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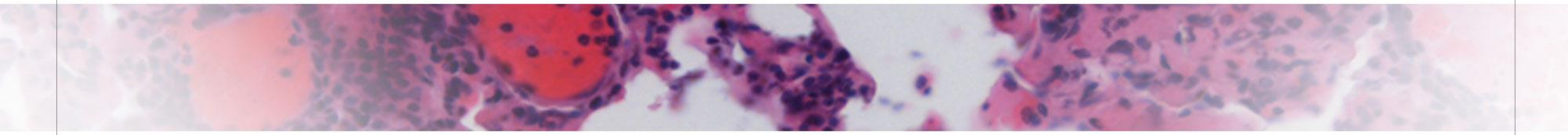

Real-world Bruton Tyrosine Kinase Inhibitor Treatment Patterns, Compliance, Costs, and Hospitalizations in Patients with Mantle Cell Lymphoma in the United States

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Disclosures

- Consulting & Education:
  - Amgen, Pfizer, Novartis, BMS/Celgene/Juno, Kite/Gilead, Precision Biosciences, Jazz, Acrotech, Beigene, Pharmacyclics, Adaptive, Century Therapeutics

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- Steering Committee
  - PeproMene Bio

Introduction

- Mantle cell lymphoma (MCL) is a rare, aggressive, and incurable B-cell malignancy

- MCL patients may initially respond well to frontline treatments; however, most will relapse or become refractory (r/r) to treatment

- While there are real-world data available on the use of ibrutinib, the first Bruton tyrosine kinase inhibitor (BTKi) approved in 2013 for the treatment of r/r MCL, there is limited data on the more recently approved BTKis, acalabrutinib (approved in 2017) and zanubrutinib (approved in late 2019), primarily due to disease rarity and time lag of claims dataset

Objectives

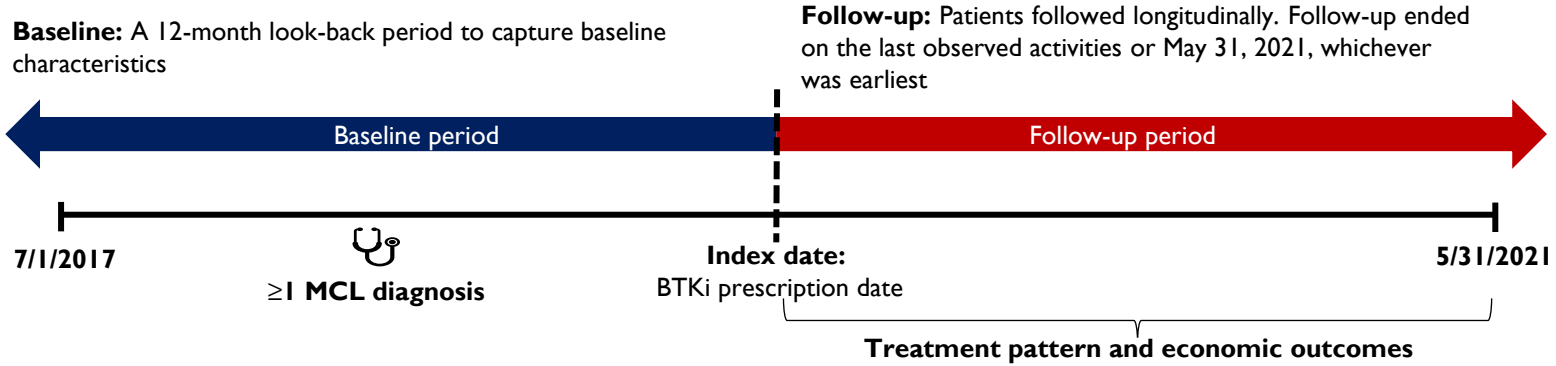
- To examine clinical and sociodemographic characteristics of patients receiving BTKi
- To describe the treatment patterns and compliance by each BTKi
- To assess the costs and hospitalizations associated with each BTKi use in the real-world setting in the United States

Methods

- **Study design:** Retrospective, observational study
- **Data source:** Symphony Health's IDV® (Integrated Dataverse), a de-identified, open-source claims database. IDV captures and aggregates data from different data vendors and assigns a unique patient identifier to each claim through a proprietary patient matching process

- **Study population:**
  - Adult MCL patients ≥1 BTKi prescription claim for 12 months
  - Index date: defined as the use of one of the BTKis of interest: ibrutinib, acalabrutinib, or zanubrutinib

Figure 1. Real-world frequency of risk assessment testing



Methods

- **Treatment cohort:** Patients were stratified into three cohorts based on their index BTKi (ibrutinib, acalabrutinib, and zanubrutinib).
- **Outcomes:**
  - Length of stay
  - Inpatient hospital charges
- **Descriptive analyses:** to examine patient characteristics, treatment patterns, and economic outcomes by each BTKi
- **Treatment pattern:**
  - **Treatment duration:** The total number of days from the first day of a line of therapy to the last drug prescription date, plus days of supply for oral drugs of the therapy
  - **Discontinuation:** Treatment with BTKi was considered as discontinued when there was a gap of >60 days in medication supply
  - **Compliance rate:** the ratio of actual number of days supply over possible number of days supply for each BTKi product

Results: Patient Characteristics

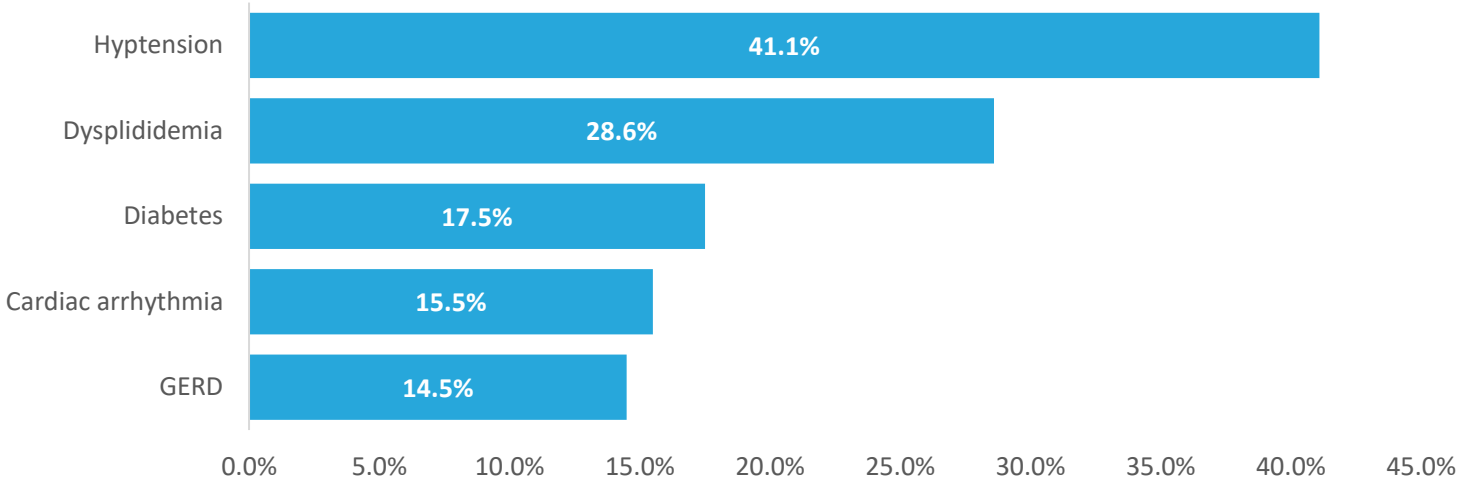
Table 1. Demographic and Clinical Characteristics of MCL Patient Population

	Ibrutinib (N=1,242)	Acalabrutinib (N=485)	Zanubrutinib (N=67)
Age at index, Mean (SD)	71.4 (6.9)	71.6 (7.8)	73.8 (7.1)
Median (IQR)	64(64-74)	68(61-71)	71 (59-71)
Age≥65 years, n (%)	1,033 (83.2%)	398 (82.1%)	59 (88.1%)
Age≥75 years, n (%)	622 (50.1%)	243 (50.1%)	37 (55.2%)
Male, n (%)	917 (73.8%)	363 (74.9%)	45 (67.2%)
White, n (%)	856 (68.9%)	345 (71.1%)	50 (74.6%)
Annual household income distribution, n (%)			
<30k	182 (14.7%)	47 (9.7%)	5 (7.5%)
30K - 49.99K	169 (13.6%)	62 (12.8%)	9 (13.4%)
50K - 74.99K	211 (17.0%)	91 (18.8%)	10 (14.9%)
75K - 99.99K	180 (14.5%)	78 (16.1%)	9 (13.4%)
100K+	290 (23.4%)	127 (26.2%)	23 (34.3%)
Unknown	210 (16.9%)	80 (16.5%)	11 (16.4%)
Education distribution, n (%)			
High school graduate or Lower	270 (21.7%)	93 (19.2%)	12 (17.9%)
College	420 (33.8%)	179 (36.9%)	22 (32.8%)
Associate degree / Bachelor's degree or higher	349 (28.1%)	137 (28.3%)	22 (32.8%)
Unknown	203 (16.3%)	76 (15.7%)	11 (16.4%)

Results: Clinical Characteristics of MCL Patients with BTKi treatment

- The most common comorbidities at BTKi treatment initiation were hypertension (41.1%), followed by dyslipidemia (28.6%), diabetes (17.5%), cardiac arrhythmia (15.6%), and gastroesophageal reflux disease (14.5%)

Figure 2. Baseline Comorbidities of MCL Patient Population with BTKi treatment (Top 5 Comorbidities)

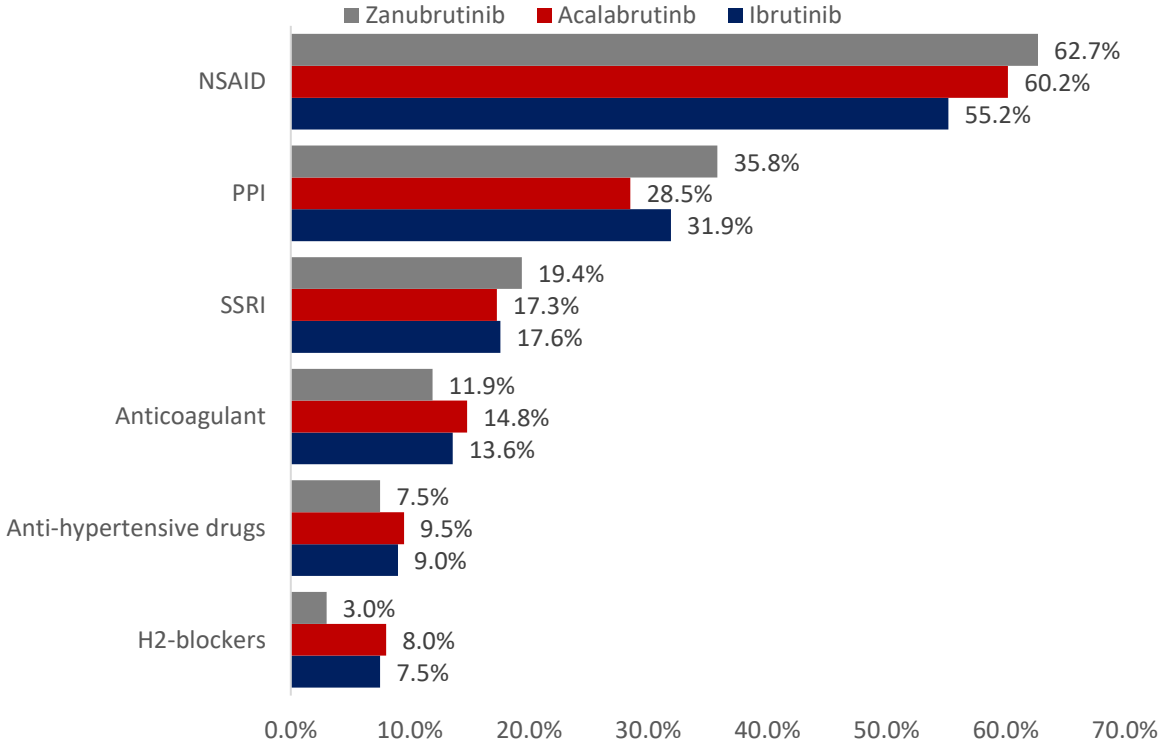


Abbreviation: *GERD, Gastroesophageal reflux disease*

Results: Clinical Characteristics of MCL Patients with BTKi treatment

- NSAID and PPI are the two most common concomitant medications across the three BTKi drugs
- 28.5% of acalabrutinib users were concurrently on PPIs, even though such concomitant use should be avoided

Figure 3. Baseline Concomitant Medication Use among MCL Patient Population by BTKi



Abbreviations: *NSAID, non-steroidal anti-inflammatory drug; PPI, proton pump inhibitor; SSRI, selective serotonin reuptake inhibitor*

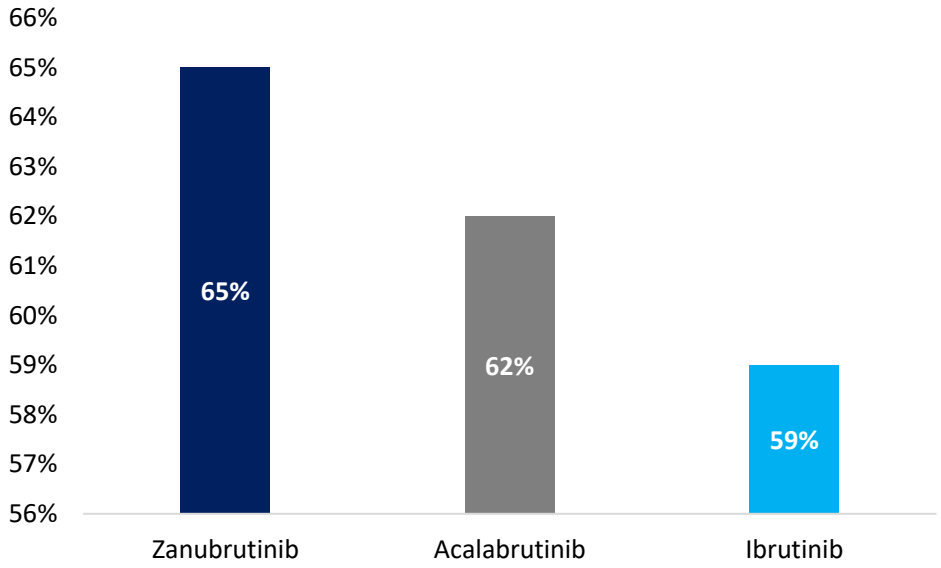
Results: Treatment Patterns – Switching and Line of Therapy

- **Switching**
  - Among zanubrutinib users, 22% were switched from ibrutinib and 7% switched from acalabrutinib
  - Among acalabrutinib users, 21% were switched from ibrutinib
- **Line of therapy**
  - Over half of the ibrutinib use was in the frontline setting (68.4%)
  - The use of acalabrutinib and zanubrutinib was more in the r/r setting (68.9% and 80.6%, respectively)

Results: Treatment Patterns – Compliance

- The compliance rate was higher in zanubrutinib group (65%) than acalabrutinib (62%) and ibrutinib (59%) groups

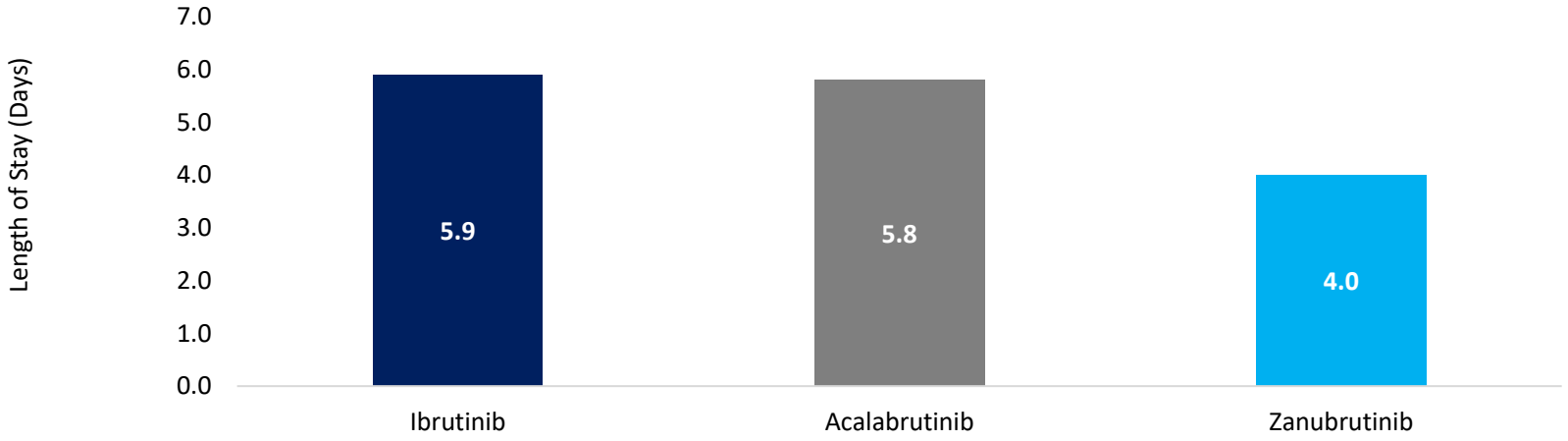
Figure 4. Compliance Rate by BTKi



Results: Economic Outcomes – Length of Stay (LOS)

- Overall, the average LOS is 5.9 days among MCL patients who used BTKi and had at least 1 hospitalization
- Patients in the zanubrutinib group had a shorter LOS (4.0 days) than those in the ibrutinib (5.9 days) and acalabrutinib (5.8 days) groups

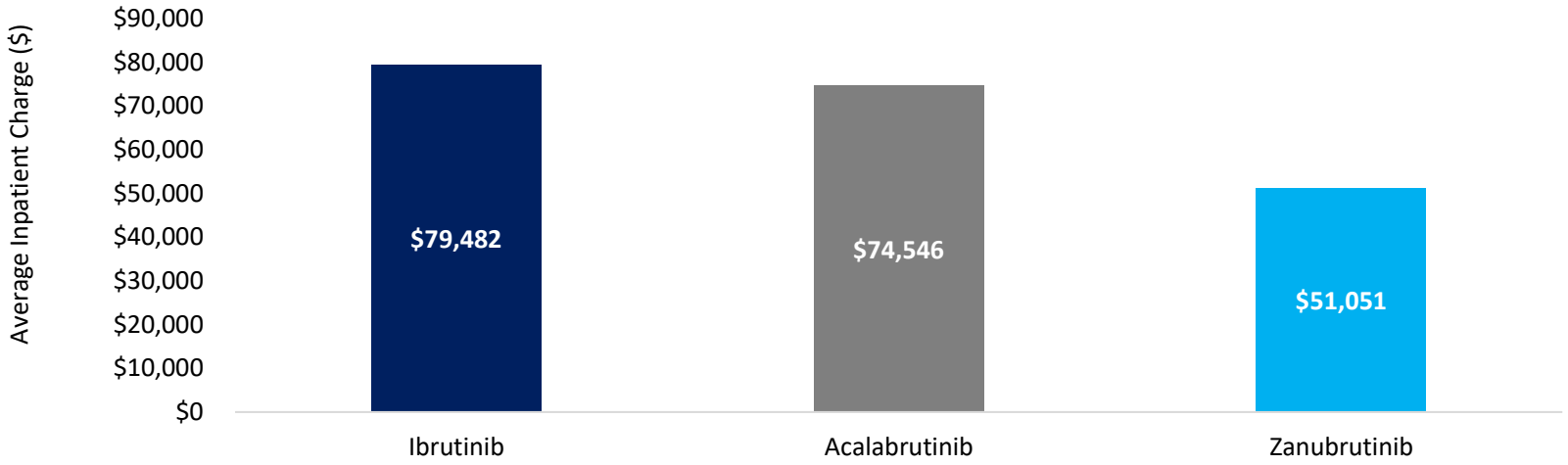
Figure 5. Average Length of Stay among MCL Patients, by BTKi



Results: Economic Outcomes – Inpatient Charge per Stay

- On average, the total submitted inpatient charge per stay is lower for patients in the zanubrutinib group ($51,051) than patients in the ibrutinib ($79,482) and acalabrutinib ($74,546) groups

Figure 6. Average Inpatient charge per stay among MCL Patients, by BTKi



Discussion

- Study results should be interpreted with consideration of limited sample size and follow-up periods due to disease rarity and data availability
- Study limitations were inherent to the use of claims databases in an observational study design
- Future studies are needed to further understand factors associated with treatment selection and outcomes

Conclusions

This study provides the first real-world evidence on patients with MCL treated with all currently available BTKis (zanubrutinib, acalabrutinib, ibrutinib)

- BTKis are being used increasingly in the front-line setting
- Based on the 1-year follow-up period, the treatment adherence is better for zanubrutinib compared with the other two BTKis
- MCL patients who used zanubrutinib are associated with shorter LOS and hospital charges than that of acalabrutinib and ibrutinib