimulant effects<br>• If implementing General Healthy Eating for IBS does not improve IBS symptoms, consider an Elimination Diet trial. Recommend referring to a Registered Dietitian if trialing an elimination diet or if the patient is identified to be at risk of disordered eating or nutrition deficiency. Elimination trials include:<br>  ○ Single elimination trial (e.g., lactose, gluten, fructose, fructans, or sugar alcohol)<br>  ○ Low FODMAP diet trial (2-6 week elimination then reintroduction phase)<br>• Ensure Celiac Disease screening is complete prior to eliminating gluten. |
| Physical Activity | • See the Canadian 24-Hour Movement Guidelines.<br>• These guidelines suggest 60 min/day for 5-17 year olds and even more for those under 5 years. |

| **Pharmacological therapy**<br>*Evidence for these therapies is limited in pediatrics.* | |
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| **Antispasmodics** | • **Indication:** May reduce symptoms of abdominal pain, however, it is not clear if one agent is more effective than another.[14]<br>• **Mechanism of action:** Smooth muscle relaxation by various mechanisms.<br>• **Adverse effects:** Anticholinergic reactions with some agents (CNS depression, xerostomia), dyspepsia (peppermint oil).[15]<br>• **Dose:** Dose recommendations may not exist for certain antispasmodics in younger children. Some doses listed below are from adult guidelines. A reasonable trial is given for 4 weeks as listed below. Could use regularly or PRN.<br>**Recommended Medications:**<br>• Trimebutine (Modulon®) -Children ≥12 years and Adolescents 100-200 mg TID ($40-80/month).<br>• Pinaverium Bromide (Dicetel®) (from adult dosing guidelines) 50-100 mg TID ($50-75/month).<br>• Hyoscine Butylbromide (Buscopan®) - 10 mg TID-QID ($25-40/month).<br>• Dicyclomine hydrochloride (Bentylol®) - Children ≥2 years 10 mg 3 to 4 times daily ($25-40/month) |
| **Enteric coated peppermint oil** | • **Indication:** abdominal pain[16,17,18]<br>• **Mechanism of action:** Smooth muscle relaxation by various mechanisms.<br>• **Adverse effects:** May interact with medications. It is important to discuss use with their pharmacist and/or healthcare team.[9]<br>• **Recommended Medications:** *next page* |

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| | • Altoids peppermint breath mints<br>• Enteric coated peppermint oil capsules<br>• IBgard® - dose would vary depending on child's weight and cost would vary as well depending on location |
| **Cyproheptadine** | • **Indication:** functional abdominal pain, functional dyspepsia, abdominal migraine (prophylaxis), often well tolerated with minimal significant adverse effects. A small study found that cyproheptadine was beneficial in the treatment of FAPDs in children[19]<br>• **Mechanism of action:** 1st generation anti-histamine, serotonin, and calcium channel blocking effects on the smooth muscle of the bowel<br>• **Adverse effects:** appetite stimulant and weight gain, sedation<br>• **Dosing:** 0.25 - 0.5 mg/kg either OD or divided BID, comes as 4 mg tabs so often can round to this dose for ease of administration. Maximum 12 mg/day for children ages 2-6 years; 16 mg/day for children ≥ 7 years of age. |
| **Tricyclic antidepressants (TCAs)** | • **Evidence:**<br>  ○ Most studied antidepressant class for treatment of abdominal pain.[20]<br>  ○ Conflicting data regarding amitriptyline use in children with DGBIs.<br>  ○ One small study found a significant benefit in quality of life compared with placebo[21]<br>  ○ A large multicenter study found both amitriptyline and placebo were associated with excellent therapeutic response with no significant difference between amitriptyline and placebo after 4 weeks of treatment. Possibly patients with mild to moderate intensity of pain responded better to treatment.[22]<br>• **Mechanism of action:** Suggested to be beyond serotonin and norepinephrine, and as a result of blocking voltage-gated ion channels, opioid receptor activation and potential neuro-immunologic anti-inflammatory effects.[9] Their anticholinergic properties also slow GI transit time.<br>• **Place in therapy:** Recommended for overall symptom improvement in patients with IBS, as well as sleep issues, anxiety, or depression. Also consider in patients with abdominal migraines.<br>• **Adverse effects:**<br>  ○ Anticholinergic and antihistaminic (drowsiness/insomnia, xerostomia, palpitations, weight gain, constipation, urinary retention).[13]<br>  ○ Behavioural changes especially in young children.<br>• monitor ECG QTc interval before starting and 10 days after reaching peak dose<br>• Can take 2-3 months to reach maximum effect.<br>• Aim to use the lowest effective dose. Reassess therapy after 6-12 months.<br>• Dose should be gradually reduced if discontinuing.<br>**Recommended Medications**<br>• Amitriptyline: 0.25-0.5 mg/kg qhs, increase weekly by 5-10 mg, until 1.0-1.5 mg/kg (max 60mg qhs) |
| **Probiotics** | • **Evidence:** select products have evidence to improve symptoms of IBS in pediatric patients from at least one appropriately designed trial.<br>• **Place in therapy:** May improve global symptoms, bloating, and flatulence.<br>• **Recommended products:** Refer to Probiotic Chart for up to date evidence. These strains have the most evidence to support benefits (a one-month trial is reasonable). |

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| | ○ Align®<br>○ BioGaia®<br>○ Culturelle®<br>○ Gerber®<br>○ Visbiome® |
| **Loperamide (Imodium®)** | • **Evidence:** Does not affect global IBS symptoms but may help with frequency and consistency of bowel movements. Suggested against for overall symptom improvement.[23]<br>• **Mechanism of action:** Through μ (mu) opioid receptor agonist, thus decreasing GI motility.<br>• **Place in therapy:** Effective antidiarrheal. Does not lead to overall symptom improvement in patients with IBS.<br>• **Adverse effects**: Sedation, nausea, abdominal cramps.[11] Lowest addiction potential of all opioids.<br>• **Dose:** 2-4 mg initially, followed by 2 mg after each loose bowel movement. Max 16 mg/day. |
| **Digestive Enzymes** | • Digestive enzyme supplements contain a combination of enzymes including amylase, lactase, protease, lipase to target symptoms of indigestion.<br>• Lactase enzyme breaks down lactose in dairy; therefore, may be useful for the treatment of lactose intolerance.<br>• Alpha-galactosidase enzyme (Beano®) may aid gas and bloating symptom management when consuming legumes (e.g., beans, lentils, and peas) and cruciferous vegetables (e.g., Brussel sprouts, broccoli, and cauliflower) |

## 6. When to refer for consultation and/or endoscopy

a. If alarm features are identified
b. If investigations reveal a positive celiac screen
c. If the fecal calprotectin result is > 200 mcg/g

- If recommended strategies have led to unsatisfactory treatment or management of symptoms, consider using e-advice on Netcare service before referring.
- Provide as much information as possible on the referral form, including identified alarm feature(s), important findings, and treatment/management strategies trialed with the patient.

### Still concerned about your patient?

The primary care physician is typically the provider who is most familiar with their patient's overall health and knows how they tend to present. Changes in normal patterns, or onset of new or worrisome symptoms, may raise suspicion for a potentially serious diagnosis, even when investigations are normal and typical alarm features are not present.

There is evidence to support the importance of the family physician's intuition or "gut feeling" about patient symptoms, especially when the family physician is worried about a sinister cause such as cancer. A meta-analysis examining the predictive value of gut feelings showed that the odds of a patient being diagnosed with cancer, if a GP recorded a gut feeling, were 4.24 times higher than when no gut feeling was recorded.[24]

When a "gut feeling" persists in spite of normal investigations, and you decide to refer your patient for specialist consultation, document your concerns on the referral with as much detail as possible. Another option is to seek specialist advice (see Advice Options) to convey your concerns.

## PROVIDER RESOURCES

### Advice Options for Pediatrics

Non-urgent advice is available to support family physicians.

- Non-urgent **electronic** advice is available through Alberta Netcare eReferral (responses are received within five calendar days). View the eReferral Learning Centre for more information.
  - Community pediatrics advice is available in the Calgary Zone
  - Pediatric gastroenterology advice is available in the Edmonton Zone
- Non-urgent **telephone** advice connects family physicians and specialists in real time via a tele-advice line. Family physicians can request non-urgent advice from a pediatrician:
  - In the Edmonton and North Zones by calling 1-844-633-2263 or visiting pcnconnectmd.com.
  - In the Calgary Zone at specialistlink.ca or by calling 403-910-2551.

### Nutrition Services (Adults and Pediatrics)

To refer your patient to a Registered Dietitian:

- Visit Alberta Referral Directory and search for nutrition counselling.
- To learn more about programs and services offered in your zone, visit ahs.ca/Nutrition.
- Health Link has Registered Dietitians available to answer nutrition questions. If a patient has a nutrition question, they can complete a self-referral at ahs.ca/811 or call 811 and ask to talk to a dietitian.

| Resources | |
|---|---|
| For further education on management of disorders of gut-brain interaction, Pediatric GI STAR website offers self-paced modules for health care providers. There is also a resources section containing website and handouts to share with patients. | https://peds-gi-star.ca/ |
| Nutrition Guidelines for Health Professionals – Irritable Bowel Syndrome | Nutrition Guideline - Irritable Bowel Syndrome (albertahealthservices.ca) |
| Depending on the severity of functional impairment, this inventory may predict what resources you could access | Functional Disability Inventory (aap.org) |
| The Functional Disability Inventory is a 15-item child self-report measure assessing perceived difficulty in performing common activities in the domains of school, home, recreation, and social interactions. Participants rate the difficulty they had in carrying out each activity in the preceding 2 weeks (from 0 [no trouble] to 4 [impossible]). The Functional Disability Inventory consists of 15 items and yields a total score that can range from 0 to 60, with higher scores indicating greater disability. Clinical reference points have been established such that total scores of 0 to 12 reflect low disability, scores of 13 to 29 reflect moderate disability, and scores of ≥30 reflect severe disability. | Somatic Symptoms in Pediatric Patients With Chronic Pain: Proposed Clinical Reference Points for the Children's Somatic Symptoms Inventory (Formerly the Children's Somatization Inventory) - ScienceDirect<br><br>Children's Somatic Symptoms Inventory (CSSI) Manual (aap.org) |

# BACKGROUND

## About this Pathway

- Digestive health primary care pathways were originally developed in 2015 as part of the Calgary Zone's Specialist LINK initiative. They were co-developed by the Department of Gastroenterology and the Calgary Zone's specialty integration group, which includes medical leadership and staff from Calgary and area Primary Care Networks, the Department of Family Medicine, and Alberta Health Services.
- The pathways were intended to provide evidence-based guidance to support primary care providers in caring for patients with common digestive health conditions within the patient medical home.
- Based on the successful adoption of the primary care pathways within the Calgary Zone, and their impact on timely access to quality care, in 2017 the Digestive Health Strategic Clinical Network (DHSCN) led an initiative to validate the applicability of the pathways for Alberta and to spread availability and foster adoption of the pathways across the province.

## Authors & Conflict of Interest Declaration

This pathway was reviewed and revised under the auspices of the DHSCN in 2021 by a multi-disciplinary team led by family physicians and gastroenterologists. For more information, contact the Provincial Pathways Unit (PPU) at albertapathways@primarycarealberta.ca

## Pathway Review Process

Primary care pathways undergo scheduled review every three years, or earlier, if there is a clinically significant change in knowledge or practice. The next scheduled review is Winter 2027; however, we welcome feedback at any time.

## Copyright Information



## Disclaimer

This pathway represents evidence-based best practice but does not override the individual responsibility of healthcare professionals to make decisions appropriate to their patients using their own clinical judgment given their patients' specific clinical conditions, in consultation with patients/alternate decision makers. The pathway is not a substitute for clinical judgment or advice of a qualified healthcare professional. It is expected that all users will seek advice of other appropriately qualified and regulated healthcare providers with any issues transcending their specific knowledge, scope of regulated practice, or professional competence.

## PATIENT RESOURCES

### Information

| Description | Website |
|---|---|
| General information (MyHealth.Alberta.ca) | https://myhealth.alberta.ca |
| Many resources for patients and families on functional GI disorders including handouts | https://peds-gi-star.ca/resources/ |
| Nutrition Education Material | ahs.ca/NutritionResources |
| Gut Health Patient Journal (Physician Learning Program) | 9c849905-3a37-465a-9612-7db1b9a0a69c.filesusr.com/ugd/7b74c1_81f1695f08214a66bc339462c52cd011.pdf |
| Kelty Mental Health Resource Centre | https://keltymentalhealth.ca |
| The Comfort Ability website | Learn to manage chronic pain/functional symptoms and create comfort |

### Services available

| Description | Website |
|---|---|
| Services for patients with chronic conditions (Alberta Healthy Living Program - AHS) | ahs.ca/ahlp |
| Nutrition Workshops & Classes | ahs.ca/NutritionWorkshops |
| Ask a Dietitian a Nutrition Question | Complete a self-referral at ahs.ca/811 or call 811 and ask to talk to a dietitian. |

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