Vulnerable Patients with Inflammatory Bowel Disease: Data from the OneFlorida Clinical Research Consortium

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Abstract

Crohn's Disease and ulcerative colitis, collectively known as Inflammatory Bowel Disease (IBD), are conditions characterized by inflammation and ulceration of the intestines. This work aims to highlight disparities among vulnerable IBD populations using the OneFlorida Clinical Research Consortium, a data network housing claims and electronic health record information for more than 15 million patients in Florida. A retrospective analysis using data collected between 01/01/2012 and 06/30/2020 was performed using OneFlorida, and patients were identified using diagnosis and pharmacy codes for IBD. 10,578 patients met the inclusion criteria. Healthcare utilization (emergency department visits, inpatient stay, medications, procedures), disease severity (c-reactive protein, white blood cell count, hemoglobin, albumin), and outcomes (i.e., abdominal surgery) were assessed for patients of different ages, gender, ethnicities, races, and locations. Notably, adolescent and young adult (AYA) patients (ages 17-25) use significantly more corticosteroids than both the pediatric and older adult groups (*p*-values 0.005 and 0.0007). Contrary to prior literature, Hispanic IBD patients used more biologic medications compared to non-Hispanic White patients (p<0.0001), whereas non-Hispanic Black patients used more steroids (p=0.0004). These findings illustrate a need for targeted educational interventions to support these vulnerable populations.

Keywords: Inflammatory Bowel Disease, Crohn's Disease, ulcerative colitis, healthcare utilization, racial/ethnic disparities

Background

Inflammatory Bowel Disease (IBD) is an umbrella term encompassing Crohn's Disease (CD) and ulcerative colitis (UC). Typically diagnosed in the first two decades of life, these chronic autoimmune conditions affect the gastrointestinal tract to varying extents, causing uncontrolled inflammation, ulceration and can form fibrotic segments of intestine over time. Symptoms can include abdominal pain, diarrhea, rectal bleeding, weight loss, loss of appetite, and fatigue, posing a significant disease burden on patients and health systems. Left unchecked and

untreated, IBD can result in serious complications, including infections, malabsorption, intestinal strictures, fistulas, and obstructions, increasing the risk of hospitalization and abdominal surgery.

Research has shown that environmental modulation of the gut microbiome in genetically susceptible individuals contributes to the pathogenesis of IBD by disrupting the normal intestinal barrier function and immune response (Nishida et al., 2018). As such, pharmacotherapies for IBD are designed to suppress the immune system and control inflammation, restoring and enhancing wound healing. During acute exacerbations of IBD, patients are typically given corticosteroids such as prednisone, which work quickly to treat inflammation. However, steroid use is associated with poor disease outcomes, including an increased need for hospitalization, abdominal surgeries, and risk of mortality (Lichtenstein et al., 2012). As a result, maintenance medications are essential to prevent excessive steroid use and control disease progression. More traditional treatment plans for IBD have utilized 5-amino salicylic acid (5-ASA) and its derivatives to treat inflammation. Other treatment modalities include immunomodulators such as azathioprine, methotrexate, and 6-mercaptopurine.

Over the last several decades, a class of biologic agents (i.e., infliximab, adalimumab, certolizumab, golimumab) has emerged, targeting key inflammatory mediators including cytokines, such as tumor necrosis factor-alpha (TNF-alpha). In recent years, the Food and Drug Administration has approved additional biologic and small molecule therapeutics with other molecular targets, including interleukins 12 and 23 (ustekinumab, risankizumab), integrins (vedolizumab), sphingosine 1 phosphate (ozanimod), and the JAK/STAT pathway (tofacitinib, upadacitinib), for use in IBD. These medications are increasingly valuable in managing IBD, as they can control more severe disease. Studies have shown that biologics are effective at inducing and maintaining remission (Hashash et al., 2021) and are predictive of improved long-term clinical outcomes, especially if started earlier in the disease (Berg et al., 2019). As a result, biologics are considered surrogates for quality of care in IBD.

Despite advancements in IBD treatment, disparities in healthcare utilization still exist among patient populations. Previous work has highlighted the adolescent and young adult (AYA) age range as a vulnerable group with IBD, as they may face additional challenges in navigating the healthcare system as they transition from pediatric to adult care (Bollegala et al., 2022). Given

that newly-diagnosed IBD patients are usually in this age group, they may have additional barriers to seeking care as many move away from home to pursue higher education. Previous studies from our group have shown that college-aged patients with IBD encounter unique, age-specific challenges in managing their disease, including maintaining a social life and relationships, interacting with physicians, and transitioning to college (Chaudhry et al., 2020). These challenges may contribute to lapses in care, potentially leading to poor disease management, worse disease severity, and unfavorable health outcomes. Moreover, previous work has found differences in biologic use among patients of different races and ethnicities. For instance, Hispanic patients with IBD have been shown to be less likely to utilize biologics when compared to non-Hispanic White (NHW) patients (Damas et al., 2013). Although Hispanics are a rapidly growing demographic in the United States, updates on healthcare utilization trends for Hispanic patients with IBD are lacking.

Aims

This large retrospective cohort study aims to identify vulnerable IBD patient populations and highlight disparities in biologic use, disease severity, and healthcare utilization among patients of different races, ethnicities, ages, and gender in Florida. Secondary aims include preliminary geographic analysis and assessment of access to care and social determinant metrics across Florida counties.

Methods

A large retrospective cohort study was conducted from 01/01/2012 to 06/30/2020 utilizing the OneFlorida Clinical Research Consortium, a data network currently housing electronic health records (EHR) and claims information for over 15 million patients in the state of Florida. Inclusion criteria were individuals with active International Classification of Diseases 9th or 10th diagnosis codes for Crohn's disease or ulcerative colitis with more than two encounters and a separate pharmacy code for medication used specifically in IBD. Alternatively, individuals with only one encounter associated with a diagnosis code for IBD but with an associated pharmacy code for IBD-specific medication were also included. Patients with comorbidities were not excluded from the study.

Primary outcomes of interest for evaluating healthcare utilization included emergency department (ED) visits, hospitalizations (ED to inpatient admission or inpatient stay), endoscopies, abdominal surgeries, imaging studies, and medications. Medications that were

assessed included prescriptions for steroids, narcotics, antidepressants, and biologics. Biologics were defined as a prescription for at least one of the following biologic agents: adalimumab, infliximab, vedolizumab, certolizumab, ustekinumab, golimumab, natalizumab, and tofacitinib. Additional outcomes of interest included disease severity, which was assessed using reference values for white blood cell (WBC) count, hemoglobin, C-reactive protein (CRP), and albumin. Lastly, county-level geographical analysis was performed, and patients were compared based on socioeconomic vulnerability (SEV), a census-derived index measure of poverty, unemployment, education, percent income spent on housing, and linguistic isolation, among other factors (California Public Utilities Commission). Patients within a higher SEV quartile (i.e., Q4) were defined to be more socioeconomically vulnerable.

Utilization rates were calculated as the number of patients with at least one value of the variable. The patient population was stratified by disease, age group, race/ethnicity (Hispanic, non-Hispanic Black, and non-Hispanic White groups), county, and SEV. Chi-square tests were used to compare rates of healthcare utilization and disease severity. Logistic regression was performed, and adjustments for disease type, age, sex, and race/ethnicity were made accordingly. Adjusted odds ratios comparing groups of interest were reported. *P*-values less than 0.05 were determined to be statistically significant. This study was approved by the University of Florida Institutional Review Board (IRB202002324).

Results

College-Age Patients with IBD Utilize Healthcare Differently

A cohort of 10578 patients within the OneFlorida Clinical Research Consortium was identified using inclusion criteria for IBD. Six thousand eight hundred thirty-six (65%) members of the cohort had a diagnosis of Crohn's Disease, while 3742 (35%) were diagnosed with ulcerative colitis (Figure 1A). The 17–25-year-old age group, the adolescent and young adults (AYA), comprised 25.8% (n=2731) of all patients (Figure 1B). Notably, as shown in Table 1.1 and Figures 2A-C, the AYA have significantly more steroid prescriptions than both the pediatric (6-16 years) and adult (26-50 years) age groups (48.9% vs. 44.3% and 45.3%; *p*-values 0.005 and 0.0007, respectively). Compared to older adults with UC, AYA patients with UC are more likely to use steroids, but this trend was not observed for CD (Table 1.2). Compared to the pediatric age group, the AYA also had significantly more narcotic prescriptions (*p*<0.0001) and

antidepressant prescriptions (*p*<0.0001). This trend continues with older adult patients being most likely prescribed narcotics and antidepressants. Although there is no difference in the rates of emergency department use between the AYA and pediatric groups (33.7% vs. 33%; *p* value 0.18), the AYA have significantly more admissions from the ED (22.3% vs. 10.9%; *p* value <0.0001). When accounting for UC/CD disease variation, significant age group differences were observed in ambulatory visits, ED visits, and inpatient stays but not in admissions to inpatient stays from the ED (Table 1.2). Importantly, compared to the AYA group, inpatient hospital stays were more likely among pediatric patients with both CD and UC. Biologic use decreased with age across all age groups, with 51% pediatric vs. 40% AYA vs. adults 25.4% (*p*-value < 0.0001). However, there was no statistically significant association when accounting for UC/CD disease variation (*p*=0.769) (Table 1.2).
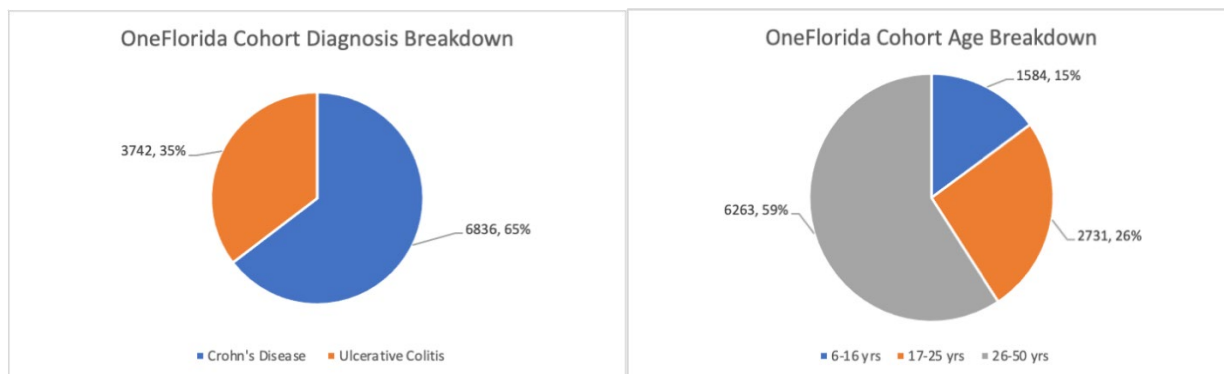
Figures 1A (left) and 1B (right). OneFlorida Cohort Characteristics

Table 1.1. Healthcare Utilization Among IBD Patients of Different Age Groups. (*= significant difference between 6-16 and 17-25; **= significant difference between 17-25 and 26-50 groups)

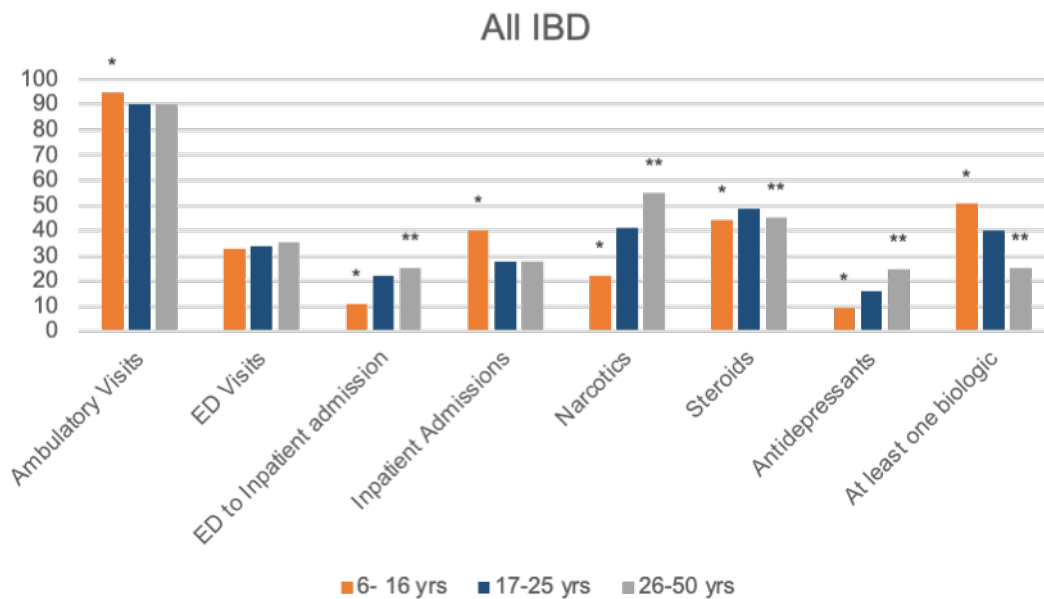|	All IBD			Crohn's Disease			Ulcerative colitis		
	6-16 yrs	17-25 yrs	26-50 yrs	6-16 yrs	17-25 yrs	26-50 yrs	6-16 yrs	17-25 yrs	26-50 yrs
Ambulatory Visits	94.9*	90.2	90	95.9*	90.1	88.9	92.1	90.3	91.8
ED Visits	33	33.7	35.3	34.3	36.6	40.5**	29.3	28	27
ED to Inpatient admission	10.9*	22.3	25.4**	10.8*	23	28.3**	10.9*	20.8	20.8
Inpatient Admissions	40.1*	27.9	27.6	40.2*	29.9	31.1	39.7*	24	21.8**
Narcotics	22.3*	41.1	55**	22.8*	44.6	61.4**	21.1*	34.3	44.8**
Steroids	44.3*	48.9	45.3**	42.4*	47.1	45.9	49.9*	52.3	44.3**
Antidepressants	9.5*	15.9	24.9**	9.6*	16.6	26.9**	9.2*	14.6	21.7**
At least one biologic	50.6*	40.0	25.4**	55.2*	45.8	30.5**	37.0*	28.8	28.8**

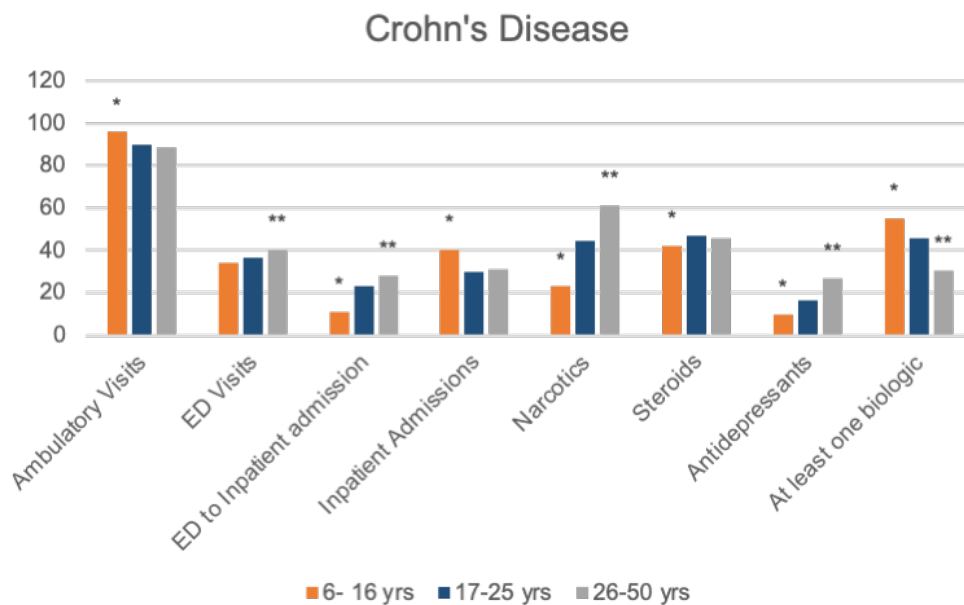**Figure 2A.** Healthcare Utilization by Age Group

Figure 2B. Healthcare Utilization by Age Group for Patients with Crohn's Disease
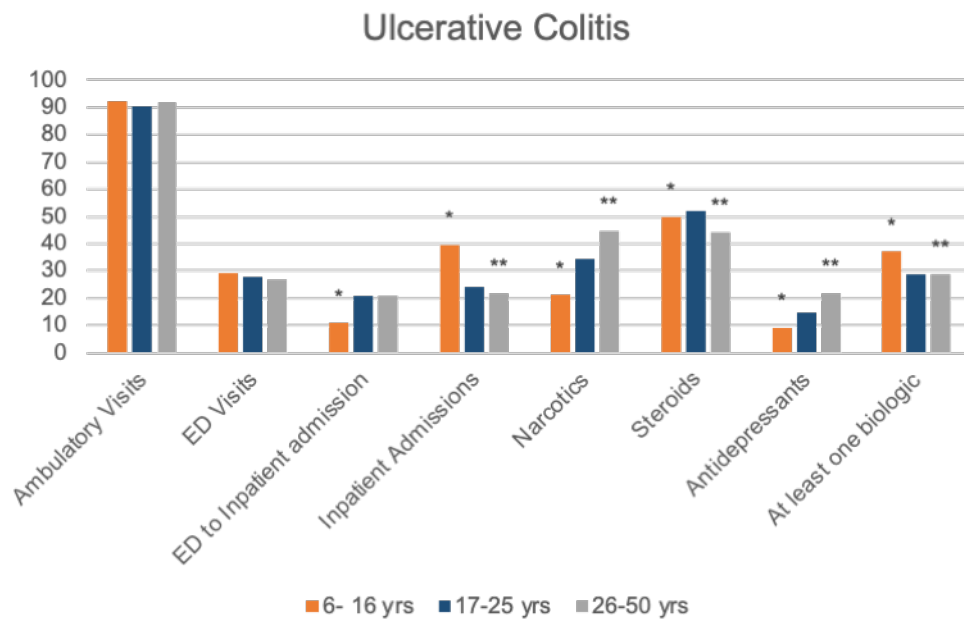

Figure 2C. Healthcare Utilization by Age Group for Patients with Ulcerative Colitis

Table 1.2. Odds of Healthcare Utilization and UC/CD Interaction with Age Group

Age Group (Years)	Odds Ratio (95% CI)	p-value	Disease Type x Age Group Interaction p-value	UC OR (95% CI)	CD OR (95% CI)
Ambulatory Visit			<.0001		
17-25	Ref	--		Ref	Ref
6-16	2.18 (1.68, 2.82)	<.0001		1.30 (0.85, 1.98)	2.74 (1.97, 3.81)
26-50	0.95 (0.82, 1.11)	0.51		1.17 (0.90, 1.52)	0.85 (0.70, 1.02)
ED Visit			0.047		
17-25	Ref	--		Ref	Ref
6-16	0.88 (0.77, 1.01)	0.07		1.01 (0.77, 1.32)	0.85 (0.72, 0.99)
26-50	1.08 (0.97, 1.19)	0.147		0.97 (0.82, 1.16)	1.14 (1.00, 1.28)
ED to Inpatient Stay			0.096		
17-25	Ref	--		--	--
6-16	0.39 (0.33, 0.47)	<.0001		--	--
26-50	1.18 (1.06, 1.32)	0.003		--	--
Inpatient Hospital Stay			0.007		
17-25	Ref			Ref	Ref
6-16	1.63 (1.42, 1.86)	<.0001		2.04 (1.58, 2.63)	1.51 (1.29, 1.76)
26-50	0.99 (0.89, 1.09)	0.7924		0.91 (0.76, 1.09)	1.03 (0.91, 1.17)
Narcotics			0.005		
17-25	Ref	--		Ref	Ref
6-16	0.38 (0.33, 0.44)	<.0001		0.49 (0.37, 0.65)	0.36 (0.30, 0.42)
26-50	1.77 (1.61, 1.95)	<.0001		1.60 (1.36, 1.87)	1.86 (1.66, 2.10)
Antidepressants			0.767		
17-25	Ref	--		--	--
6-16	0.56 (0.46, 0.69)	<.0001		--	--
26-50	1.63 (1.44, 1.83)	<.0001		--	--
Steroids			0.003		
17-25	Ref	--		Ref	Ref
6-16	0.84 (0.74, 0.95)	0.005		0.91 (0.72, 1.15)	0.83 (0.71, 0.96)
26-50	0.86 (0.78, 0.94)	0.0007		0.72 (0.62, 0.84)	0.93 (0.83, 1.04)
Biologics			0.769		
17-25	Ref				
6-16	1.48 (1.30, 1.68)	<.0001		--	--
26-50	0.52 (0.47, 0.57)	<.0001		--	--

Male and Female Patients with IBD Utilize Healthcare Differently

Stratification of the OneFlorida cohort by gender revealed various discrepancies in healthcare utilization patterns among college-aged IBD patients. Females with CD aged 17-25 years old had significantly more ambulatory visits ($p=0.0196$), inpatient admissions ($p=0.0285$), esophagogastroduodenoscopies (EGD) ($p=0.0023$), colonoscopies ($p=0.0062$), and prescriptions for narcotics ($p=0.0006$) than males with CD (Table 2). In addition, females 17-25 years old with CD and UC both had significantly more emergency department visits ($p=0.0011$; $p=0.0037$, respectively) and prescriptions for antidepressants ($p<0.0001$; $p<0.0086$, respectively) than males (Table 2). There were no gender-related differences in ambulatory visits, inpatient admissions, endoscopy, or narcotic use for patients with ulcerative colitis.

Table 2. Gender Differences in Healthcare Utilization for UC and CD Patients 17-25 Years Old (*= significant difference between males and females with the same diagnosis)

Gender Differences in Healthcare Utilization for UC and CD Patients 17-25 Years Old				
	Crohn's Disease		Ulcerative Colitis	
	Female	Male	Female	Male
Ambulatory Visits	91.8*	88.5	91.9	88.7
ED Visits	40.4*	33	32.3*	23.8
Inpatient Admissions	32.4*	27.6	24	24
EGD	18.4*	13.2	9.1	9.2
Colonoscopy	28.5*	22.9	24.6	25.7
Narcotics	48.7*	40.7	35.2	33.4
Antidepressants	21.1*	12.4	17.6*	11.6
Median Hb	*		*	
>12	36.5	51.9	34.8	45.2
Mild (11-12)	13.4	5.7	12.2	3
Moderate (8-10.9)	16.4	6.3	15.3	11.8
Severe (<8)	0.8	0.5	1.3	1.5

Hispanic Patients with IBD are More Likely to Use Biologics than Non-Hispanic Whites

The racial and ethnic breakdown of the OneFlorida IBD Cohort was 4971 (47%) NHW, 2501 (24%) Hispanic, and 1152 (11%) NHB (Table 3). 3484 (32.9%) patients were prescribed at least one biologic agent. Compared to NHW patients, Hispanic patients were more likely to utilize biologics ($p<0.0001$), whereas NHB patients had no significant difference in biologic use ($p=0.144$) (Table 4). These findings remained consistent even after adjusting for patient socioeconomic vulnerability (SEV) (Figure 3). Conversely, 4889 (46.2%) patients were

prescribed corticosteroids. Steroid use was significantly greater for NHB patients compared to NHW (p=0.0004), with no difference seen for Hispanic patients (p=0.335) (Table 5). Concerning healthcare utilization, 3637 (34.4%) patients had at least one emergency department visit. Compared to NHW, Hispanics were less likely to visit the ED (p<0.0001) and to be admitted from the ED to an inpatient stay (p<0.0001) (Tables 6 and 7). NHB patients were more likely to utilize the ED than NHW patients (p<0.0001), but no difference was found in admissions from the ED (p=0.108). Regarding disease severity, Hispanics had significantly fewer indicators of active disease compared to NHW patients, as evidenced by c-reactive protein (p=0.005), albumin (p<0.0001), hemoglobin (p<0.0001), and WBC (p<0.0001).

Table 3. Racial and Ethnic Breakdown of the OneFlorida Cohort

Race/Ethnicity	OneFlorida Database n (%)	IBD Patient cohort in OneFlorida n (%)
Total unique patients	2,748,300	10,578 (3.8%)
Non-Hispanic White	1,271,900 (46%)	4,971 (47%)
Hispanic	684,200 (24%)	2,501 (24%)
Non-Hispanic Black	561,200 (20%)	1,152 (11%)
Others	230,900 (8.4%)	1,645 (15%)

Table 4. Odds of Biologic Use (at least one biologic) by Race/Ethnicity (n=3484)

Race/Ethnicity	Odds Ratio	p-value
Non-Hispanic White (NHW)	Reference	--
Non-Hispanic Black (NHB)	0.90 (0.77, 1.04)	0.144
Hispanic	1.34 (1.20, 1.49)	<.0001

Table 5. Odds of Steroid Use by Race/Ethnicity (n=4889)

Race/Ethnicity	Odds Ratio (95% CI)	p-value
Non-Hispanic White	Reference	--
Non-Hispanic Black	1.26 (1.11, 1.43)	0.0004
Hispanic	1.05 (0.95, 1.16)	0.335

Table 6. Odds of Emergency Department (ED) Visits by Race/Ethnicity (n=3637)

Race/Ethnicity	Odds Ratio (95% CI)	p-value
Non-Hispanic White	Ref	--
Non-Hispanic Black	1.38 (1.21, 1.57)	<.0001
Hispanic	0.79 (0.71, 0.87)	<.0001

Table 7. Odds of ED Admission to Inpatient Hospital Stay by Race/Ethnicity (n=2378)

Race/Ethnicity	Odds Ratio (95% CI)	p-value
Non-Hispanic White	Ref	--
Non-Hispanic Black	1.12 (0.98, 1.29)	0.108
Hispanic	0.62 (0.55, 0.70)	<.0001
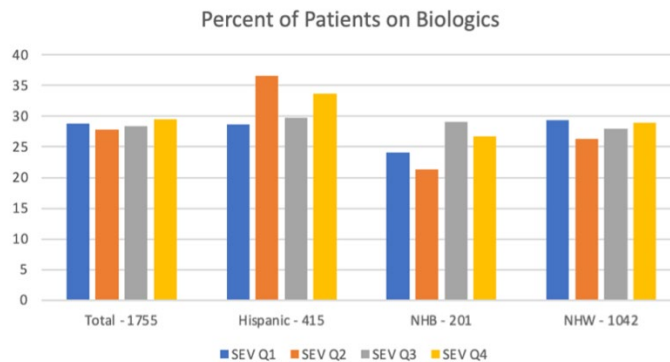
Figure 3. Biologic Use and Socioeconomic Vulnerability

Patients with Crohn's Disease Utilize Healthcare Differently Than Those with Ulcerative Colitis

Patients with CD were more likely to have ED visits, get admitted from the ED, and have an inpatient hospital stay when compared to UC patients ($p<0.0001$), but no difference was observed for ambulatory visits (Table 8). Patients with CD had higher odds of being prescribed narcotics and antidepressants ($p<0.0001$ and $p=0.0003$). Further, patients with CD were more than twice as likely to be prescribed a biologic agent than those with UC ($p<0.0001$). Steroid use was not significantly different between UC and CD overall ($p=0.202$). After accounting for UC/CD disease variation (Table 8), narcotic use was the only healthcare utilization variable that demonstrated a significant association between disease type and race/ethnicity (OR 1.68 favoring CD; $p=0.009$).

Table 8. UC vs. CD: Odds of Healthcare Utilization and Interaction with Race/Ethnicity

Model Variable	Ulcerative Colitis	Crohn's Disease OR (95% CI)	p-value	Disease Type x Race/Ethnicity Interaction p-value
Ambulatory Visit	Ref	0.89 (0.77, 1.03)	0.109	0.607
ED Visit	Ref	1.60 (1.46, 1.75)	<.0001	0.327
ED to Inpatient Stay	Ref	1.27 (1.15, 1.41)	<.0001	0.091
Inpatient Hospital Stay	Ref	1.39 (1.27, 1.53)	<.0001	0.603
Narcotics	Ref	1.68 (1.54, 1.83)	<.0001	0.009
Antidepressants	Ref	1.21 (1.09, 1.34)	0.0003	0.114
Steroids	Ref	0.95 (0.88, 1.03)	0.202	0.076
Biologics	Ref	2.23 (2.03, 2.45)	<.0001	0.571

Geographic Differences in Biologic Use Among Patients with IBD in Florida

Geographic analysis from the OneFlorida data suggests that overall biologic use is greatest among populated counties in Florida. At the county level, counties with a moderate/high proportion of their IBD patients on biologic agents (greater than 40%) include Sarasota County, Miami-Dade County, Broward County, Palm Beach County, Alachua County, and Duval County, among others (Figure 4 - All IBD). Counties with less than 16 patients were categorized as having negligible biologic use. For Hispanic IBD patients, biologic use was high (greater than

50%) in Miami-Dade, Palm Beach, Lee, and Marion counties (Figure 4). Interestingly, the central Florida area, including Orange County and Orlando, represents a large urban center with low biologic use (less than 17%). Of all three race/ethnicity groups, in urban areas, Hispanics have the largest percentage of patients using biologics at 38% vs. 29% for NHW and 27% for NHB (Figure 5). Conversely, in rural areas, NHW patients had the greatest biologic use at 39% vs. 33% for Hispanics and 35% for NHB (Figure 5). Unexpectedly, our findings show that NHW and NHB have higher rates of biologic use in rural areas, while Hispanics display the opposite healthcare utilization behavior and are more likely to be prescribed a biologic in urban areas.
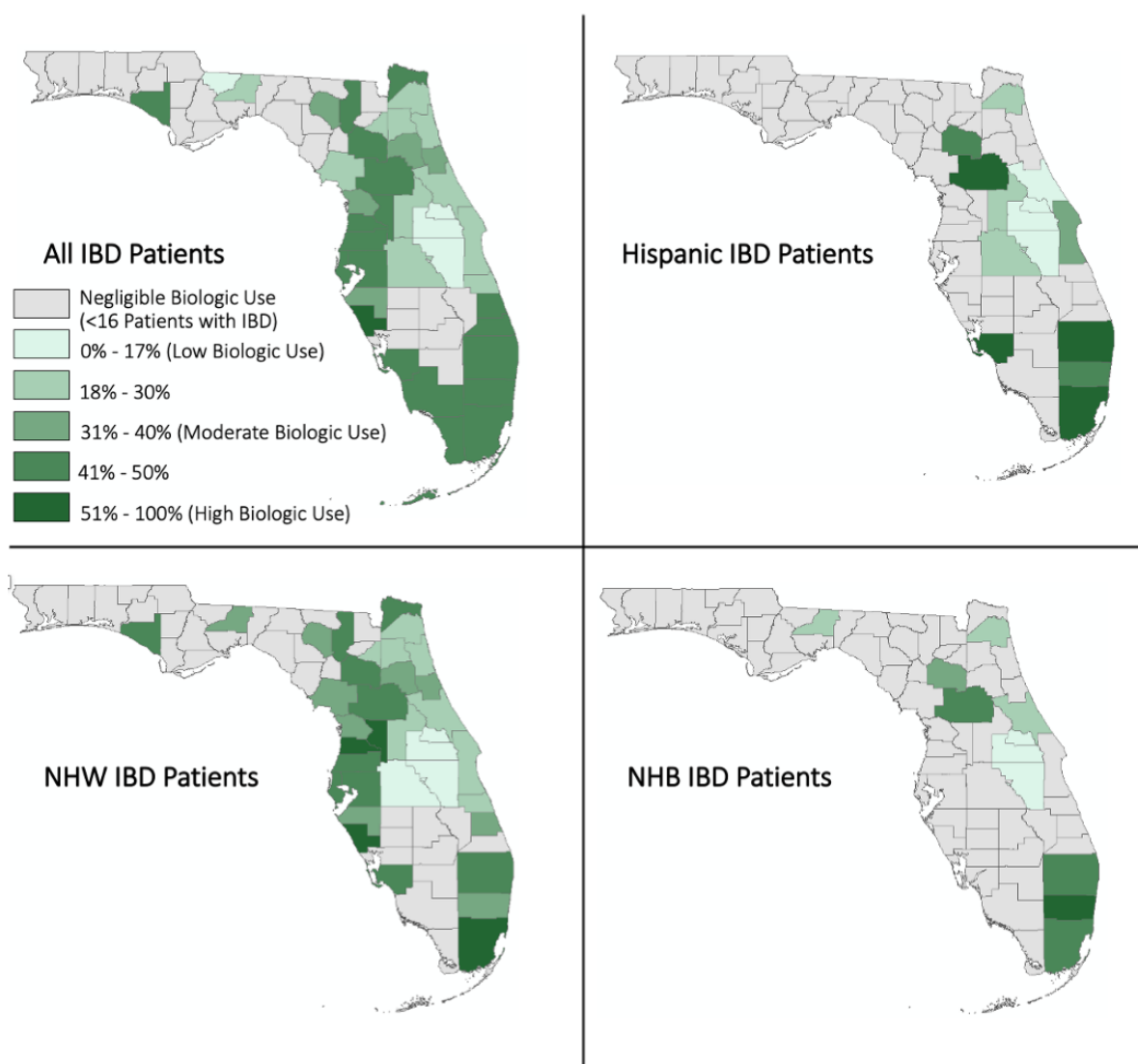
Figure 4. Percent of Patients with IBD (Ages 6 to 50) on Biologics in Florida Counties
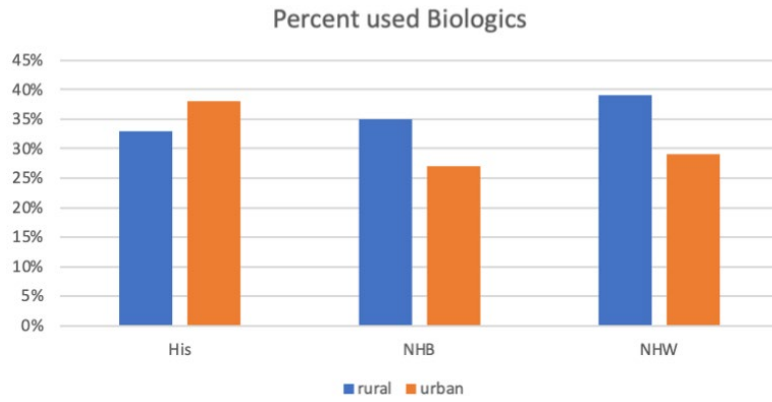
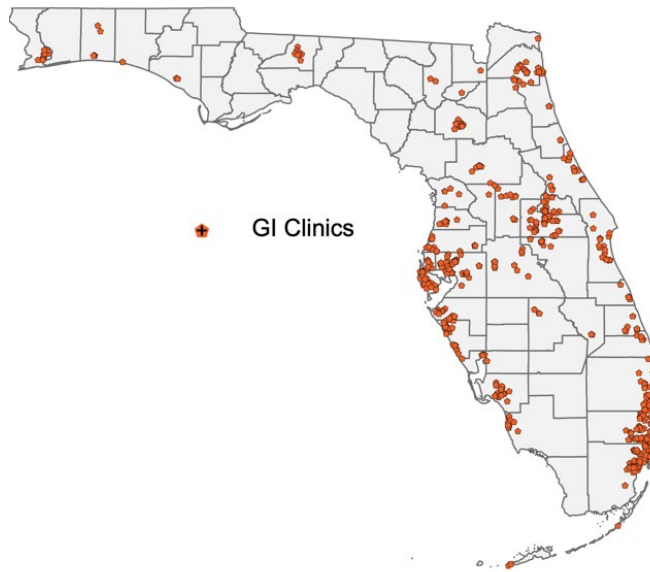**Figure 5.** Rural vs. Urban Biologic Use by Race/Ethnicity

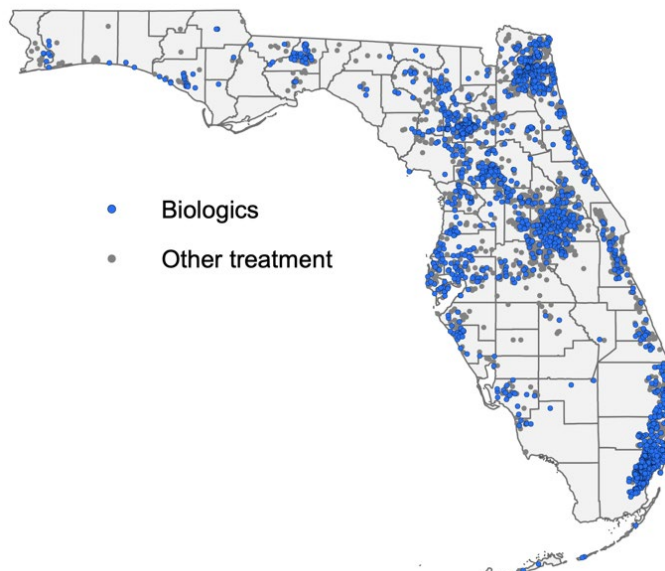**Figure 6A.** Location of Gastroenterology Clinics in Florida

Figure 6B. Location of Patients with IBD Receiving Biologics
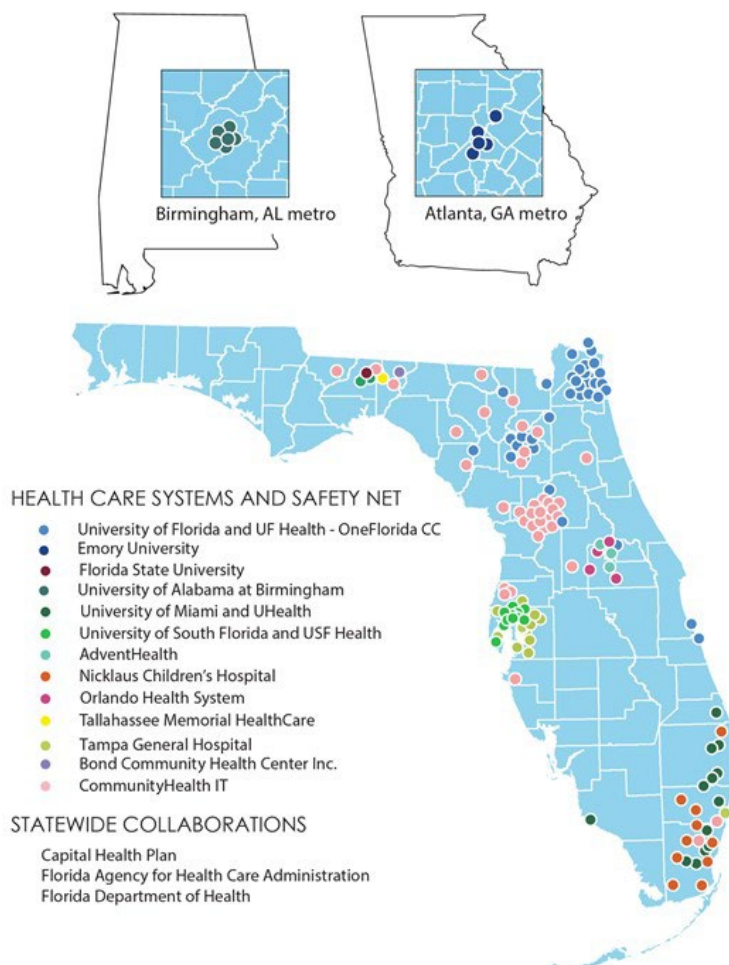in Florida

Figure 7. OneFlorida Network (Hogan et al., 2022)

Discussion

This large retrospective analysis of 10,578 patients with IBD within the OneFlorida Clinical Research Consortium highlighted two vulnerable populations, adolescent and young adult (AYA) and Hispanic patients.

This study found increased steroid use among adolescents and young adults with IBD, significantly greater than the pediatric and older adult groups. While UC and CD had no differences in steroid use overall (Table 8), when accounting for age, steroid use was more likely among AYA compared to older adults with UC but not with CD (Table 1.2). There are several possibilities for this disease-specific variation in steroid use. AYA patients with UC may present with more severe symptoms or rapid progression, which could require steroids. Alternatively, differences in disease perception may contribute to difficulties with medication compliance. The increasing incidence of IBD among pediatric and college-aged patients presents several barriers to managing their disease. Studies have shown decreased medication adherence rates (Ingerski et al., 2010), lack of developmental maturity (Paine et al., 2014), and psychosocial challenges as obstacles to effective transition to adult IBD care. Previous work has also shown that patients with IBD do not adjust to college as well as healthy students, affecting their perception of academics and health-related quality of life (Almadani et al., 2014). These findings show that AYA patients may have lapses in physical and psychological care, which could contribute to poor disease supervision and gender-specific outcomes.

In this analysis, biologic use was more likely among patients with CD than those with UC (Table 8). While this finding was not significant when accounting for disease variation among the different races and ethnicities, this study is among the first to show increased use of biologics among the Hispanic population overall, contrary to a smaller study that found decreased use among Hispanics in Florida (Damas et al., 2013). Although IBD has traditionally been believed to affect NHW patients at a higher rate, recent work from UCLA, with both clinical and histopathological confirmation, has shown that Hispanics and NHW have comparable prevalence and incidence of IBD and no difference in Montreal classification, pharmacotherapy, or IBD-related surgery (Zhornitskiy et al., 2021). Although Hispanics are commonly considered an underserved population in healthcare, our positive findings for biologic use among Hispanics

may be unique to this Florida-based study or represent improved care over time. Fewer markers of disease activity (CRP, albumin, hemoglobin, WBC) and fewer hospitalizations among Hispanics compared to NHW support our finding of increased biologic use. One possibility for increased biologic use among Floridian Hispanics is that this growing population has enabled a newer generation of providers that are increasingly aware of the needs facing this often overlooked group.

Although results of this study show increased use of biologics among Hispanics and decreased use for non-Hispanic Blacks (compared to NHW), geographic analysis revealed that biologic use is highly variable across Florida for all races and ethnicities. The clustering of Hispanics within urban areas (Figure 5) may allow for increased access to providers and improved care, as many academic health centers and IBD centers of excellence are centrally located in cities. However, our finding of low biologic use in central Florida questions this argument's validity. Orange County, which includes the city of Orlando, contains one of the highest densities of gastroenterology clinics in the state of Florida (Figure 6A) and a large IBD patient population (Figure 6B), so it is unlikely that inaccess to providers is contributing to low biologic use.

This study has several strengths. The large cohort assessed in this OneFlorida study ensures that meaningful healthcare utilization trends are captured, strengthening the power and generalizability of the findings to the broader IBD population. Further, the employment of electronic health records (EHR) and linked claims data through the OneFlorida Data Trust, currently housing data for more than 15 million patients, allows for the inclusion of a demographically diverse and representative IBD population. The study findings fill critical knowledge gaps for racial/ethnic minorities with IBD, and this analysis is among the first to report geographic variability of biologic use at the county level. Moreover, the assessment of clinically relevant disease severity markers, which are not available in claims databases, enhances the robustness of our healthcare utilization findings.

Limitations exist in this retrospective study. The OneFlorida Data Trust contains integrated data from January 2012 onwards (Hogan et al., 2022). Our study purposefully spanned 2012-2020 to maximize eligible patients but did not consider changes in IBD management guidelines or practice patterns over time, a potential source of confounding bias. Moreover, the

retrospective study design of this analysis is a limitation since there is an inherent inability to control patient exposure or interventions. As a result, a causal relationship cannot be established between variables. Similarly, using electronic health records for participant selection may be a source of selection bias, as some patients are over or underrepresented in the OneFlorida Data Trust. Although the OneFlorida network has many institutional and local partners that report data (Figure 7), the lack of a large academic healthcare center in central Florida may contribute to lower reporting of EHR data, including biologic use, for Hispanics. Hence, a limitation of this study is that data from patients who receive care at an institution not affiliated with OneFlorida may not be collected in this analysis. Lastly, Florida is home to the third largest Hispanic population in the country, and our findings may not be able to extrapolate to other Hispanic-rich regions of the United States. Further studies should assess Hispanic subgroups, patient origin, and immigration status to specify differences in healthcare utilization, disease severity, and outcomes.

Conclusion

Inflammatory Bowel Disease poses a significant disease burden on patients and health systems. Although treatment of IBD has improved, vulnerable populations remain susceptible to disparities in healthcare utilization and access to care. Importantly, this large retrospective study of 10,578 patients with IBD using the OneFlorida Clinical Research Consortium finds that AYA patients ages 17-25 have significantly greater steroid use than both their younger and older counterparts. Overall, patients with Crohn's Disease have more hospitalizations and prescriptions for narcotics, antidepressants, and biologic agents compared to ulcerative colitis. Contrary to prior literature, Hispanic patients have significantly more biologic use than non-Hispanic White patients, and this unexpected finding is also associated with decreased markers of disease activity and fewer hospitalizations. On the other hand, non-Hispanic Black patients use more steroids than NHW patients and are more likely to be hospitalized. Despite these overall trends for race and ethnicity, biologic use is highly variable across Florida and may not be solely an access to care issue. These findings affirm the need for age-specific, geographically conscious, and racially/ethnically inclusive patient education for IBD. Furthermore, patients within the 17-25 age group may benefit from a streamlined care intervention that connects them with evidence-based resources and healthcare providers.

Acknowledgments

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