

# CASE STUDY: SEVERE INFLAMMATORY BOWEL DISEASE

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Presented by Cayleih Mackay- April 2013

# Topics of Review:

- Previous Admission
- Clinical Course: Case Study Admission
- Inflammatory Bowel Disease Overview
- Nutrition Care Process:
  - MNT for hospital admission
  - FMHx
  - PMH
  - Social Hx
  - Dietary Hx
- Discussion Topics:
  - Isotretinoin (Accutane®)
  - Low FODMAP Diet

# Medical Presentation: Case Study Adm

- M.A.: 28 year old male
- Presented to Emergency Department at Thornton Hospital with severe ulcerative colitis (UC) flare
  - recurrent bloody stools (4-5BM/day), severe abd pain, bloating
- *Clostridium difficile* (C. diff) positive (likely from previous adm)
- Admitted January 3, 2013 through April 2, 2013
- Length of Hospital Stay: 89 days

# Previous Adm: Dec 13-21, 2013

- Presentation: UC flare
  - severe bloody stools (12-15BM/day)
  - abdominal pain
  - bloating
  - Additional Dx: Cronh's Disease (CD)
- Treatment
  - Prednisone taper
    - Glucosteroid- monitor blood glucose
  - Remicade
    - Tumor necrosis factor alpha (TNF- $\alpha$ ) blocker used to treat severe, unresponsive UC
  - Discharge
    - Clinical Improvement
    - Noted rising CRP (Table 1)

# Anthropometrics/Weight Loss Hx

- UBW: 155-160lb
- December Adm Weight: 156lb
  - 74" (6ft 2in.)
  - BMI 20, IBW 190lb, 82%IBW
- Case Study Adm Weight: 132lb
  - BMI 17, 69%IBW
- Lowest Weight during Case Study Adm: **102lb**
  - BMI 13, 54%IBW
- Discharge Weight: 114lb
  - BMI 14.6, 60%IBW

**Table 3: Weight History**

Date	Weight (lbs)	Date	Weight (lbs)
12/13/12	156	3/9	105
1/3/13	132	3/10	108
1/4/	131	3/11	106
1/25	129	3/14	114
1/28	132	3/15	111
1/31	123	3/16	108
2/23	102	3/22	106
2/25	106	3/24	108
2/26	106	3/25	110
2/27	104	3/26	111
3/4	112	3/29	114

# CASE STUDY ADMISSION: CLINICAL INTERVENTIONS

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# Initial Procedures

- C. Diff+: Surgery postponed to January 9, 2013
- Initial Surgical Intervention:
  - Laparoscopic-assisted total abdominal colectomy
  - End ileostomy
  - Mucous fistula
    - discharge mucous or gasses from the non-functioning portion of the colon and rectum
  - Laparoscopic assisted splenic flexure mobilization:
  - **COMPLICATIONS:** stool spillage into abdomen d/t torn bowel during surgery
    - Abd irrigated, drained



# Clinical Course: Numerous Complications

- 1/3 Detection of C. Diff
- 1/9 OR: Laparoscopic-assisted total abdominal colectomy with end ileostomy and mucous fistula and laparoscopic assisted splenic flexure mobilization: stool spillage into abdomen d/t torn bowel
- 1/16 Ileus pattern on KUB
- 1/17: IR unable to drain intraabdominal abscess
- 1/20 Blair MD: CT abdomen and pelvis: “slightly interval worsening of the multiple dilated loops of small bowel with several areas of narrowing compared to prior CT abdomen and pelvis imaging; persistent fluid collection within the right posterior pelvis and under the right rectus abdominal muscle”
- 1/25 EGD: 450cc bilious fluid detected, removed via suction
- 1/30 Febrile, bacteremia
- 2/1 Continued fever (101.6F max), emesis, >5L ileostomy OP. Sigmoidoscopy: mild patchy erythema and loss of vascularity throughout the terminal ileum, severe ulcerated and denuded rectal stump not consistent with diversion colitis. A larger ulcer (8mm) was also seen 25cm from the stoma
- 2/4 OR: Complete proctectomy, repair of small bowel enterotomy, and abdominal abscess washout. Intubated
- 2/6: Extubated
- 2/7 Re-intubated d/t increasing respiratory effort
- 2/9 OR: Soft tissue infection 2/2 enterocutaneous fistula: exploratory laparotomy, takedown enterocutaneous fistula, small bowel section, abdominal washout
- 2/10 OR: abdominal washout, abthera wound vac placement, intra-operative ileoscopy
- 2/11 OR: abdominal washout, end ileostomy, abthera wound vac placement
- 2/13 OR: abdominal washout, retention sutures for partial abdominal wound closure, abthera wound vac placement
- 2/15 OR: abdominal washout with abdominal closure, wound vac placement
- 2/18: Extubated, ~2L bloody stool output
- Post 2/18 complications: wound vacuum malfunction due to obstructions, high fistula output with leakage, and continued high ileostomy output/leakage

# Summary of Complications

- Non-draining, intraabdominal abscess → N/V
- EGD: 450cc bilious fluid
- Fever, bacteremia, emesis, high ileostomy/fistula output
- Further surgical interventions:
  - Proctectomy (removal of anus)
  - numerous fistula closures
  - 5 abdominal washouts
- Post Surgeries: Sepsis → progression to SIRS
- Further Complications:
  - wound vac malfunction d/t obstructions
  - high fistula and ileostomy output (max 6.4L) and leakage

# Output Hx: Table 2

**Table 2: Ileostomy, Stoma, and Measurable Output History**

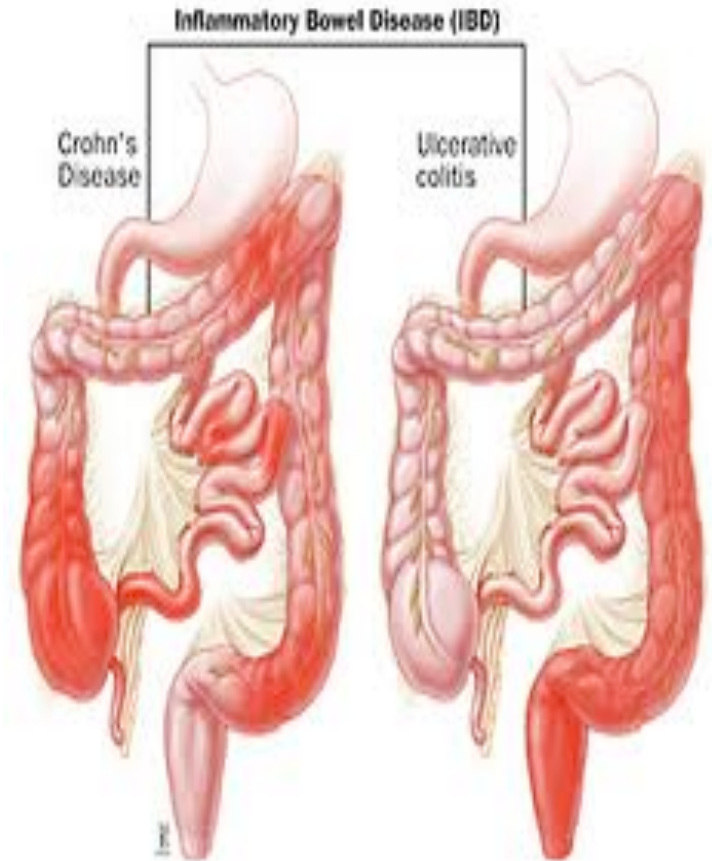
Date	Right Lower Quadrant Ileostomy Output (ml)	Left Lower Quadrant Stoma/Fistula Output (ml)	Measurable Output (ml)	Total Output (ml)
2/11	0	825	--	825
2/12	0	2025	--	2025
2/13	0	1085	--	1085
2/14	0	1025	--	1025
2/15	25	675	--	700
2/16	25	1575	--	1600
2/17	10	1255	--	1265
2/18	10	2155	--	2165
2/19	0	300	--	300
2/20	0	750	--	750
2/21	300	1825	--	2125
2/22	0	2850	--	2850
2/23	0	4750	--	4750
2/24	0	6040	--	6040
2/25	0	2100	--	2100
2/26	250	2510	--	2760
2/27	0	1925	--	1925
2/28	316	2575	100	2991
3/1	100	4500	350	4950
3/2	0	5500	500	6000
3/3	40	5900	100	6040
3/4	200	6200	--	6400
3/5	75	6100	--	6175
3/6	0	3725	--	3725
3/7	55	4400	--	4455
3/8	35	2300	--	2335
3/9	0	4500	--	4500
3/10	40	4175	--	4175
3/11	20	2150	--	2170
3/12	0	1130	--	1130
3/13	150	1650	--	1800
3/14	310	3020	--	3300
3/15	175	700	--	875
3/16	70	400	--	470
3/17	50	650	--	700
3/18	220	500	--	720
3/19	40	395	--	435
3/20	0	575	--	575
3/21	0	700	--	700
3/22	0	450	--	1350
3/23	5	250	--	255
3/24	0	95	--	95
3/25	0	150	--	150
3/26	0	355	70	405
3/27	0	460	--	460
3/28	0	700	--	700
3/29	0	1100	--	1100
3/30	0	550	--	550
3/31	35	545	--	580
4/1	0	300	165	765

INFLAMMATORY BOWEL  
DISEASES:  
CRONH'S DISEASE,  
ULCERATIVE COLITIS

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# Crohn's Disease vs Ulcerative Colitis

- Crohn's Disease (CD)
  - transmural inflammation of the digestive tract
  - affects any portion of GI tract from the mouth to the most distal bowel in a discontinuous fashion
- Ulcerative Colitis (UC)
  - Inflammation generally restricted to mucosa
  - contiguous disease that usually begins in the rectum and progresses up the colon at varying lengths



# Pathophysiology: CD and UC

- Etiology unknown: likely involves complex interactions between the GI immunologic system, gut microflora, genetics, and environmental factors
- Both conditions: Inappropriate T-cell activation → release of inflammatory cytokines
- GI Dysbiosis:
  - Increases in *Enterobacteriaceae*, *Bacteroidetes*, *Enterococci*, *Clostridium difficile*, *E. coli*, *Shigella flexneri*, and *Listeria* spp
  - Decreases in *Firmicutes*, *Eubacterium rectale*, *Bacteroides fragilis*, *B. vulgatus*, *Ruminococcus albus*, *R. callidus*, *R. bromii*, and *F. prausnitzii*

# Medications, FDIs, Surgical Management

- Corticosteroids
  - Monitor BG
  - Ca-Vit D suppl recommended with long term use.
- Anti-inflammatory agents (aminosalicylates)
- Immunosuppressive agents (cyclosporine, azathioprine, mercaptopurine)
  - Monitor renal & hepatic function
- Antibiotics (metronidazole)
  - Diarrhea: losses of Na/K, Zn, Mg
- Monoclonal antitumor necrosis factor (anti-TNF) (Remicade)
- CD: 50-70% will require surgery: resections of the intestine
- UC: 20% of will require a colectomy and ileostomy

# Complications, Symptoms, Prognosis

- CD complications
  - abscesses, deep-ulcers, fistulas, fibrosis, submucosal thickening, localized strictures, narrowed segments of bowel, obstructions
- UC complications
  - less common
  - bleeding from deep ulcerations, bowel rupture, severe abdominal bloating
- Symptoms:
  - diarrhea, abdominal pain and bloating, fever, weight loss, anemia, food intolerances, malnutrition, and growth failure in children
  - bloody stools more common in UC
- Px
  - Mortality ratio: 1.4 to 5 times the general population
  - Increased risk of small bowel malignancy



# NUTRITION CARE PROCESS

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# Medical Nutrition Therapy (MNT): Hospitalization

- Initial Nutrition Presentation:
  - Weight Loss Trigger: 24lb in <1month (severe weight loss)
  - BMI 17, 69%IBW
  - Low Prealbumin 8 (12/15), CRP 22.2 (12/15)
  - Low ionized Ca (1.11)
  - Low Na/Cl (130/95) → likely related to loose stools
  - Low Cr (0.57)
- Nutrition Diagnosis:
  - Inadequate protein-energy intake r/t medical condition, suboptimal appetite prior to admit AEB 24lb weight loss, depleted prealbumin.
- Estimated Needs:
  - Mifflin:  $1621 \times 1.3-1.5$
  - 2100-2400kcal (35-40kcal/kg), 90-120g protein (1.5-2g/kg)
  - Maintenance Fluids: 2100-2400kcal (1ml/kcal)

# Diet Order History: Table 4

Table 4: Diet Order History- All TPN Rx D15%, AA5%, IL20%

Date	Diet Order	Enteral Nutrition	Parenteral Nutrition
1/3/2013	Clear Liquid		
1/4	Low residue		
1/8	NPO		
1/9	Clear liquid		
1/10			TPN 40ml/hr x 24 +IL 20ml/hr x 12
1/11	Low residue		TPN 40ml/hr x 24 +IL 20ml/hr x 12
1/12	Low residue		discontinued
1/13	Low residue		TPN: Rx unknown
1/15	NPO		discontinued
1/17	Clear liquid		
1/18	low residue		
1/19	NPO		
1/20	CLEAR LIQUID		
1/21	low residue		
1/21	full liquid		
1/22	NPO		TPN 40ml/hr x 24 +IL 20ml/hr x 12
1/22	sip water/ice		TPN 40ml/hr x 24 +IL 20ml/hr x 12
1/23	clear liquid		TPN 40ml/hr x 24 +IL 20ml/hr x 12
1/23	full liquid		TPN 40ml/hr x 24 +IL 20ml/hr x 12
1/25	NPO		TPN 90ml/hr x 24 +IL 20ml/hr x 12
1/25	clear liquid		TPN 90ml/hr x 24 +IL 20ml/hr x 12
1/27	full liquid		TPN 90ml/hr x 24 +IL 20ml/hr x 12
1/28	low residue		TPN 90ml/hr x 24 +IL 20ml/hr x 12
1/31	NPO		TPN 90ml/hr x 24 +IL 20ml/hr x 12
2/1	low residue		TPN 90ml/hr x 24 +IL 20ml/hr x 12
2/2	NPO		TPN 90ml/hr x 24 +IL 20ml/hr x 12
2/2	sip water/ice		TPN 90ml/hr x 24 +IL 20ml/hr x 12
2/3	clear liquid		TPN 90ml/hr x 24 +IL 20ml/hr x 12
2/4	NPO		TPN 90ml/hr x 24 +IL 20ml/hr x 12
2/6	sip water/ice		TPN 90ml/hr x 24 +IL

2/9	NPO		20ml/hr x 12 TPN 90ml/hr x 24 +IL 20ml/hr x 12
2/11			TPN 90ml/hr x 24 +IL 20ml/hr x 12
2/14	NPO	Peptamen AF 10ml/hr x 24hrs	TPN 90ml/hr x 24 +IL 20ml/hr x 12
2/17	NPO	Peptamen 60ml/hr	TPN 90ml/hr x 24 +IL 240ml twice weekly
2/18	Clear liquid	Peptamen 60ml/hr	TPN 90ml/hr x 24 +IL 240ml twice weekly
2/18	Peptamen 50ml/hr	Peptamen 60ml/hr	not received
2/19	NPO, Clear Liquid, Carb limited, Peptamen AF 60ml/hr x 24 hrs	Peptamen 60ml/hr	TPN 480ml total + IL 320ml total
2/20	CHO limited, full liquid, nocturnal TF peptamen 60ml/hr	Nocturnal Peptamen 60ml/hr	TPN 640ml total +IL 80ml
2/21	Regular diet + 2 cans Peptamen Prebio TID	Nocturnal Peptamen 60ml/hr	discontinued
2/24	General		
3/7	clear liquid		
3/8	General		
3/14	NPO		
3/15	NPO		TPN 320ml total + IL 160ml total
3/16	NPO		TPN 357ml total +IL 200ml total
3/17	NPO		TPN 908ml total +IL 60ml total
3/18	NPO		TPN 1387ml total + IL 160ml total
3/19	NPO		TPN 1900ml total+ IL 266ml total
3/20	NPO		TPN 100ml/hr x 24hrs + IL 20ml/hr x 12hrs
4/2	NPO		Discharge: nocturnal cyclic TPN 2400ml + IL 20ml/hr x 12 hrs

# TPN Hx

- Post initial surgery: Supplement to oral diet
  - Continuous D15%, AA5% @40ml/hr + 20%IL 20ml/hr x 12hrs via PICC
- Post proctectomy 2/9/13:
  - Intubated: Penn State Equation
  - Continuous TPN @90ml/hr + IL
  - TG increased from 61 to 282: d/c IL
  - Extubated: resumed oral diet, placed on cyclic TPN
    - POCT-BS: 45-474
    - d/c cyclic, restarted on continuous
  - Continued high fistula and ileostomy output (max 6.4L/day)
    - Made NPO, restarted on TPN @40ml/hr per MD (38% lower end needs)
      - Energy needs NOT met via TPN until 5 days after NPO
      - Weight decreased from 114lb to 106lb

# Tube Feeding: Appropriate?

- Post Proctectomy
  - Trickle TF Peptamen AF via NG @ 10ml/hr → advanced to 60ml/hr, then d/c 9 days after initiation
  - Why were TF indicated now, but not after the first surgery? Need for weight gain?
  - Contraindications: Need for bowel rest, high output fistula (>1L) indicating malabsorption
  - \*To confirm malabsorption: look at ileostomy output, compare to TF

# Regular vs Low Residue Diet

- Advanced to Regular diet February 21
  - Indication: need for weight gain
  - Sample diet: pizza, French fries, hot dogs, cookies and ½ lb cheeseburger
    - High Fat
  - Increased output: >2L, Max 6.4L/day
    - Fat malabsorption likely d/t CD, UC, and increased gastrointestinal inflammation 2/2 to multiple surgeries and recent SIRS
  - At urgent request from family to control output, M.A. was made NPO March 14 and re-started on TPN @100ml/hr + 20ml/hr x 12 hrs
  - Discharged on cyclic (?) TPN 2400ml +IL 20ml/hr x 12 hrs nightly

# Low FODMAP Diet

- FODMAP: fermentable, oligosaccharides (fructans and galactans), disaccharide (lactose), monosacchride (fructose), and polyols
- FODMAPs: poorly absorbed in the small intestine, osmotically active, and rapidly fermented by bacteria → functional symptoms secondary to luminal distention
- Breath Hydrogen Testing
  - Hydrogen>Methane = poor absorption
- Sustained reduction in symptoms of abdominal bloating and cramping in 74% of 62 patients with functional gastrointestinal disorders
- Pilot study: 10 ileostomates- frequency of pouch emptying reduced. Increasing FODMAPs was associated with a 22% effluent volume increase.

**Table 1** Food sources of FODMAPs (where FODMAPs are problematic based on standard serving size) and suitable alternatives

FODMAP	Excess fructose	Lactose	Oligosaccharides (fructans and/or galactans)	Polyols
Problem high FODMAP food source	<p><i>Fruits:</i> apples, pears, nashi pears, clingstone peaches, mango, sugar snap peas, watermelon, tinned fruit in natural juice</p> <p><i>Honey</i></p> <p><i>Sweeteners:</i> fructose, high fructose corn syrup</p> <p><i>Large total fructose dose:</i> concentrated fruit sources; large serves of fruit, dried fruit, fruit juice</p>	<p><i>Milk:</i> cow, goat and sheep (regular &amp; low-fat), Ice cream</p> <p><i>Yoghurt</i> (regular &amp; low-fat)</p> <p><i>Cheeses:</i> soft &amp; fresh (e.g. ricotta, cottage)</p>	<p><i>Vegetables:</i> artichokes, asparagus, beetroot, Brussels sprout, broccoli, cabbage, fennel, garlic, leeks, okra, onions, peas, shallots.</p> <p><i>Cereals:</i> wheat &amp; rye when eaten in large amounts (e.g. bread, pasta, couscous, crackers, biscuits)</p> <p><i>Legumes:</i> chickpeas, lentils, red kidney beans, baked beans</p> <p><i>Fruits:</i> watermelon, custard apple, white peaches, rambutan, persimmon</p>	<p><i>Fruits:</i> apples, apricots, cherries, longon, lychee, nashi pears, nectarine, pears, peaches, plums, prunes, watermelon</p> <p><i>Vegetables:</i> avocado, cauliflower, mushrooms, snow peas</p> <p><i>Sweeteners:</i> sorbitol(420), mannitol(421), xylitol(967), maltitol (965), isomalt (953) &amp; others ending in '-ol'</p>
Suitable alternative low-FODMAP food source	<p><i>Fruit:</i> banana, blueberry, carambola, durian, grapefruit, grape, honeydew melon, kiwifruit, lemon, lime, mandarin, orange, passionfruit, paw paw, raspberry, rockmelon, strawberry, tangelo.</p> <p><i>Honey substitutes:</i> maple syrup, golden syrup</p> <p><i>Sweeteners:</i> any except polyols</p>	<p><i>Milk:</i> lactose-free, rice milk</p> <p><i>Cheese:</i> 'hard' cheeses including brie, camembert</p> <p><i>Yoghurt:</i> lactose-free</p> <p><i>Ice cream substitutes:</i> gelati, sorbet</p> <p><i>Butter</i></p>	<p><i>Vegetables:</i> bamboo shoots, bok choy, carrot, celery, capsicum, choko, choy sum, corn, eggplant, green beans, lettuce, chives, parsnip, pumpkin, silverbeet, spring onion (green only), tomato</p> <p><i>Onion/garlic substitutes:</i> garlic-infused oil</p> <p><i>Cereals:</i> gluten-free &amp; spelt bread/cereal products</p>	<p><i>Fruits:</i> banana, blueberry, carambola, durian, grapefruit, grape, honeydew melon, kiwifruit, lemon, lime, mandarin, orange, passionfruit, paw paw, raspberry, rockmelon</p> <p><i>Sweeteners:</i> sugar (sucrose), glucose, other artificial sweeteners not ending in 'ol'</p>



# Past Medical Hx, Family Medical Hx

- PMH:

- UC Dx: 2008 (age 23). Sx of severe abd cramping/pain started after eating Carl's Junior burger.
- ER 2010 → remission until Thanksgiving 2012
- Thanksgiving 2012: beginning of UC flare
- Severe soy allergy as baby: 3 hospitalizations
  - “One in 20 million” allergy
  - No longer has allergy

- FMHx

- Paternal Uncle: colon cancer survivor
- Paternal first cousin: Celiac Disease
- Mother: Diverticulosis

# Social Hx

- Attended small Catholic private school K-8<sup>th</sup> grade
  - 30 classmates: 15 boys, 15 girls
  - 3 boys (including M.A.) dx with **severe** IBD, all required J-pouchs and semi/total colectomies
  - **10% of class with IBD vs 0.396% worldwide prevalence**
- Education: BA and MA in English Literature
  - FODMAP Diet compliance associated with time availability, **higher education status**, and use of specific cookbooks
- Support system:
  - Married mother and father, 2 brothers
  - Tight group of friends
  - Does not attend support groups

# Potential triggers of UC Flare

## Thanksgiving 2012

- Stress

- Sharing room with younger brother in parents house
- Trying to find job in struggling economy
- Hired for office job at County: increased stress

- Dietary Intake

- Typical Western diet
  - High fat, high animal protein, high omega 6:omega 3, low to moderate fruits and vegetables
- Increased alcohol consumption
  - From rare EtOH intake to nightly glass of wine

# Sample Diet: Table 5

**Table 5: Typical Meal Items Prior to Hospitalization, Preferences and Aversions**

<b>Meal</b>	<b>Items (portions)</b>
<b>Breakfast</b>	High fiber cereal, banana, Lactaid milk
<b>Lunch</b>	Turkey Sandwich (whole wheat bread, lettuce, tomatoes, pickles, teaspoon mayonnaise), Salad (lettuce, cherry tomatoes, olives, light range or light Italian dressing)
<b>Dinner</b>	Main Dishes: Chicken breast, spaghetti with meal balls, fettuccini Alfredo, steak, ribs, vegetable meatball soup, clam chowder Side Dishes: white rice, Spanish rice
<b>Snacks</b>	Cheeze-its, yogurt, quesadilla (flour tortilla, mozzarella cheese), Hebrew National Hot dogs
<b>Preferences</b>	Hamburger, sausage, pastrami, deli sandwiches, pizza, donuts, ice cream
<b>Aversions</b>	nuts, seeds, vegetable and fruit skins, white enriched bread

# Isotretinoin (Accutane®)

- M.A. reports undergoing “2 rounds” of Accutane for severe acne as a teenager
- Accutane:
  - Maker: Roche Pharmaceuticals
  - Vitamin A analog approved by FDA for severe nodulocystic acne in 1982
  - Pulled from the US market in 2009, citing “high costs from personal-injury lawsuits” (multi-million dollar settlements)
    - **Generic forms still available**

# Isotretinoin (Accutane®) and IBD

- Several studies link IBD (particularly UC) to Accutane exposure
- Case-controlled analysis of claims data from 8,189 cases of IBD (4,428 UC, 3,664 cases CD)
  - Accutane exposure **strongly** associated with increased risk of UC (**OR 4.36**, 95%CI 1.97, 9.66), but not CD (Crockett)
  - Dose-responsive relationship: higher doses, dose escalation, and longer durations associated with the highest risk of UC.
- As of January 2012, there were 6,000 cases pending against Roche Pharmaceuticals

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