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Background: There is a paucity of information on the trends in healthcare utilization and costs of epileptic patients over changes in age.

Objectives: The study aimed to describe the healthcare utilization trends and cost of illness for epilepsy in ages 0–90 years

Methods: Medicaid Analytic eXtract (MAX) data from 29 states, Marketscan Commercial Claims and Marketscan Medicare claims, from 2008 to 2010 were utilized for this study. MAX data for patients were limited to patients aged 0–18 years. Due to data heterogeneity, we implemented different inclusion and exclusion criteria. We used only claims data for Medicaid and utilized both claims and encounter data for Marketscan. We identified epileptics as those with two ICD9 codes for epilepsy 30 days apart but within 180 days. For the primary analysis, we calculated total costs attributable to epilepsy (TEC), percentage contribution of epilepsy related inpatient (IPP), outpatient (OTP), and prescription costs (RXP) to overall epilepsy costs, and percentage contribution of epilepsy-related costs to overall healthcare costs (ECP). All costs were adjusted to 2010 dollars using healthcare inflation. Additional sensitivity analysis was also conducted using epilepsy subtypes.

Results: We examined healthcare records for 452 354 epilepsy patients (202 550 from Medicaid, 227 515 from Marketscan commercial, and 22 273 from Marketscan Medicare). For ages 0–18 years, we found similar cost trends between Medicaid and Marketscan, except in ECP. ECP costs were lower in Medicaid compared with Marketscan, implying Medicaid recipients have more comorbid conditions. ECP was 60% at the beginning of life and consistently decreased as age increased until reaching 32% at the age of 90 years. OTP was consistently around 40% in all the age groups. IPC was highest in the first year of life at 60% but decreased dramatically to a nadir of 12% at the age of 16 years and increased consistently reaching 32% at the age of 90 years. Surprisingly, TEC decreased consistently as the age increased.

Conclusions: We found the healthcare utilization and costs of illness to be strongly related to age. Identification of these trends could lead to better understanding on how patients consume healthcare resources over age.

661. Non-medical Use of Benzodiazepines and Opioids: An Online National Survey in the United Kingdom

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Background: Data on poly-drug use and non-medical use (NMU) of prescription drugs in Europe are limited; this is important given the high prevalence of prescription drug abuse in the United States.

Objectives: The study aimed to report use and NMU of opioids only, benzodiazepines only, and opioids and benzodiazepines (both) in a United Kingdom (UK) national survey.

Methods: An online cross-sectional study was undertaken in July 2014. Respondents were obtained from a panel maintained by a market research company. Those aged 16 years and older living in the UK were eligible. The 2504 respondents reflect the geographical and gender distribution of the UK. Respondents were excluded if they reported use of all illicit drugs in the last 7 days or NMU of all opioids ($n=5$). Lifetime use and NMU of prescription drugs (use without doctor's prescription or for any reason other than recommended by a doctor), illicit drug use, chronic pain (pain lasting at least 3 months that occurs constantly or flares up frequently), and Drug Abuse Screening Test (DAST-10) were analyzed. Chi-square tests and Kruskal–Wallis for statistical differences were performed.

Results: A total of 2499 respondents completed eligible surveys; 1509 (60.4%) reported opioid use only, 31 (1.2%) benzodiazepine use only, and 412 (16.5%) use of both. Of the 979 (39.2%) respondents reporting NMU of an opioid or benzodiazepine, most (94.2%) reported NMU of opioids only. However, 80.7% of those reporting NMU of benzodiazepines also reported NMU of opioids (19.3% reported NMU of benzodiazepines only). Respondents reporting NMU of both had the highest proportion of chronic pain (69.6%, $p=0.0045$) and illicit drug use (71.7%, $p<0.0001$) and the highest median DAST-10 (3.0, $p<0.0001$) compared with the opioids or benzodiazepine groups.

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Conclusions: These data suggest high prevalence of NMU of opioids in the UK, although the prevalence of NMU of benzodiazepines was lower. Amongst those reporting lifetime NMU of benzodiazepines, opioids were often also reported. This study confirmed poly-drug NMU may indicate severe health consequences related to drug abuse. Understanding poly-drug NMU is important to inform interventions.

662. Primary Sclerosing Cholangitis in the UK Clinical Practice Research Datalink (CPRD GOLD)

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Background: Primary sclerosing cholangitis (PSC) is a rare cholestatic liver disease, often associated with inflammatory bowel disease (IBD). Within CPRD GOLD, there is a specific code for PSC, plus codes for other forms of cholangitis.

Objectives: The study aimed to describe the characteristics of patients with PSC in CPRD GOLD.

Methods: Patients with a Read code for PSC in 1988–2013 but without a secondary sclerosing cholangitis diagnosis any time were eligible. We analyzed patient characteristics before PSC diagnosis among those with at least 1-year data before and after the first diagnosis. Abnormal lab values were defined as >3 times upper limit normal [ULN] for liver enzymes and >1.5 times ULN for total bilirubin.

Results: A total of 371 patients (mean age 54 ± 18 years, men 58.2%) were identified with PSC, of whom 9.7%, 3.2%, and 0.5% also had Read codes for cholangitis, sclerosing cholangitis, and other cholangitis diagnosis, respectively. Of these 371 patients, 222 (59.8%) had at least one liver function test recorded. The number of patients tested and the percentage of patients with abnormal results were as follows: alkaline phosphatase (217, 87.1%), alanine transaminase (178, 55.6%), γ-glutamyl transpeptidase (156, 87.2%), aspartate transaminase (69, 42.0%), and total bilirubin (208, 15.9%). IBD (43.7%, mostly ulcerative colitis 37.2%) was the most common medical history, followed by benign neoplasms (12.9%), cancers (5.9%, solid 5.1%), biliary cirrhosis (2.2%), and liver transplantation (1.4%).

Conclusions: The cohort of patients with a PSC diagnosis in CPRD GOLD had high prevalence of abnormal liver function and IBD co-morbidity. Findings from this study will be used to develop future protocols in CPRD GOLD.

663. Mitigating the Paucity-of-data Problem for Target Population Sizing: Exploring a Model-based Approach for Advanced Gastroenteropancreatic Neuroendocrine Tumors

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Background: Epidemiologic data on neuroendocrine gastroenteropancreatic tumors (GEP-NETs) are scarce in the literature. Thus, sizing the target population to support the real-world value of treatments represents a major challenge.

Objectives: The study aimed to develop a model to estimate the number of patients with specific site and type of GEP-NETs over a 5-year horizon. Study population: Two GEP-NET sub-populations were considered: (i) patients with stable/slow progressing well-differentiated GEP-NETs and unresectable locally advanced/metastatic disease and (ii) patients with stable/slow progressing well-differentiated, non-functioning GEP-NETs and unresectable locally advanced/metastatic disease.

Methods: A literature review was conducted to obtain data on incidence, prevalence, and survival of GEP-NETs in Europe. The following strategy was used: (i) crude prevalence and incidence rates for a broader GEP-NET population identified in the literature; (ii) stratification of estimates according to the above sub-populations derived using proportions of GEP-NETs by site and type using clinical data; and (iii) further stratification of epidemiologic data by clinical experts. A target population growth model mapping the population journey throughout the 5-year period was then developed.

Results: For the first sub-population, the predicted total EU patient number is expected to change from 10 411 to 12 136 in the 5-year span, based on a

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