

## Background

Inflammatory bowel disease (IBD), including Crohn's disease (CD) and ulcerative colitis (UC), is a relapsing and unremitting chronic condition resulting in substantial healthcare resource consumption. Research suggests that the long-term use of biologic agents in the treatment of IBD results in decreased healthcare spending.<sup>1</sup> While most patients (pts) can be adequately managed as an outpatient by their primary gastroenterologist, some IBD pts may seek emergent or inpatient care for acute conditions, either related or unrelated to their underlying disease. Without proper management or redirection to their physician office site of care, this can result in excessive utilization of healthcare resources, unnecessary medication use, and additional costs to the healthcare system.

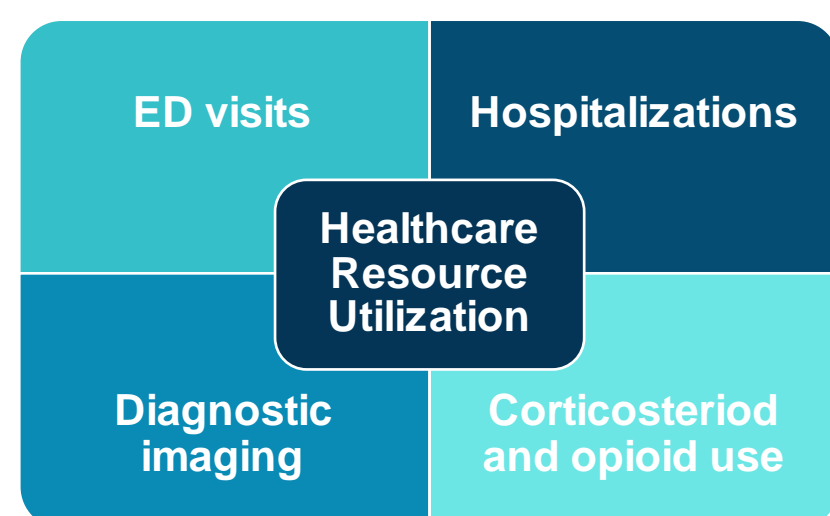
## Aim

To quantify the utilization of healthcare resources in IBD pts treated with vedolizumab (VDZ) or infliximab (IFX) in a large gastroenterology (GI) practice.

## Methods

A retrospective chart review was conducted of IBD patients treated continuously for 2 years (yrs) with VDZ or IFX in a GI office setting between July 2015 and Dec 2017. This cohort with available data was then evaluated for use of healthcare resources.

- Healthcare resources utilization was defined by use of any or all of the following factors:



- Data collection included demographics, clinical characteristics, frequency of emergency department (ED) visits, and hospitalizations (hosp). For patients admitted to the ED and/or hospital, additional parameters evaluated included diagnostic imaging studies, use of corticosteroids, and use of opioids.
- Rates are expressed as events per encounters and events per 100 pt-yrs.
- Costs per ED visit and hosp expenditures were determined using the 2013-2015 Medical Expenditures Panel Survey. Costs for diagnostic imaging were determined using the CMS Physician Fee Schedule.
- Corticosteroid and opioid use were captured with descriptive statistics.

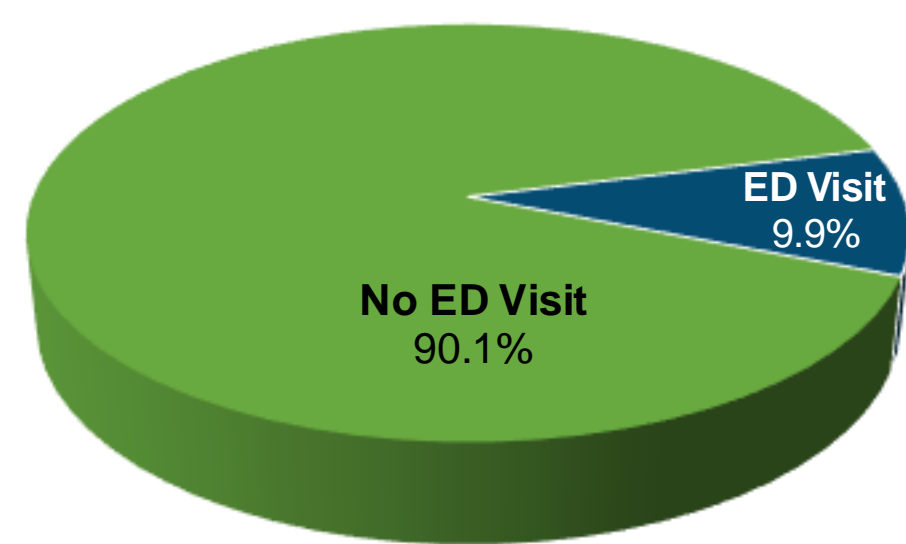
## Study Population

### Demographics and Baseline Characteristics

Characteristics	Total (n=242)
<b>Gender, n (%)</b>	
Male	128 (53)
<b>Age</b>	
Mean yrs (range)	38 (2-80)
<b>IBD Diagnosis, n (%)</b>	
Crohn's Disease (CD)	172 (71)
Ulcerative Colitis (UC)	70 (29)
<b>Disease Characteristics, n (%)</b>	
Fistulizing CD	25 (10)
<b>Duration of Disease</b>	
Median years (IQR)	7.1 (2.8-13.5)
<b>Biologic Agent, n (%)</b>	
Vedolizumab (VDZ)	208 (86)
Infliximab (IFX)	34 (14)

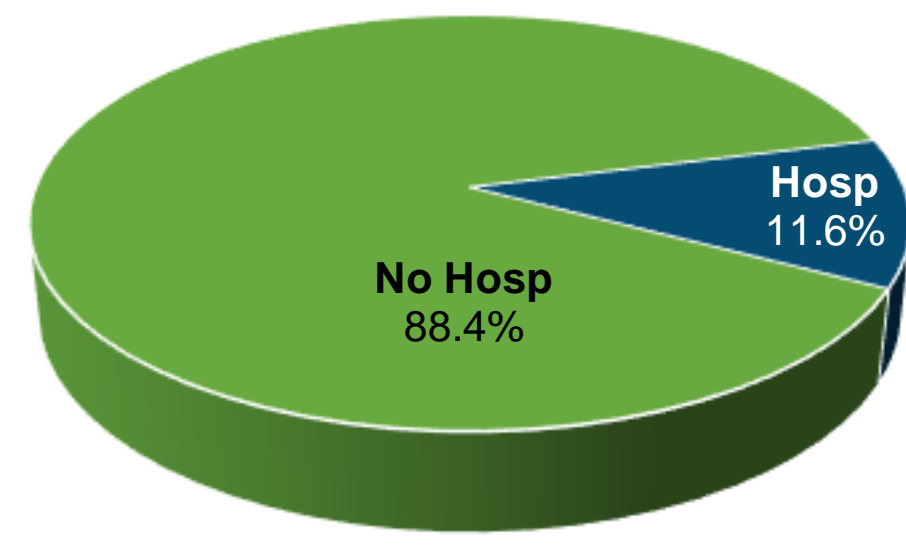
## ED Visits and Hospitalizations

### Utilization of the ED



- 24 visits to the ED in 14 pts accounted for a 2-year utilization rate of 9.9% and 4.9 ED visits per 100 pt-yrs. Of these, 83% were IBD-related.
- 5 pts had multiple visits to the ED, with 2 pts with 4 visits each.
- Incidence of ED visits was similar between IFX and VDZ, with 10% and 9% of pts, respectively.

### Utilization of Inpatient Hospitalization



- 28 hospitalizations in 19 pts accounted for a 2-year utilization rate of 11.6% and 5.8 hosp per 100 person-yrs. Of these, 86% were IBD-related.
- 2% of all pts had more than one hospitalization.
- Incidence of hospitalizations was similar between IFX and VDZ, with 11% and 15% of pts, respectively.

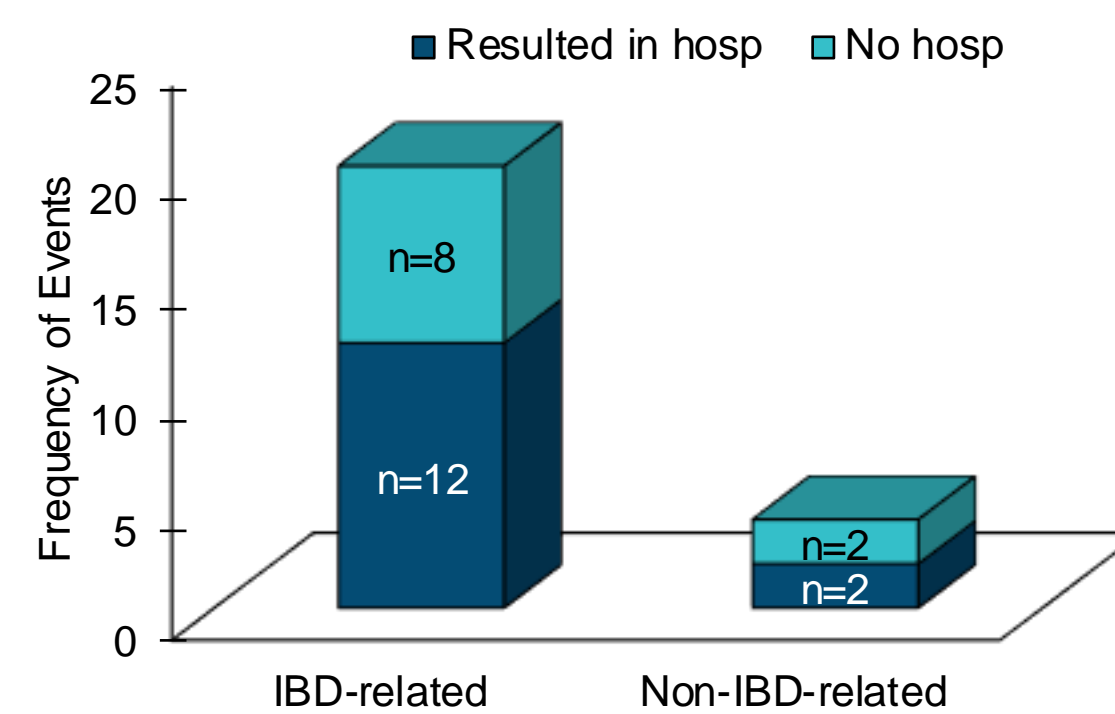
### ED/Hosp Diagnostic and Medication Use

Healthcare Resources	ED Visit (n=24)	Hosp Visit (n=28)	Total (n=52)
	Frequency (Percent)		
<b>Diagnostic Imaging Work-Up</b>			
CT scan	12 (50%)	6 (21%)	18 (35%)
Endoscopy	-	8 (29%)	8 (15%)
MRI	1 (4%)	2 (7%)	3 (6%)
Ultrasound	2 (8%)	1 (4%)	3 (6%)
X-ray	2 (8%)	2 (7%)	4 (8%)
<b>IBD-Specific Medication Use</b>			
<i>Corticosteroid</i>			
IV	3 (12%)	4 (14%)	7 (13%)
PO	-	1 (4%)	1 (2%)
Discharge on PO steroid	1 (4%)	4 (14%)	5 (10%)
<i>Opioid</i>			
IV	5 (21%)	4 (14%)	9 (17%)
PO	1 (4%)	3 (11%)	4 (8%)
Discharge on PO opioid	-	2 (7%)	2 (4%)

Abbreviations: CT: computed tomography; ED: emergency department; Hosp: hospitalization; IBD: inflammatory bowel disease; IV: intravenous; MRI: magnetic resonance imaging; PO: oral.

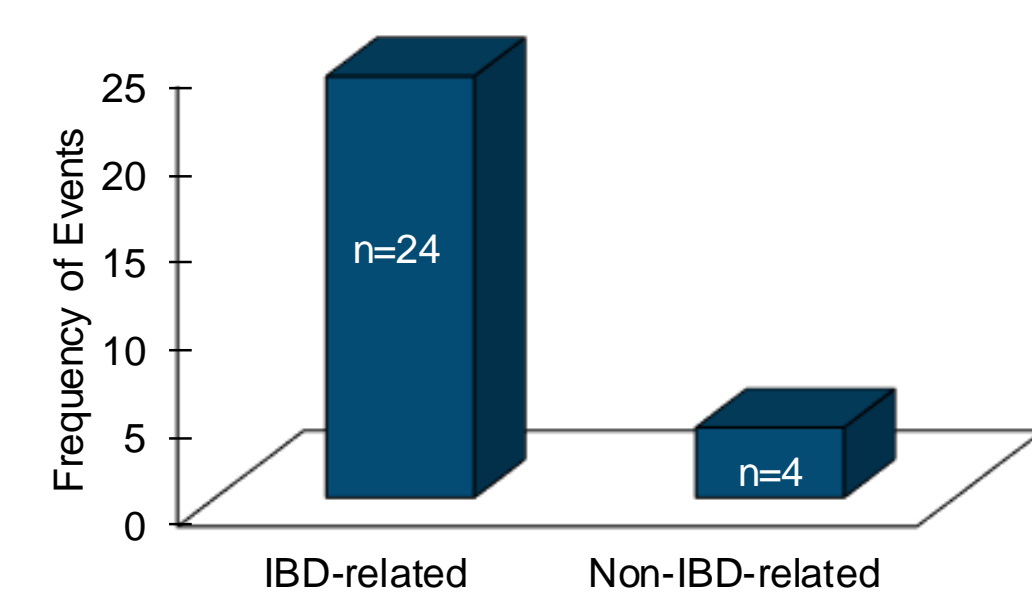
- Diagnostics were performed overall in 36 pts (69%) admitted to either the ED or hosp.

### IBD-Related ED Visits



- IBD-related ED visits were for GI related symptoms (70%), serious disease complications (20%) and obstruction (10%).
- 58% of ED visits resulted in an hospitalization.

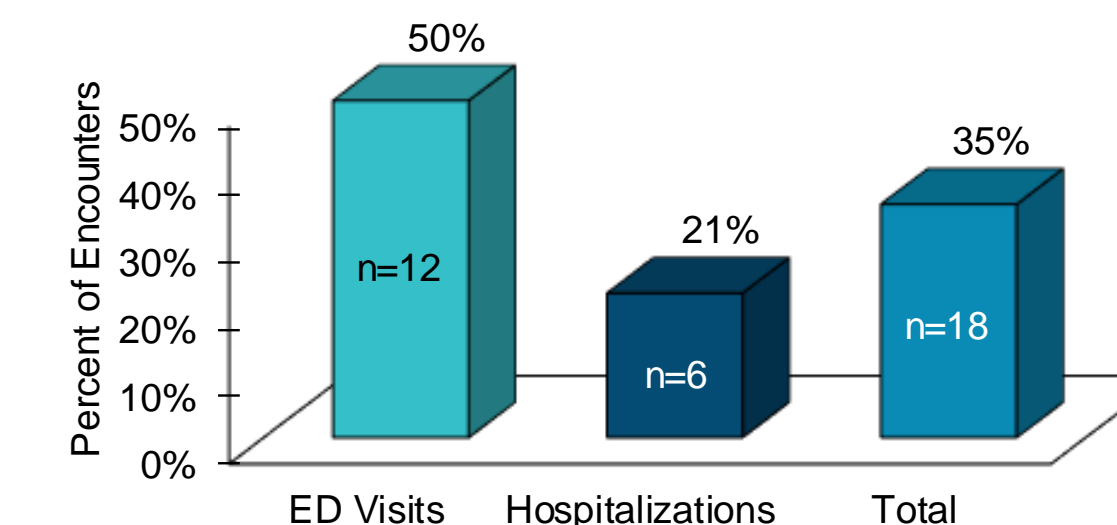
### IBD-Related Hospitalizations



- 82% of hospitalizations were IBD-related, for GI related symptoms (37%), serious disease complications (46%) and obstruction (17%).

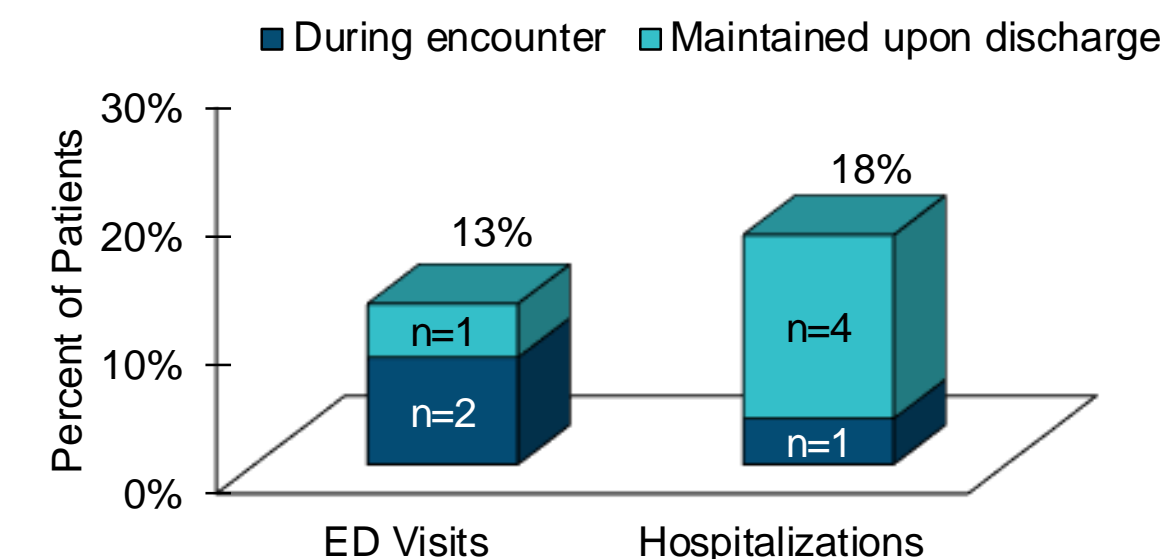
## Healthcare Resource Utilization

### CT Scans



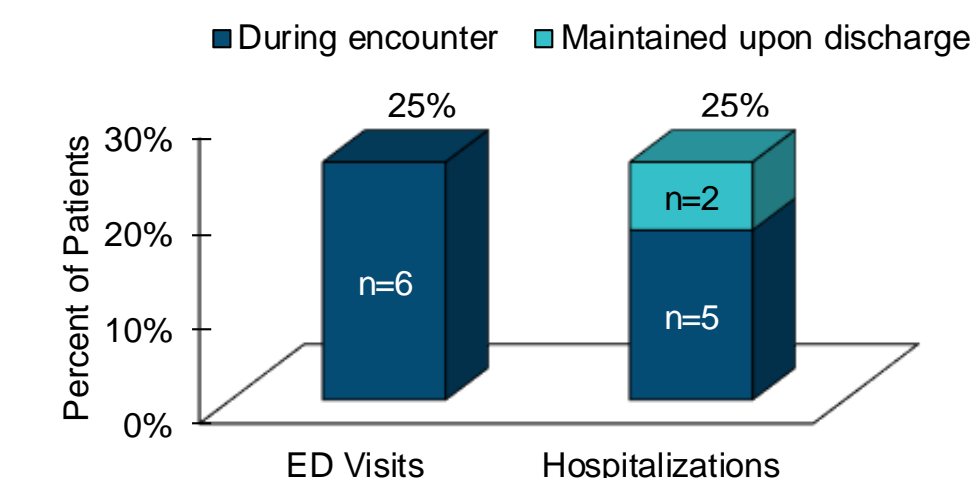
- CT scans were performed during 35% of ED visits and hosp, with the majority of scans (67%) conducted in the ED.
- 3/18 CT scans (17%) were unrelated to IBD, 1 in the ED and 1 in the hosp.

### Corticosteroid Use



- Corticosteroids were initiated in 15% of pts in the ED or hosp. Additionally, 5 pts were discharged on maintenance corticosteroids.

### Opioid Use



- Opioids were administered in 25% of pts in the ED or hosp and 2/52 (4%) were discharged on opioids.

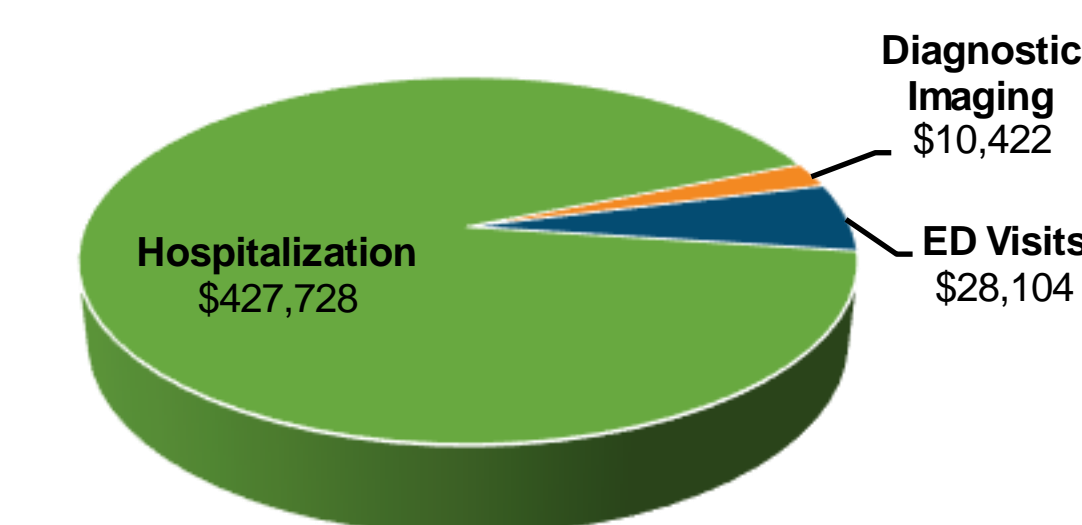
### Healthcare Resource Costs

Healthcare Resources	Frequency of Utilization	Cost per Visit/ Procedure*	Total Cost Per Resource
<b>ED Visits</b>			
All-cause ED visit	24	\$ 1,171	\$ 28,104
<b>Hospitalizations</b>			
All-cause hospitalization	28	\$ 15,276	\$ 427,728
<b>Diagnostic Imaging</b>			
CT scans	18	\$ 393	\$ 7,072
Endoscopies	8	\$ 147	\$ 1,175
MRIs	3	\$ 569	\$ 1,707
Ultrasounds	3	\$ 156	\$ 468
X-rays	4	-	-
Total diagnostic imaging work-ups	36	-	\$ 10,422
<b>Overall Total</b>	-	-	<b>\$ 466,254</b>

\*All-cause hospitalization and ED visit costs were obtained from Medical Expenditures Panel Survey (MEPS), 2013-2015; diagnostic cost obtained from CMS Physician Fee Schedule, inpatient rate.

- \$465,468 (99.8%) of cost were incurred during IBD-related visits.

### Total Healthcare Resource Utilization Cost



- The total healthcare resource utilization cost incurred over 2 yrs from ED visits, hospitalizations, and diagnostic imaging was \$466,254, equating to over \$20,000 per pt.
- 92% of the total healthcare resource utilization costs were from hospitalizations.

## Discussion

- The ED utilization rate with IFX and VDZ-treated pts was 4.9 per 100 pt-years in our study, lower than previously reported ED utilization rates in IBD patients.<sup>2,3</sup>
- The hospitalization rate was 5.8 per 100 pt-years in our study, also lower than other reports.<sup>2,3</sup>
- Although the study population included only those receiving IFX and VDZ for IBD, differing from published reports, the observed reductions in ED visits and hospitalizations may be reflective of a relatively stable IBD population generally well managed by gastroenterologists on a biologic agent.<sup>1-3</sup>
- Corticosteroids were administered in 18% of all hospital admissions, which then led to 14% discharged on corticosteroids.
- Opioids were given to 25% of pts, with 4% discharged home on opioids.
- Surprisingly, half of all ED visits resulted in a CT scan. This number is higher than expected if the patient had been referred to their primary GI physician for care and may be indicative of over-use of CT scans.
- Healthcare resource utilization costs over the 2 year study period were almost a half million dollars for only 22 pts, accounting for a mean cost of \$21,193 per pt.
- Timely referral of patients back to their GI physician with avoidance of unnecessary diagnostics and drug use can limit unnecessary healthcare resource utilization.

## Conclusion

- IBD pts who seek care from the ED and hospital may result in unnecessary healthcare expenditures.
- Most ED visits and hospitalizations resulted in a form of diagnostic imaging, with CT scan being the most frequent. Use of corticosteroids and opioids were also notable.
- In GI office-managed IBD, triage of care should be provided back to the physician site of care for optimal outcomes and minimal use of healthcare resources.

## References

- David G et al. J Med Econ, 18(2): 137-144, 2015
- Cohen R et al. J Med Econ, 18(6): 447-456, 2015
- Kappelman MD et al. Inflamm Bowel Dis. 17 (1): 62-68, 2011