

Determining the Cost and Prescribing Patterns Associated with the Appropriate Use of Proton Pump Inhibitors (PPIs) in an Outpatient Medical Center

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Background

Proton pump inhibitors (PPIs) are one of the most widely used class of medications for stomach acid suppression therapy, resulting in an estimated \$13 billion in global sales. PPIs are used to manage or prevent a variety of gastrointestinal disease, including gastroesophageal reflux disease (GERD), dyspepsia, reflux esophagitis, peptic ulcer disease, hypersecretory conditions (Zollinger-Ellison syndrome), H. pylori, and ulcers. Although PPIs are well-tolerated and have been shown to be more efficacious compared to other acid suppression therapies like histamine receptor-2 antagonist (H2RA), long-term use of PPIs have been associated with increased risk of infection like pneumonia and C. difficile, nutritional and vitamin deficiencies like Vitamin B-12, magnesium, and calcium, and osteoporosis. There are few clinical guidelines that address appropriate use and length of treatment therapy, which can lead to over utilization and adverse events associated with long-term use.

Currently, there are few studies that examine the cost and utilization of PPIs in an ambulatory outpatient care setting.

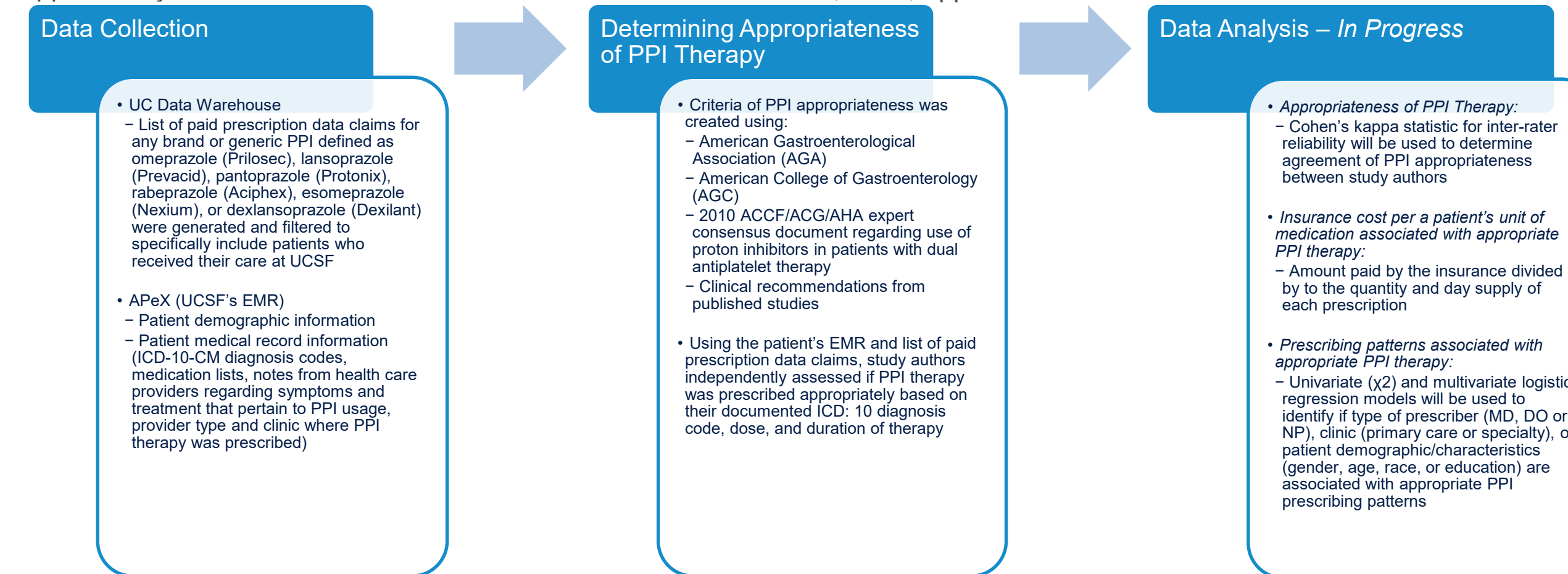
In addition, health plan payers have strong incentives to understand the cost associated with the appropriate use of PPIs to ensure safe and cost-effective health care services.

Objectives:

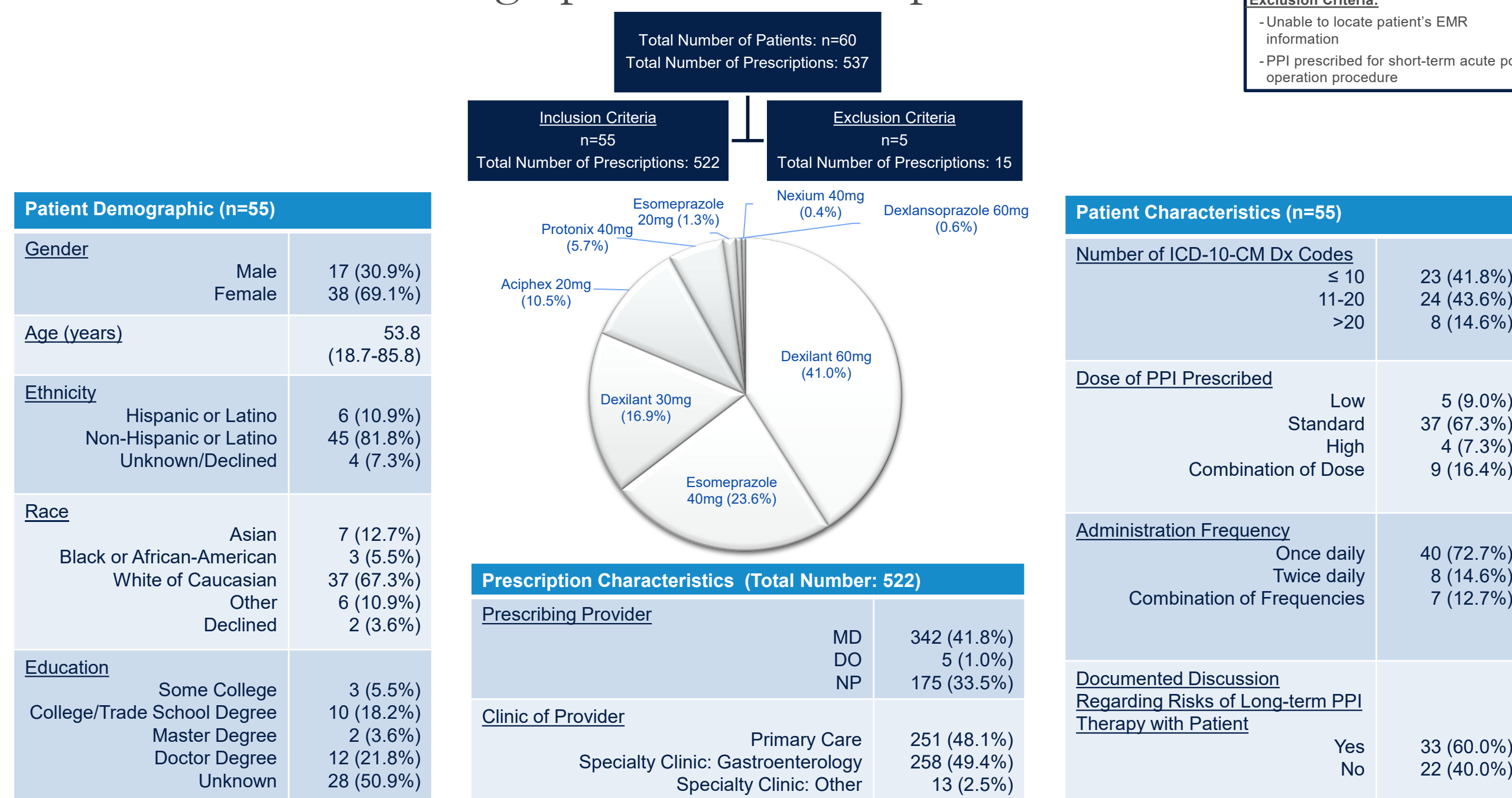
- Primary Outcome:** To determine the prescription cost and prescribing patterns associated with the appropriate use of proton pump inhibitors in the UCSF outpatient medical center.
- Secondary Outcome:** To determine if patient demographics such as gender, age, ethnicity, race, education or patient characteristics such as total number of ICD-10-CM diagnosis codes are associated with appropriate prescribing practices of proton pump inhibitors in the UCSF outpatient medical center.
- Hypothesis:** There is overutilization of PPIs in this ambulatory care population and a large proportion of PPI therapy prescribed do not have a clear indication of usage, dose of PPI prescribed is higher than indicated, and duration of PPI therapy is longer than clinically recommended.

Methods

A retrospective data analysis of University of California, San Francisco's (UCSF) outpatient self-funded payer plans from January 1st, 2015 – December 31st, 2019 was collected and matched to the patient's electronic medical record (EMR). This study was approved by the UCSF Institutional Review Board on November 20th, 2019, approval #19-28543.



Baseline Patient Demographics and Prescription Data



Appropriateness of PPI Therapy Assessment Questions

Based on patient's EMR and prescription claims information, study investigators individually assessed for each patient:

- Does the patient have an appropriate documented indication for PPI use?
- Is the dose of PPI appropriate for the patient?
- Is the duration of PPI prescribed appropriate for the patient?

Study Strengths

Most studies solely examine cost or appropriateness of PPIs and utilize EMR generated PPI prescribing orders which does not accurately reflect if a patient receives the prescription medication at the pharmacy. Due to limited availability and access of prescription claim data bases, many studies incorporate the use of wholesale drug cost or pharmacy cash price to evaluate cost. This study is unique because it incorporates true health care dollars spent by insurance payers on cost of prescription medication that is appropriately prescribed.

Study Limitations

A key limitation of this study is utilizing retrospective EMR data to determine if PPI therapies were appropriately prescribed. Misclassification can occur due to incomplete medical record notes, missing documentation including undocumented verbal conversations regarding PPI therapy, time lapse in patient care due to change of insurance coverage or receiving care in a different health setting that is not incorporated to the EMR database that this study had access to. This can lead to underestimating the number of appropriate PPIs that were prescribed.

Research Application

This information from this study can help health plan payers and health institutions:

- Identify target areas to evaluate how PPIs are prescribed in a health care setting
- Establish prescribing guidelines to provide cost-efficient and safe health care practices for its patients