Utilization of Diagnostic Testing and Indications for Long-Term Twice-Daily Proton Pump Inhibitor (PPI) Therapy for Gastroesophageal Reflux Disease (GERD) in a Large Healthcare System

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BACKGROUND

PPIs are frequently prescribed in clinical settings where benefits may be uncertain. For typical GERD symptoms in the absence of alarm symptoms, current ACG guidelines recommend an 8-week trial of PPI followed by de-prescribing efforts if symptom amelioration is successful, or objective diagnostic testing with upper endoscopy (EGD), possibly followed by esophageal physiologic testing, if symptoms persist. In the absence of objective diagnostic findings on EGD or reflux monitoring, efforts should be made to de-prescribe and de-escalate therapy.

AIMS

- Assess the **utilization of diagnostic testing** (EGD and/or reflux monitoring) among patients with GERD diagnoses who received prescriptions for long-term twice-daily PPI therapy.
- Assess the **diagnostic yield of available endoscopic testing** in patients with GERD on long-term twice-daily PPI therapy, in particular the presence of documented long-term evidence-based indications (such as erosive esophagitis, esophageal ulcers, peptic stricture, Barrett's esophagus, or eosinophilic esophagitis) for PPI therapy.
- Utilize the findings to **inform and implement quality improvement initiatives** to improve care delivery within the healthcare system.

METHODS

Patients were identified within Duke University Health System using the DEDUCE® web-based data query tool.

Inclusion Criteria:

- Adults ≥18 years old
- An ICD diagnosis of GERD
- Office evaluation in the ambulatory setting between 6/2018 – 6/2021
- Receipt of long-term twice daily PPI therapy, defined as ≥90 days of therapy
- Using DEDUCE, CPT codes for upper endoscopy and reflux monitoring were used to determine receipt of these testing modalities within the DUHS from ~2013 onwards.

Patient data collected from Provation endoscopy reporting software from 2013-2021

- Included patients with documented upper endoscopic evaluations.
- Patient medical record identification cross-referenced with patients who had CPT codes for upper endoscopy from DEDUCE ® cohort
- Collected findings from endoscopy suggestive of need for long-term PPI therapy (eosinophilic esophagitis, reflux esophagitis, Barrett's esophagus, peptic stricture, and esophageal ulcer) and reported in an aggregate manner.

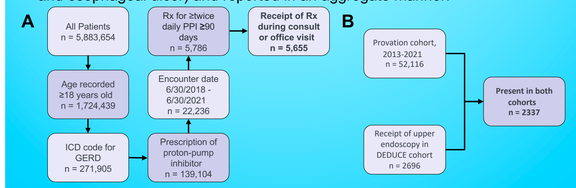
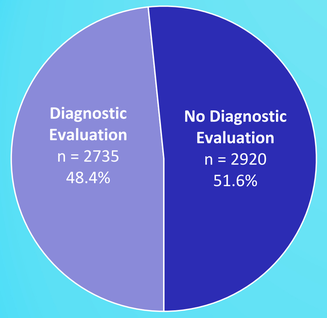


Figure 1. Cohort Selection Diagram for A) DEDUCE Cohort for Diagnostic Evaluation and B) Provation Cohort for Endoscopic Findings Potentially Warranting Long-Term PPI Therapy.

RESULTS

Figure 2. Receipt of Diagnostic Testing for GERD in Long-Term, High-Dose PPI Users



Type of testing received	n (%)
Upper endoscopy	2696 (47.7%)
Reflux monitoring	491 (8.7%)
Both modalities	452 (8.0%)

Table 1. Breakdown of Diagnostic Testing Modalities Received by Patients with GERD Prescribed Long-Term Twice-Daily PPI Therapy Who Underwent Diagnostic Evaluation.

	Diagnostic Evaluation (n = 2735)	No Diagnostic Evaluation (n = 2920)	p-values
Age (years)	57.1±0.3	58.3±0.3	0.005*
Body Mass Index (BMI)	31.0±0.1	31.6±0.2	0.006*
Gender (female)	1898 (69.4%)	1916 (65.6%)	0.002*
Race *(missing = 97)*			
White	1681 (62.4%)	1998 (69.8%)	<0.001*
Black	838 (31.1%)	672 (23.5%)	
Asian	62 (2.3%)	77 (2.7%)	
Other	115 (4.3%)	115 (4.0%)	
Ethnicity *(missing =109)*			
Non-Hispanic	2505 (93.1%)	2663 (93.3%)	0.71
Hispanic or Latino	187 (7.0%)	191 (6.7%)	
Marital Status *(missing =58)*			
Married	1526 (56.2%)	1658 (57.5%)	0.32
Not Married	1189 (43.8%)	1224 (42.5%)	
Smoking Status *(missing = 5)*			
Current	279 (10.2%)	390 (13.4%)	<0.001*
Former	974 (35.6%)	945 (32.4%)	
Never	1481 (54.2%)	1581 (54.2%)	

Table 2. Demographics of Patients Who Underwent Diagnostic Evaluation (with EGD and/or Reflux Monitoring) compared to Patients who did not undergo Diagnostic Evaluation .

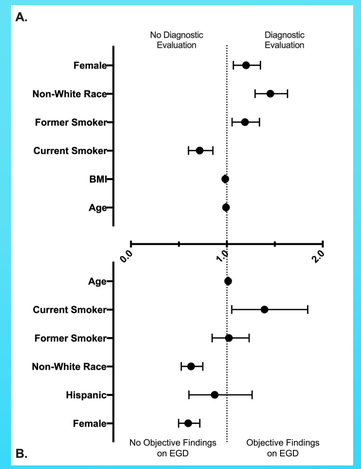
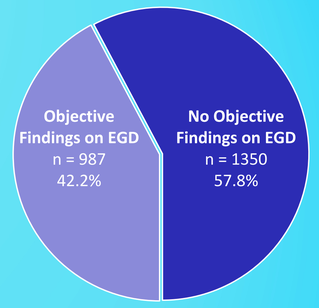


Figure 4. Forest Plots for Multivariate Analysis of Factors Associated with A) Diagnostic Evaluation (EGD and/or Reflux Monitoring) Among Patients with GERD Prescribed Twice-Daily Long-Term PPI Therapy; and B) Objective Endoscopic Findings Potentially Warranting Long-Term PPI Therapy. Odds ratios are depicted with bars representing associated 95% Confidence intervals; values not crossing the dashed line at 1 are significant.

Figure 3. Objective Indications for Long-Term PPI Use Based on Upper Endoscopy Reports



	Objective Findings on EGD (n = 987)	No Objective Findings on EGD (n = 1350)	p-values
Age (years)	58.6±0.5	55.7±0.4	<0.001*
BMI	30.8±0.2	31.2±0.2	0.30
Gender (female)	607 (61.5%)	1002 (74.2%)	<0.001*
Race *(missing = 35)*			
White	673 (68.7%)	749 (56.6%)	<0.001*
Black	255 (26.1%)	470 (35.5%)	
Asian	16 (1.6%)	40 (3.0%)	
Other	35 (3.6%)	64 (4.8%)	
Ethnicity *(missing =39)*			
Non-Hispanic	922 (94.8%)	1219 (92.0%)	0.01*
Hispanic or Latino	51 (5.2%)	106 (8.0%)	
Marital Status *(missing =16)*			
Married	565 (57.6%)	729 (54.4%)	0.13
Not Married	416 (42.4%)	611 (45.6%)	
Smoking Status *(missing = 0)*			
Current	124 (12.6%)	131 (9.70%)	0.009*
Former	371 (37.6%)	467 (34.6%)	
Never	492 (49.9%)	752 (55.7%)	

Table 3. Demographics of Patients with EGD Findings to Potentially Warrant Long-term PPI Use Compared to Patients without EGD Findings.

CONCLUSIONS

- Among patients diagnosed with GERD prescribed long-term PPI therapy, **only 48%** had documented objective diagnostic testing.
- In those with GERD who underwent EGD with endoscopic findings available, **42%** had endoscopic indications for long-term PPI therapy.
- Demographics associated with increased odds of undergoing diagnostic evaluation (female sex, non-white race) were not associated with a higher odds of having objective EGD findings warranting long-term PPI therapy.

FUTURE DIRECTIONS

- Root cause analysis (fishbone diagram below) to help understand system-based issues and potential areas for quality improvement.
- Partnering with ambulatory care clinics to engage relevant stakeholders in quality improvement initiatives.
- Current PDSA cycle ideas being developed or considered:
  - Provider education with development of de-prescribing algorithms
  - Development of triage nursing refill protocols for long-term, high-intensity PPI therapy to trigger decision-making
  - E-consult for gastroenterology action team for GERD

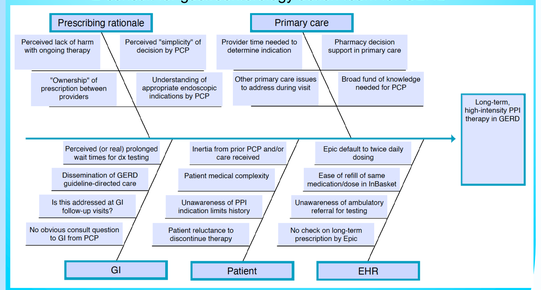


Figure 4. Fishbone (Ishikawa) Diagram Evaluating Possible Causes and Areas to Intervene to Reduce Inappropriate Use of High-Intensity PPI Therapy in Patients with GERD.

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