INFLAMMATORY BOWEL DISEASE

Introduction

Inflammatory bowel disease (IBD) refers to a group of inflammatory conditions affecting the colon and small intestine. The two main types of IBD are ulcerative colitis, which affects the large intestine, and Crohn's disease, which may occur in any part of the gastrointestinal tract [1]. The peak age of onset is between 15 and 30 years [2]. Those first presenting with ulcerative colitis typically have obvious symptoms, such as bloody diarrhoea, which usually lead to rapid medical assessment. In contrast, the small intestine inflammation associated with Crohn's disease may initially lead to more non-specific symptoms such as abdominal pain, nausea and weight loss [3].

While the precise cause of IBD is unknown, it is generally thought to arise from an inappropriate immune response to the commensal organisms living within the intestines, with or without an element of autoimmunity. While the intestines normally contain a large number of immune cells, these cells are normally restrained from mounting a full immune response to commensal organisms and dietary antigens by immune system regulatory pathways. During infections, activation of the gut-associated lymphoid tissues occurs but is rapidly damped. In IBD, it is thought this process may be abnormally regulated [2].

In New Zealand, there has been a large rise in the incidence of IBD over the past 50 years [3]. Rates in the South Island are higher than in the North. One possible explanation is the differing ethnic composition of the South Island population, and the fact that IBD is much more common in European, than in Māori or Pacific peoples [3]. Gender differences are also evident, and many studies have found that Crohn's disease is more common in males than in females until around 16–18 years of age, after which time rates become higher in females The reason for this switch is not understood, but hormonal factors have been implicated [3].

Some children with IBD have more aggressive disease than adults, with children with Crohn's having more frequent inflammation of the proximal small intestine, and a high proportion also having perianal disease. These factors may increase the risk of strictures and penetrating disease, thereby increasing the need for medication and surgery. Inflammatory bowel disease in children may impair nutrition, so that weight loss is common at diagnosis and loss of potential height becomes a concern over time [3].

The following section reviews hospital admission for children and young people aged 0–24 years, with Crohn's disease or ulcerative colitis listed in any of their first 15 diagnoses.

Data Source and Methods

Definition

Hospital admissions for children and young people aged 0–24 years with Crohn's disease or ulcerative colitis listed in any of their first 15 diagnoses

Data Source

National Minimum Dataset

Numerator: Hospital admissions for children and young people aged 0–24 years with Crohn's disease (ICD-10-AM K50) or ulcerative colitis (ICD-10-AM K51) listed in any of the first 15 diagnoses.

Denominator: Statistics New Zealand Estimated Resident Population (projected from 2007)

Notes on Interpretation

Note 1: This analysis focuses on hospital admissions for children and young people with Crohn's disease or ulcerative colitis listed in any of the first 15 diagnoses, rather than on the subset of admissions where these diagnoses were the primary reason for admission. The rationale for looking beyond the primary diagnosis was the need to highlight the full spectrum of health issues experienced by children and young people with inflammatory bowel disease, and their consequent requirement for health services.

Note 2: If no mention of Crohn's disease or ulcerative colitis was made in any of the first 15 diagnoses, these cases were not included, even if the patient had been assigned an inflammatory bowel disease related code on a previous admission.

Table 1. Hospital Admissions for Children and Young People Aged 0–24 Years with Crohn's Disease by Admission Type and Primary Diagnosis or Procedure, New Zealand 2008–2012

Primary Diagnosis or Procedure	Number of Admissions: Total 2008–2012	Number of Admissions: Annual Average	Admission Rate per 100,000 Population	% of Admissions in Category	% of Admissions in those with Crohn's Disease
Acute and Arranged Admissions by Primary Diagnosis					
Crohn's Disease: Large Intestine	601	120.2	7.87	20.9	15.7
Crohn's Disease: Small Intestine	314	62.8	4.11	10.9	8.2
Crohn's Disease: Other	581	116.2	7.61	20.2	15.2
Crohn's Disease: Unspecified	863	172.6	11.30	30.0	22.6
Anal/Rectal Abscess	58	11.6	0.76	2.0	1.5
Intestinal Obstruction	45	9.0	0.59	1.6	1.2
Anal/Rectal Fissure and Fistula	21	4.2	0.28	0.7	0.6
Other Diseases of the Digestive System	119	23.8	1.56	4.1	3.1
Iron Deficiency Anaemia	52	10.4	0.68	1.8	1.4
Abdominal/Pelvic Pain	25	5.0	0.33	0.9	0.7
Other Diagnoses	198	39.6	2.59	6.9	5.2
Total Acute and Arranged Admissions	2,877	575.4	37.68	100.0	75.4
Waiting List Admissions by Primary Procedure					
Injection or Infusion of Substance	361	72.2	4.73	38.4	9.5
Fibreoptic Colonoscopy +/− Biopsy	259	51.8	3.39	27.6	6.8
Panendoscopy +/− Biopsy	84	16.8	1.10	8.9	2.2
Resection of Small Intestine	52	10.4	0.68	5.5	1.4
Colectomy/Hemicolectomy	23	4.6	0.30	2.4	0.6
Procedures on Anal Fistula	15	3.0	0.20	1.6	0.4
Procedures Involving Ileostomy	14	2.8	0.18	1.5	0.4
Transfusion of Gamma Globulin	12	2.4	0.16	1.3	0.3
Other Procedures	99	19.8	1.30	10.5	2.6
No Procedure Listed	21	4.2	0.28	2.2	0.6
Total Waiting List Admissions	940	188.0	12.31	100.0	24.6
Total Crohn's Disease Admissions	3,817	763.4	49.99		100.0

Source: Numerator: National Minimum Dataset, hospital admissions for children and young people with Crohn's disease listed in any of the first 15 diagnoses; Denominator: Statistics NZ Estimated Resident Population (projected from 2007)

Table 2. Hospital Admissions in Children and Young People Aged 0–24 Years with Ulcerative Colitis by Admission Type and Primary Diagnosis or Procedure, New Zealand 2008–2012

Primary Diagnosis or Procedure	Number of Admissions: Total 2008–2012	Number of Admissions: Annual Average	Admission Rate per 100,000 Population	% of Admissions in Category	% of Admissions in those with Ulcerative Colitis
Acute and Arranged Admissions by Primary Diagnosis					
Ulcerative Colitis	487	97.4	6.38	85.0	56.8
Gastroenteritis	17	3.4	0.22	3.0	2.0
Iron Deficiency Anaemia	10	2.0	0.13	1.7	1.2
Crohn's Disease	9	1.8	0.12	1.6	1.1
Other Diagnoses	50	10.0	0.65	8.7	5.8
Total Acute and Arranged Admissions	573	114.6	7.50	100.0	66.9
Waiting List Admissions by Primary Procedure					
Fibreoptic Colonoscopy +/− Biopsy	173	34.6	2.27	60.9	20.2
Injection or Infusion of Substance	45	9.0	0.59	15.8	5.3
Panendoscopy +/− Biopsy	18	3.6	0.24	6.3	2.1
Procedures Involving Ileostomy	13	2.6	0.17	4.6	1.5
Total Proctocolectomy	12	2.4	0.16	4.2	1.4
Colectomy/Hemicolectomy	7	1.4	0.09	2.5	0.8
Other Procedures	14	2.8	0.18	4.9	1.6
No Procedure Listed	2	0.4	0.03	0.7	0.2
Total Waiting List Admissions	284	56.8	3.72	100.0	33.1
Total Ulcerative Colitis Admissions	857	171.4	11.22		100.0

Source: Numerator: National Minimum Dataset, hospital admissions for children and young people with ulcerative colitis listed in any of the first 15 diagnoses; Denominator: Statistics NZ Estimated Resident Population (projected from 2007)

New Zealand Distribution and Trends

Distribution by Primary Diagnosis and Procedure

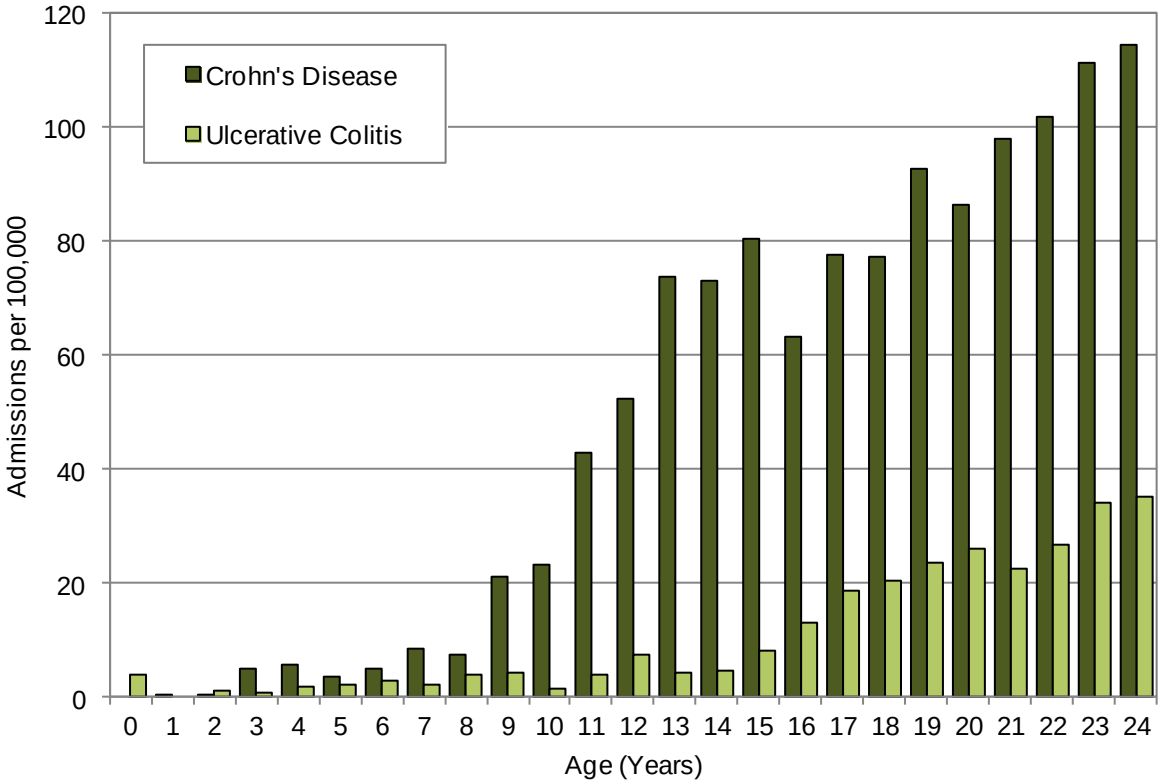
Crohn's Disease: In New Zealand during 2008–2012, 82.0% of acute and arranged hospitalisations in children and young people with Crohn's disease listed in any of their first 15 diagnoses, had Crohn's disease listed as the primary reason for admission. The remaining 18.0% of admissions were for a range of conditions, the majority of which were related to Crohn's disease, including anal/rectal abscesses, intestinal obstructions and anal/rectal fissures and fistulae (**Table 1**). Of those admitted from the waiting list with a diagnosis of Crohn's disease, injections or infusions of therapeutic substances (38.4%) and fibreoptic colonoscopies +/− biopsies (27.6%) were the most frequent primary procedures listed (**Table 1**).

Ulcerative Colitis: During the same period, 85.0% of acute and arranged hospitalisations in children and young people with ulcerative colitis listed in any of their first 15 diagnoses, had ulcerative colitis listed as their primary reason for admission. The remaining 15.0% were for a range of conditions, including gastroenteritis and iron deficiency anaemia (**Table 2**). Of those admitted from the waiting list with a diagnosis of ulcerative colitis, fibreoptic colonoscopies +/− biopsies (60.9%) and injections or infusions of therapeutic substances (15.8%) and were the most frequent primary procedures listed (**Table 2**).

Distribution by Age

In New Zealand during 2008–2012, hospital admission for Crohn's disease and ulcerative colitis were infrequent during childhood, but increased during adolescence, with the highest rates being seen amongst those in their early twenties (**Figure 1**).

Figure 1. Hospital Admissions for Children and Young People with Crohn's Disease or Ulcerative Colitis by Age, New Zealand 2008–2012



Source: Numerator: National Minimum Dataset, hospital admissions for children and young people with Crohn's disease or ulcerative colitis listed in any of the first 15 diagnoses; Denominator: Statistics NZ Estimated Resident Population (projected from 2007)

Distribution by Ethnicity and Gender

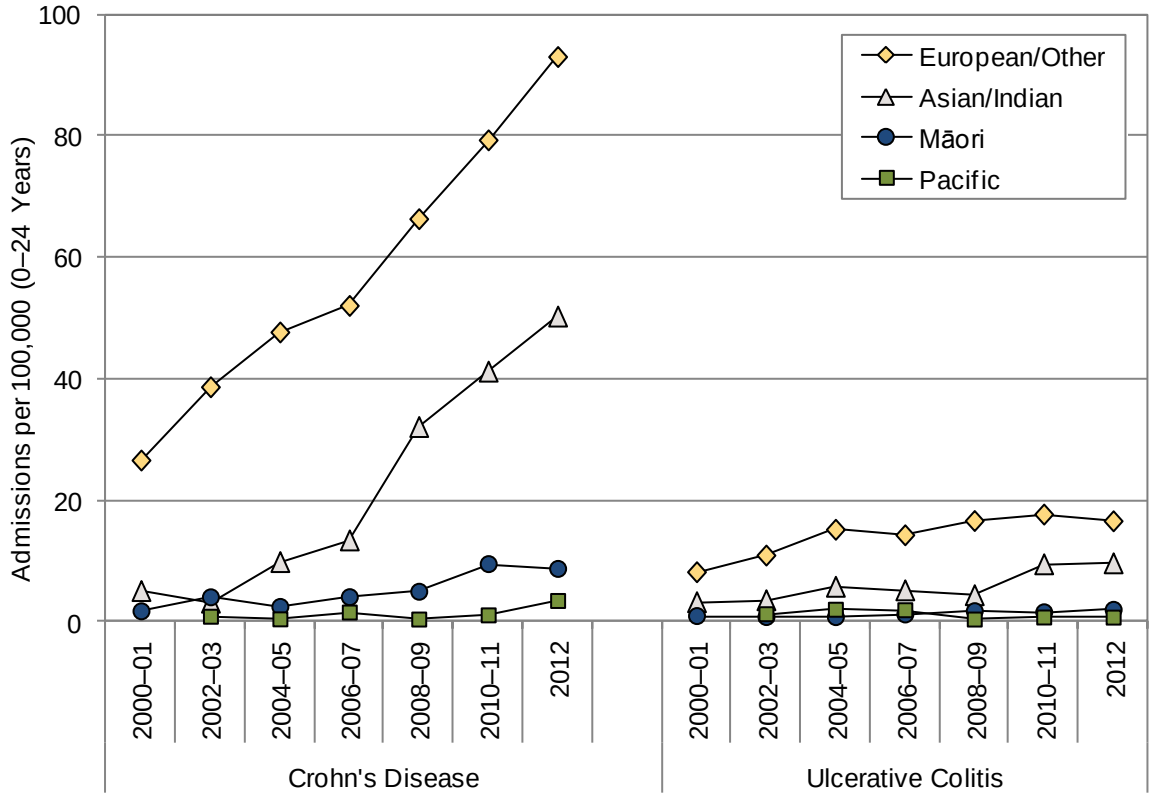
In New Zealand during 2008–2012, hospital admissions for those with Crohn's disease were *significantly* higher for males, although no *significant* gender differences were evident for ulcerative colitis. Admission rates for Crohn's disease were also *significantly* higher for European/Other > Asian/Indian > Māori > Pacific children and young people, while admissions for ulcerative colitis were *significantly* higher for European/Other > Asian/Indian > Māori and Pacific children and young people (**Table 3**).

Table 3. Hospital Admissions for Children and Young People Aged 0–24 Years with Crohn's Disease or Ulcerative Colitis by Ethnicity and Gender, New Zealand 2008–2012

Variable	Rate	Rate Ratio	95% CI	Variable	Rate	Rate Ratio	95% CI
Crohn's Disease							
Asian/Indian	39.56	0.52	0.46–0.58	Female	47.92	1.00	
European/Other	76.72	1.00		Male	51.95	1.08	1.02–1.16
Māori	7.54	0.10	0.08–0.12				
Pacific	1.28	0.02	0.01–0.03				
Ulcerative Colitis							
Asian/Indian	7.53	0.44	0.35–0.57	Female	11.66	1.00	
European/Other	17.00	1.00		Male	10.80	0.93	0.81–1.06
Māori	1.71	0.10	0.07–0.15				
Pacific	0.57	0.03	0.01–0.09				

Source: Numerator: National Minimum Dataset, hospital admissions for children and young people with Crohn's disease or ulcerative colitis listed in any of the first 15 diagnoses; Denominator: Statistics NZ Estimated Resident Population (projected from 2007); Note: Ethnicity is Level 1 Prioritised; Rate is per 100,000 population

Figure 2. Hospital Admissions for Children and Young People Aged 0–24 Years with Crohn's Disease or Ulcerative Colitis by Ethnicity, New Zealand 2000–2012



Source: Numerator: National Minimum Dataset, hospital admissions for children and young people with Crohn's disease or ulcerative colitis listed in any of the first 15 diagnoses; Denominator: Statistics NZ Estimated Resident Population (projected from 2007); Note: Ethnicity is Level 1 Prioritised

Trends Ethnicity

In New Zealand during 2000–2012, hospital admissions for those with Crohn's disease were higher for European/Other > Asian/Indian > Māori > Pacific children and young people, while admissions for ulcerative colitis were higher for European/Other > Asian/Indian > Māori and Pacific children and young people. Admissions for both conditions increased in European/Other, Asian/Indian and Māori children and young people during this period. Trends for Pacific children and young people however, were more variable (**Figure 2**).

South Island DHBs Distribution and Trends

South Island Distribution

In the South Island during 2008–2012, 33 Nelson Marlborough, 13 South Canterbury, 153 Canterbury, 12 West Coast, 58 Otago and 37 Southland children and young people were hospitalised with a diagnosis of Crohn's disease. Admission rates per 100,000 in Nelson Marlborough, Canterbury, the West Coast and Southland were *significantly* higher than the New Zealand rate, while rates in South Canterbury and Otago were not *significantly* different from the New Zealand rate (**Table 4**).

Similarly, 10 Nelson Marlborough, 6 South Canterbury, 30 Canterbury, <3 West Coast, 24 Otago and 12 Southland children and young people were hospitalised with a diagnosis of ulcerative colitis. Admission rates per 100,000 in Otago were *significantly* higher than the New Zealand rate, while in Canterbury rates were *significantly* lower. Rates in the remaining DHBs (with the exception of the West Coast, where small numbers precluded a valid analysis) were not *significantly* different from the New Zealand rate (**Table 4**).

South Island Trends

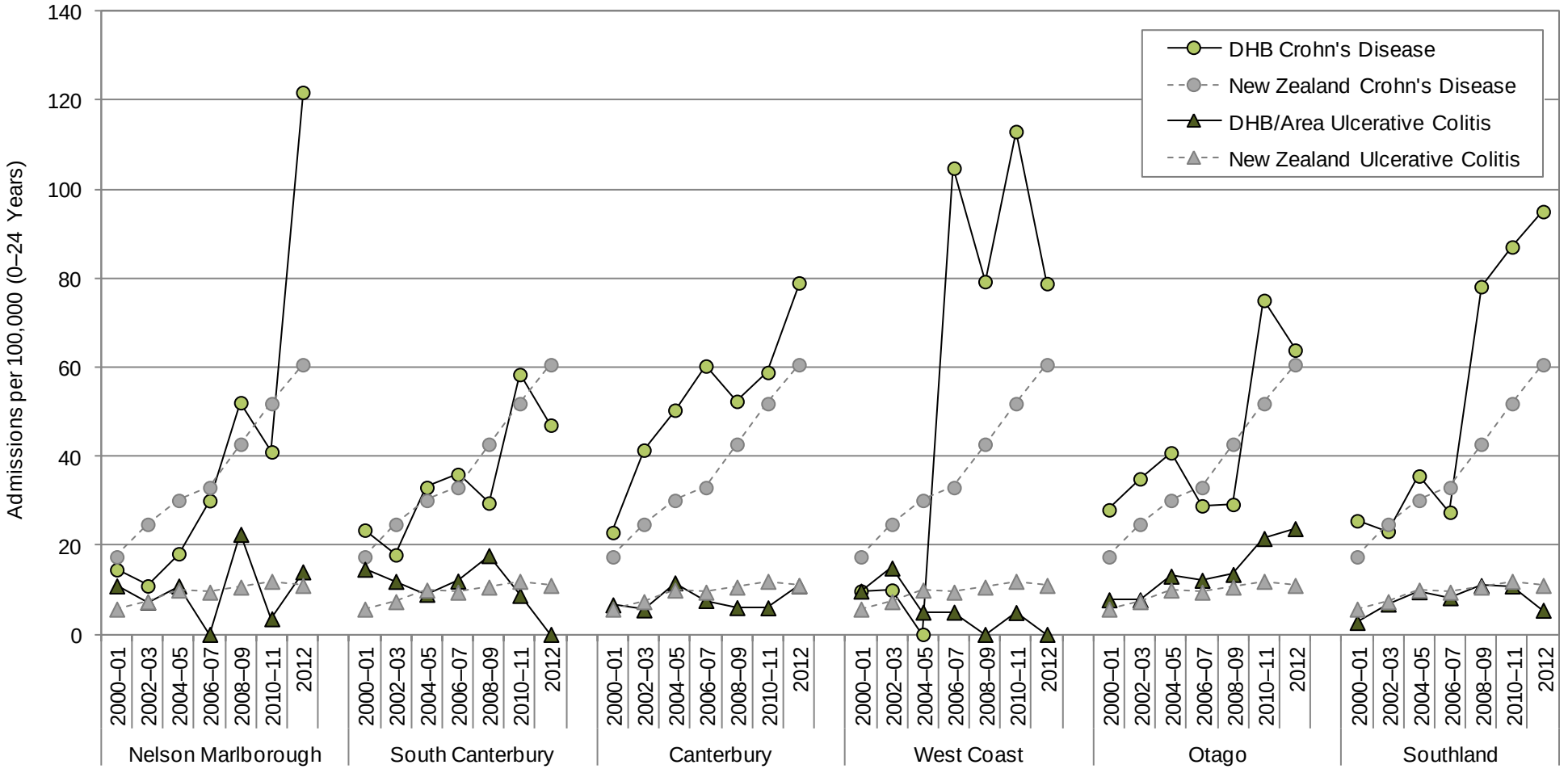
In all of the South Island DHBs during 2000–2012, while large year to year variations were evident, hospital admissions for children and young people with Crohn's disease exhibited a general upward trend. Trends for those with ulcerative colitis however, were less consistent (**Figure 3**).

Table 4. Hospital Admissions for Children and Young People Aged 0–24 Years with Crohn's Disease or Ulcerative Colitis, South Island DHBs vs. New Zealand 2008–2012

DHB/Area	Total Number of Individuals 2008−2012		Total Number of Admissions 2008−2012	Average Number of Admissions per Individual per Year	Admission Rate per 100,000 Population	Rate Ratio	95% CI
	A*	B*					
Crohn's Disease							
Nelson Marlborough	32	33	131	0.79	61.63	1.23	1.04–1.47
South Canterbury	13	13	38	0.58	44.62	0.89	0.65–1.23
Canterbury	147	153	501	0.65	60.24	1.21	1.10–1.32
West Coast	11	12	47	0.78	92.72	1.85	1.39–2.47
Otago	47	58	183	0.63	54.54	1.09	0.94–1.27
Southland	35	37	156	0.84	85.10	1.70	1.45–2.00
New Zealand	937		3,817	0.81	49.99	1.00	
Ulcerative Colitis							
Nelson Marlborough	9	10	28	0.56	13.17	1.17	0.81–1.71
South Canterbury	6	6	9	0.30	10.57	0.94	0.49–1.82
Canterbury	29	30	58	0.39	6.97	0.62	0.48–0.81
West Coast	<3	s	s	s	s	s	s
Otago	21	24	63	0.53	18.78	1.67	1.30–2.16
Southland	12	12	18	0.30	9.82	0.87	0.55–1.40
New Zealand	396		857	0.43	11.22	1.00	

Source: Numerator: National Minimum Dataset, hospital admissions for children and young people with Crohn's disease or ulcerative colitis listed in any of the first 15 diagnoses; Denominator: Statistics NZ Estimated Resident Population (projected from 2007); Note: A*: Each individual only counted once in DHB in which they first reside (i.e. DHB total = NZ total); B*: Each individual counted once in each DHB in which they reside (i.e. the sum of DHB totals exceeds New Zealand total); Rate Ratios are compared to New Zealand rates and have not been adjusted for population demographics; s: suppressed due to small numbers

Figure 3. Hospital Admissions for Children and Young People 0–24 Years with Crohn's Disease or Ulcerative Colitis, South Island DHBs vs. New Zealand 2000–2012



Source: Numerator: National Minimum Dataset, hospital admissions for children and young people with Crohn's Disease or Ulcerative Colitis listed in any of the first 15 diagnoses; Denominator: Statistics NZ Estimated Resident Population (projected from 2007)

Local Policy Documents and Evidence-Based Reviews Relevant to Inflammatory Bowel Disease

In New Zealand there is a paucity of policy documents relevant to inflammatory bowel disease in children and young people. **Table 5** reviews the available New Zealand publications, along with a range of guidelines and reviews which consider these issues in the overseas context.

Table 5. Local Policy Documents and Evidence-Based Reviews Relevant to Inflammatory Bowel Disease

Ministry of Health Policy Documents
New Zealand Guidelines Group. **Guidance on surveillance for people at increased risk of colorectal cancer 2011.** Wellington: New Zealand Guidelines Group; 2011. https://www.health.govt.nz/system/files/documents/publications/colorectal-cancer-surveillance-guidance.pdf This guideline covers colonoscopic surveillance for people at increased risk of developing colorectal cancer, specifically, people who have undergone previous colorectal cancer resection, people with inflammatory bowel disease (IBD) and people with adenomatous polyps. This guidance was an adaptation of sections of the National Institute for Health and Clinical Excellence (NICE) guideline *Colonoscopic Surveillance for Prevention of Colorectal Cancer in People with Ulcerative Colitis, Crohn's Disease or Adenomas, 2011.* The recommendations for people with IBD include: Surveillance colonoscopy should be offered following 8–10 years of clinical management in order to stratify risk. This differs from existing practice where patients with IBD are risk stratified at the onset of inflammatory bowel symptoms.
International Guidelines
Mayberry JF, et al. 2013. **NICE clinical guideline (CG152): the management of Crohn's disease in adults, children and young people**. Aliment Pharmacol Ther, 37(2), 195-203. This NICE Guideline offers best practice advice on the care of adults (aged > 18 years), children (aged < 11 years) and young people (aged 12 to 17 years) with Crohn's disease. Its major recommendations focus on: • Patient education and support • Inducing remission in Crohn's Disease, with a range of criteria being given for the use of monotherapy with glucocorticosteroids, enteral nutrition, add on treatments such as azathioprine or mercaptopurine and the use of *Infliximab and Adalimumab* • Maintaining remission in Crohn's Disease • Surgery, including where Crohn's disease is limited to the distal ileum and the management of strictures
Dignass A, et al. 2012. **Second European evidence-based consensus on the diagnosis and management of ulcerative colitis part 1: definitions and diagnosis**. J Crohns Colitis, 6(10), 965-90. Ulcerative colitis is a lifelong disease arising from an interaction between genetic and environmental factors, observed predominantly in the developed countries of the world. The precise aetiology is unknown and therefore medical therapy to cure the disease is not yet available. Within Europe there is a North–South gradient, but the incidence appears to have increased in Southern and Eastern countries in recent years. Despite randomised trials there will always be many questions that can only be answered by the exercise of judgement and opinion. This leads to differences in practice between clinicians, which may be brought into sharp relief by differences in emphasis between countries. This document updates the previous European Consensus on the diagnosis and management of UC, and was finalised by the European Crohn's and Colitis Organisation (ECCO) at a meeting held in Dublin in February 2011. ECCO is a forum for specialists in inflammatory bowel disease from 31 European countries.

Dignass A, et al. 2012. **Second European evidence-based consensus on the diagnosis and management of ulcerative colitis part 2: current management**. J Crohns Colitis, 6(10), 991-1030.

When deciding the appropriate treatment strategy for active ulcerative colitis one should consider the activity, distribution (proctitis, left-sided, extensive), and pattern of disease. The disease pattern includes relapse frequency, course of disease, response to previous medications, side-effect profile of medication and extra-intestinal manifestations. The age at onset and disease duration may also be important factors. Severe ulcerative colitis necessitating hospital admission needs to be distinguished from those with mild or moderately active disease who can generally be managed as outpatients. The simplest, best validated and most widely used index for identifying severe UC remains that of Truelove and Witts: any patient who has a bloody stool frequency ≥ 6/day and a tachycardia (> 90 bpm), *or* temperature > 37.8 °C, *or* anaemia (haemoglobin < 10.5 g/dL), *or* an elevated ESR (> 30 mm/h) has severe ulcerative colitis (Table 1.3). Only one additional criterion in addition to the bloody stool frequency ≥ 6/day is needed to define a severe attack.

It should be standard practice to confirm the presence of active colitis by sigmoidoscopy before starting treatment. Flexible sigmoidoscopy and biopsy may exclude unexpected causes of symptoms that mimic active disease such as cytomegalovirus colitis, rectal mucosal prolapse, Crohn's disease, malignancy, or even irritable bowel syndrome and haemorrhoidal bleeding. In addition, all patients with active disease require stool cultures with *Clostridium difficile* toxin assay to exclude enteric infection. Patients with an appropriate travel history should also have stool microscopy to exclude parasitic infections such as amoebiasis.

In addition, detailed treatment guidelines are outlined.

Van Assche G, et al. 2013. **Second European evidence-based consensus on the diagnosis and management of ulcerative colitis part 3: special situations**. J Crohns Colitis, 7(1), 1-33.

Detailed guidelines on the diagnosis and management of ulcerative colitis in special situations are given. These special situations include: anaemia; pouchitis; colorectal cancer surveillance; psychosomatic; and extra-intestinal manifestations.

Eugene C. 2011. **The second European evidence-based consensus on the diagnosis and management of Crohn's disease part 4**. Clin Res Hepatol Gastroenterol, 35(8-9), 518-20.

Detailed guidelines on the diagnosis and management of Crohn’s disease in further special situations are given. These special situations include: Crohn’s disease in children and adolescents; Crohn’s disease and pregnancy; Crohn’s disease and psychosocial factors; Extra-intestinal manifestations of Crohn’s disease; and alternative therapies.

Turner D, et al. 2012. **Management of pediatric ulcerative colitis: joint ECCO and ESPGHAN evidence-based consensus guidelines**. J Pediatr Gastroenterol Nutr, 55(3), 340-61.

Pediatric ulcerative colitis (UC) shares many features with adult-onset disease but there are some unique considerations; therefore, therapeutic approaches have to be adapted to these particular needs. This document aims to formulate guidelines for managing UC in children based on a systematic review of the literature and a robust consensus process. It is a product of a joint effort by a group of 27 experts in pediatric IBD of the European Crohn's and Colitis Organization (ECCO) and the European Society for Paediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN).

A total of 40 formal recommendations and 68 practice points were endorsed on how to monitor disease activity, the role of endoscopic evaluation, medical and surgical therapy, timing and choice of each medication, the role of combined therapy, and when to stop medications. A management flowchart, based on the Pediatric Ulcerative Colitis Activity Index (PUCAI), is presented.

National Institute for Health and Clinical Excellence (NICE). **Colonoscopic surveillance for prevention of colorectal cancer in people with ulcerative colitis, Crohn's disease or adenomas**. London (UK): National Institute for Health and Clinical Excellence (NICE); 2011.

These Guidelines aim to offer best practice advice on the use of colonoscopic surveillance in adults with inflammatory bowel disease (IBD), which covers ulcerative colitis and Crohn's disease or adenomas. Recommendations include:

- Offer colonoscopic surveillance to people with IBD whose symptoms started 10 years ago and who have: Ulcerative colitis (but not proctitis alone) or Crohn's colitis involving more than one segment of colon
- Offer a baseline colonoscopy with chromoscopy and targeted biopsy of any abnormal areas to people with IBD who are being considered for colonoscopic surveillance to determine their risk of developing colorectal cancer.
- Offer colonoscopic surveillance to people with IBD as defined in the recommendation above based on their risk of developing colorectal cancer determined at the last complete colonoscopy: Low risk: offer colonoscopy at 5 years; Intermediate risk: offer colonoscopy at 3 years; High risk: offer colonoscopy at 1 year.
- For people with IBD who have been offered colonoscopic surveillance, continue to use colonoscopy with chromoscopy as the method of surveillance.
- Offer a repeat colonoscopy with chromoscopy if any colonoscopy is incomplete. Consider whether a more experienced colonoscopist is needed.

Fidler JL, Rosen MP, Blake MA, Baker ME, Cash BD, Charron M, Greene FL, Hindman NM, Jones B, Katz DS, Lalani T, Miller FH, Small WC, Sudakoff GS, Tulchinsky M, Yaghmai V, Yee J**. Expert Panel on Gastrointestinal Imaging. ACR Appropriateness Criteria® Crohn's disease**. Reston (VA): American College of Radiology 2011.

These guidelines provide advice on the most appropriate initial radiologic examinations for patients (adults and children) with known or suspected Crohn's disease (CD). Major recommendations include:

- Cross-sectional (CT and MR) enterography are the preferred imaging tests for the initial diagnosis and surveillance of patients with suspected and known Crohn's disease.
- High-quality MR enterography provides the opportunity to eliminate radiation exposure for children and young adults while maintaining similar sensitivity to that of CT enterography. Institutional preference will be determined by availability, experience, and expertise.
- Barium studies (small-bowel series and barium enema) are being used less frequently in the imaging of Crohn's disease but may be extremely helpful in demonstrating anatomy and strictures for preoperative planning purposes.

Nuclear medicine techniques may be helpful in certain scenarios but are not widely used. Utilization will be determined by institutional preference.

World Gastroenterology Organisation (WGO). **World Gastroenterology Organisation Global Guideline: Inflammatory bowel disease: a global perspective.** Munich (Germany): World Gastroenterology Organisation; 2009.

These guidelines provide guidance on the diagnosis, evaluation, and management of inflammatory bowel disease. Major recommendations included those for the appropriate diagnosis through comprehensive physical examination and review of the patient's history, various tests including blood tests, stool examination, endoscopy, biopsies, and imaging studies; evaluation through the use of diagnostic criteria for ulcerative colitis (UC) and Crohn's disease (CD); and management based on diet and lifestyle considerations, optimal combination of drugs, and surgical treatment. Cascades for management of IBD in differing resource areas are outlined.

Cochrane Systematic Reviews – Effectiveness of Drug Therapies

The following Cochrane Reviews cover individual drug therapies in the management of inflammatory bowel disease:

Chande N, et al. 2013. **Azathioprine or 6-mercaptopurine for induction of remission in Crohn's disease**. Cochrane Database of Systematic Reviews(5).

Feagan BG & Macdonald JK. 2012. **Oral 5-aminosalicylic acid for induction of remission in ulcerative colitis**. Cochrane Database Syst Rev*,* 10, Cd000543.

Feagan BG & Macdonald JK. 2012. **Oral 5-aminosalicylic acid for maintenance of remission in ulcerative colitis**. Cochrane Database Syst Rev*,* 10, Cd000544.

McDonald WDJ, et al. 2012. **Methotrexate for induction of remission in refractory Crohn's disease**. Cochrane Database of Systematic Reviews(12).

Marshall JK, et al. 2012. **Rectal 5-aminosalicylic acid for maintenance of remission in ulcerative colitis**. Cochrane Database of Systematic Reviews(11).

Roth L, et al. 2011. **Sargramostim (GM-CSF) for induction of remission in Crohn's disease**. Cochrane Database of Systematic Reviews(11).

Other Reviews – Effectiveness of Drug Therapies

The following other reviews cover individual drug therapies in the management of inflammatory bowel disease:

Costa J, et al. 2013. **Infliximab reduces hospitalizations and surgery interventions in patients with inflammatory bowel disease: a systematic review and meta-analysis**. Inflamm Bowel Dis*,* 19(10), 2098-110.

Tang DH, et al. 2013. **A systematic review of economic studies on biological agents used to treat Crohn's disease**. Inflamm Bowel Dis*,* 19(12), 2673-94.

Other Cochrane Reviews

Timmer A, et al. 2011. **Psychological interventions for treatment of inflammatory bowel disease**. Cochrane Database of Systematic Reviews(8).

This review assessed the effects of psychological interventions (psychotherapy, patient education, relaxation techniques) on health related quality of life, coping, emotional state and disease activity in inflammatory bowel disease (IBD). Twenty-one randomised, quasi-randomised and non-randomised controlled studies of psychological interventions in children or adults with IBD with a minimum follow up of 2 months were included with 1745 participants; 19 studies in adults and 2 in adolescents. There is no evidence for efficacy of psychological therapy in adult patients with IBD in general. In adolescents, psychological interventions may be beneficial with positive short term effects of psychotherapy on most outcomes assessed including quality of life (2 studies, 71 patients, SMD 0.70; 95% CI 0.21 to 1.18) and depression (1 study, 41 patients, SMD -0.62; 95% CI -1.25 to 0.01), but the evidence is limited.

Other Systematic Reviews
Feuerstein JD, et al. 2013. **Systematic review: the quality of the scientific evidence and conflicts of interest in international inflammatory bowel disease practice guidelines.** Aliment Pharmacol Ther, 37(10), 937-46.
This systematic review examined inflammatory bowel disease guidelines for quality of evidence, methods of grading evidence and conflicts of interest (COI). Nineteen IBD guidelines published by the American College of Gastroenterology, American Gastroenterological Association, British Society of Gastroenterology, Canadian Association of Gastroenterology, Crohn's and Colitis Foundation of America and European Crohn's and Colitis Organisation as of 27 September 2012 were reviewed. Nearly half the IBD guideline recommendations are based on expert opinion or no evidence. The majority of the guidelines fail to disclose any COI, and when commenting, all have numerous COI. Furthermore, the guidelines are not updated frequently and there is a lack of consensus between societal guidelines. This study highlights the critical need to centralize and redesign the guidelines development process.
Cheifetz AS. 2013. **Management of active Crohn disease.** JAMA, 309(20), 2150-8.
This review evaluated the diagnosis and management of moderate to severe Crohn disease, with a focus on newer treatments and goals of care. MEDLINE was searched from 2000 to 2011. Additional citations were procured from references of select research and review articles. Evidence was graded using the American Heart Association level-of-evidence guidelines. Although mesalamines are still often used to treat Crohn disease, the evidence for their efficacy is lacking. Corticosteroids can be effectively used to induce remission in moderate to severe Crohn disease, but they do not maintain remission. The mainstays of treatment are immunomodulators and biologics, particularly anti-tumor necrosis factor. Immunomodulators and biologics are now the preferred treatment options for Crohn disease.
Panes J, et al. 2013. **Imaging techniques for assessment of inflammatory bowel disease: joint ECCO and ESGAR evidence-based consensus guidelines**. J Crohns Colitis, 7(7), 556-85.
Whereas endoscopy is a well-established and uniformly performed diagnostic examination, the implementation of radiologic techniques for the assessment of inflammatory bowel disease is still heterogeneous; variations in technical aspects and the degrees of experience and preferences exist across countries in Europe. ECCO and ESGAR scientific societies jointly elaborated a consensus to establish standards for imaging in IBD using magnetic resonance imaging, computed tomography, ultrasonography, and including also other radiologic procedures such as conventional radiology or nuclear medicine examinations for different clinical situations that include general principles, upper GI tract, colon and rectum, perineum, liver and biliary tract, emergency situation, and the postoperative setting. The statements and general recommendations of this consensus are based on the highest level of evidence available, but significant gaps remain in certain areas such as the comparison of diagnostic accuracy between different techniques, the value for therapeutic monitoring, and the prognostic implications of particular findings.
Frolkis AD, et al. 2013. **Risk of Surgery for Inflammatory Bowel Diseases Has Decreased Over Time: A Systematic Review and Meta-analysis of Population-Based Studies**. Gastroenterology, 145(5), 996-1006.
This systematic review and meta-analysis was conducted to establish the cumulative risk of surgery among patients with inflammatory bowel disease (IBD) and evaluated how this risk has changed over time. The analysis included population-based studies published as articles (n = 26) and abstracts (n = 4) that reported risks of surgery at 1, 5, or 10 years after a diagnosis of Crohn's disease and/or ulcerative colitis. The trend in risk of surgery over time was analysed by meta-regression using mixed-effect models. Based on all population-based studies, the risk of surgery 1, 5, and 10 years after diagnosis of Crohn's disease was 16.3% (95% confidence interval [CI], 11.4%–23.2%), 33.3% (95% CI, 26.3%–42.1%), and 46.6% (95% CI, 37.7%–57.7%), respectively. The risk of surgery 1, 5, and 10 years after diagnosis of ulcerative colitis was 4.9% (95% CI, 3.8%–6.3%), 11.6% (95% CI, 9.3%–14.4%), and 15.6% (95% CI, 12.5%–19.6%), respectively. The risk of surgery 1, 5, and 10 years after diagnosis of Crohn's disease and 1 and 10 years after diagnosis of ulcerative colitis has decreased significantly over the past 6 decades ($P < 0.05$).
McCombie AM, et al. 2013. **Psychotherapy for inflammatory bowel disease: A review and update**. J Crohns Colitis.
Psychotherapy may be a useful intervention for inflammatory bowel disease (IBD) patients. This systematic review evaluated all randomized controlled trials that have been performed in psychotherapy for inflammatory bowel disease patients. Eighteen studies (19 papers) were included. Psychotherapy was found to have minimal effect on measures of anxiety, depression, QOL and disease progression although shows promise in reducing pain, fatigue, relapse rate and hospitalisation, and improving medication adherence. It may also be cost effective. The effects of psychotherapy on IBD is mixed: future studies should determine whether patient screening or measuring different dependent variables improves outcomes and whether particular psychotherapies are superior over others.
Henderson P, et al. 2013. **The Diagnostic Accuracy of Fecal Calprotectin During the Investigation of Suspected Pediatric Inflammatory Bowel Disease: A Systematic Review and Meta-Analysis**. Am J Gastroenterol.
Fecal calprotectin (FC) is increasingly used during the diagnosis of inflammatory bowel disease, outperforming blood markers during investigation in children. Tests that reduce endoscopy rates in children with suspected gut inflammation would be beneficial. This systematic review and meta-analysis assessed the usefulness of FC in children undergoing their primary investigation for suspected IBD. Eight papers met the inclusion criteria (six prospective and two retrospective case-control studies). The 8 studies presented FC levels at presentation in 715 patients, 394 pediatric IBD patients, and 321 non-IBD controls. Pooled sensitivity and specificity for the diagnostic utility of FC during the investigation of suspected pediatric IBD were 0.978 (95% confidence interval (CI), 0.947–0.996) and 0.682 (95% CI, 0.502–0.863), respectively; the positive and negative likelihood ratios were 3.07 and 0.03. The review concluded that FC has a high sensitivity and a modest specificity for the diagnosis of suspected pediatric IBD. Further work is required to determine the effect of FC on endoscopy rates and its role during the re-evaluation of those with confirmed disease.

Greenley RN, et al. 2013. **Practical strategies for enhancing adherence to treatment regimen in inflammatory bowel disease**. Inflamm Bowel Dis, 19(7), 1534-45.

This review evaluates: key definitional, measurement, and conceptual challenges for understanding treatment regimen adherence in inflammatory bowel disease; published studies focused on interventions to enhance adherence in IBD; and synthesises of practical adherence promotion strategies for use in IBD by health care providers. Strategies are distinguished by the level of evidence supporting their utility as well as by age group. Findings suggest that strategies including education, regimen simplification, and use of reminder systems and organizational strategies (e.g., pill boxes) are likely to be best suited for addressing accidental non-adherence. In contrast, addressing motivational issues, teaching problem-solving skills, and addressing problematic patterns of family functioning are more likely to benefit individuals displaying intentional non-adherence.

De Cruz P, et al. 2013. **Mucosal healing in Crohn's disease: a systematic review**. Inflamm Bowel Dis, 19(2), 429-44.

The traditional goals of Crohn's disease (CD) therapy, to induce and maintain clinical remission, have not clearly changed its natural history. In contrast, emerging evidence suggests that achieving and maintaining mucosal healing may alter the natural history of CD, as it has been associated with more sustained clinical remission and reduced rates of hospitalization and surgical resection. Induction and maintenance of mucosal healing should therefore be a goal toward which therapy is now directed. This systematic review sought to: 1) explore the definition of mucosal healing; 2) review the relationship between clinical and endoscopic disease activity; 3) outline the impact of mucosal healing on short and long-term outcomes and the natural history of CD; 4) evaluate the efficacy of current therapeutics in inducing and maintaining mucosal healing; 5) review the practical issues and limitations of implementing mucosal healing strategies in clinical practice; 6) review the role of non-invasive markers of mucosal healing; and 7) propose an approach towards integrating mucosal healing as a therapeutic endpoint in clinical practice. Unresolved issues pertain to the benefit of achieving mucosal healing at different stages of the disease, the relationship between mucosal healing and transmural inflammation, the intensity of treatment needed to achieve mucosal healing when it has not been obtained using standard therapy, and the means by which mucosal healing is defined using current endoscopic disease activity indices. The main clinical challenge relates to defining the means of achieving high rates of mucosal healing in clinical practice.

Wang SL, et al. 2012. **Meta-analysis of broad-spectrum antibiotic therapy in patients with active inflammatory bowel disease**. Exp Ther Med, 4(6), 1051-56.

This meta-analysis of controlled clinical trials was conducted to evaluate whether the use of antibacterial therapy improves the clinical symptoms of inflammatory bowel disease. Randomized, controlled trials in which antibiotic therapy was compared with placebo were investigated. A total of 10 randomized, placebo-controlled clinical trials for Crohn's disease (CD) were included in the meta-analysis. The pooling of the data from these trials yielded an odds ratio (OR) of 1.35 [95% confidence interval (CI), 1.16–1.58] for antibiotic therapy compared with placebo in patients with CD. Furthermore, nine randomized placebo-controlled clinical trials for ulcerative colitis (UC) matched our criteria and were included in the analysis. The pooling of the data from these trials yielded an OR of 2.17 (95% CI, 1.54–3.05) in favour of antibiotic therapy. These results suggest that antibiotics improve clinical outcomes in patients with IBD.

Jonkers D, et al. 2012. **Probiotics in the management of inflammatory bowel disease: a systematic review of intervention studies in adult patients**. Drugs, 72(6), 803-23.

This systematic review assessed the rationale for probiotics in inflammatory bowel disease and systematically reviewed clinical intervention studies with probiotics in the management of IBD in adults. The 41 clinical intervention studies were categorized on disease type (ulcerative colitis [UC] with/without an ileo-anal pouch and Crohn's disease [CD]) and disease activity. Well-designed randomized controlled trials supporting the application of probiotics in the management of IBD are still limited. So far, no evidence is available to support the use of probiotics in CD. Further insight into the aetiology of IBD and the mechanisms of probiotic strains will aid in selecting probiotic strains for specific disease entities and disease locations.

Mao R, et al. 2012. **Fecal calprotectin in predicting relapse of inflammatory bowel diseases: a meta-analysis of prospective studies**. Inflamm Bowel Dis, 18(10), 1894-9.

This meta-analysis of prospective studies evaluated the predictive capacity of fecal calprotectin (FC) in inflammatory bowel disease (IBD) relapse. The capacity of FC to predict relapse was comparable between UC and CD. As a simple and non-invasive marker, FC is useful to predict relapse in quiescent IBD patients.

Leung Y, et al. 2011. **Transitioning the adolescent inflammatory bowel disease patient: guidelines for the adult and pediatric gastroenterologist**. Inflamm Bowel Dis, 17(10), 2169-73.

Recent data from the inflammatory bowel disease (IBD) literature support a need for transition clinics. The ideal model of a transition programme has not been established. Controlled trials are not available to measure the impact of a structured transition programme on clinically relevant endpoints such as disease control and hospital admissions. As local resources and availability of staffing and funding are highly variable, this review summarized some practical guidelines for the adult and paediatric gastroenterologist that can be used as an aid to help adolescents through the transition process even without the support of an established transition clinic.

Mills SC, et al. 2011. **Crohn's disease**. Clin Evid (Online), 2011.
A systematic review aimed to answer: What are the effects of medical treatments to induce remission in adults with Crohn's disease? What are the effects of surgical interventions to induce and maintain remission in adults with small-bowel and colonic Crohn's disease? What are the effects of medical interventions to maintain remission in adults with Crohn's disease; and to maintain remission following surgery? What are the effects of lifestyle interventions to maintain remission in adults with Crohn's disease? This review included 93 systematic reviews, RCTs, or observational studies that met the inclusion criteria. The systematic review presents information relating to the effectiveness and safety of the following interventions: aminosalicylates, antibiotics, azathioprine/mercaptopurine, ciclosporin, corticosteroids (oral), enteral nutrition, fish oil, infliximab, methotrexate, probiotics, resection, segmental colectomy, smoking cessation, and strictureplasty.
Other Relevant Publications and Websites
http://www.clinicalevidence.bmj.com/x/systematic-review/0416/guidelines.html
Guidelines on inflammatory bowel disease sourced from the National Guidelines Clearinghouse in the USA (a repository of guidelines from around the world), NICE in the UK, and other international government sources, professional medical organisations or medical specialty societies.
http://crohnsandcolitis.org.nz/
Crohn's and Colitis New Zealand is a charitable trust whose aims are to provide support, advice and information to interested individuals and people who have Crohn's disease or ulcerative colitis and their families and caregivers, and educational material to medical professionals and organisations within New Zealand. Information available includes a detailed web-based toilet map for New Zealand http://www.toiletmap.co.nz/
http://www.healthnavigator.org.nz/health-topics/crohns-disease/
The Health Navigator NZ website is a collaborative, non-profit initiative led by clinicians and consumers in response to the need for a central place to find reliable and trustworthy health information and self-help resources. This webpage gives an overview of Crohn's disease with links to various websites for both patients and health professionals.
http://www.nzsg.org.nz/cms2/research/ibd/
New Zealand Society of Gastroenterology. This webpage lists inflammatory bowel research that has been undertaken or is ongoing in New Zealand. It also lists units and contact details of the New Zealand IBD clinical trials network that have established facilities for conducting clinical trials in inflammatory bowel disease and are currently participating in trials of new treatments in New Zealand.

Note: The publications listed were identified using the search methodology outlined in Appendix 1 (Search Methods for Policy Documents and Evidence-Based Reviews)

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