Impact of Disability on Burden of Illness Among Patients With Chronic Inflammatory Demyelinating Polyneuropathy in the United States

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INTRODUCTION

- Chronic inflammatory demyelinating polyneuropathy (CIDP) is a rare, immune-mediated peripheral neuropathy characterized by demyelination of motor and sensory nerves, leading to symmetrical limb weakness, sensory loss, and diminished reflexes in a progressive or relapsing-remitting course.[1,2]
- CIDP can lead to progressive disability, significantly impacting patients' functional status and imposing a considerable economic and clinical burden.[3,4]
- Several real-world studies have demonstrated high costs and significant burden associated with CIDP and related treatment;[3,4] however, real-world data on the burden experienced specifically by patients with CIDP who experience disability is limited.

OBJECTIVE

- To evaluate the economic burden among patients with CIDP and disability compared to patients with CIDP without disability in the United States (US).

METHODS

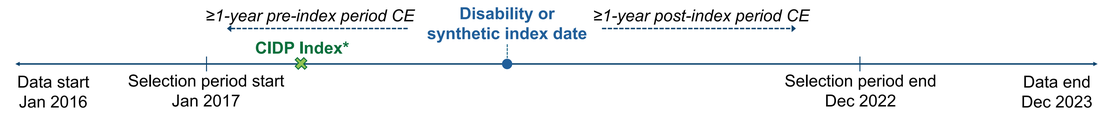
Dataset and patient cohort selection

- This retrospective cohort study was conducted using Optum's de-identified Market Clarity Data (Optum® Market Clarity) from January 2016 to December 2023 (data period).
- Patients with CIDP and disability (defined as those with a walker, cane, crutch, or wheelchair-related claim) were selected for the study (details in **Figure 1**). A comparator cohort of patients with CIDP with no disability in the data period were also identified (control cohort; details in **Figure 1**).
- An exploratory analysis comparing outcomes among patients with CIDP and wheelchair use to a control cohort (patients with CIDP who did not use wheelchairs) was also conducted. First observed wheelchair claim after CIDP index was considered the wheelchair index (analogous to the cohort of patients with CIDP and disability). A similar approach to that described in Figure 1 was used to identify the control cohort.

Study outcomes during the 1-year follow-up period and statistical analysis

- Outcomes (treatment utilization, all-cause and CIDP-related healthcare resource utilization [HRU] and costs) were compared between the disability cohort and control (without disability) cohort, using inverse probability of treatment weighting (IPTW) to adjust for differences in baseline characteristics.[#]
- Statistical significance was defined as $P<0.05$ a priori.

Figure 1. Study design



*Two confirmatory CIDP Dx, and NCT within 90 days of the first CIDP Dx, with ≥1 CIDP Dx following the NCT within 365 days (the first observed CIDP Dx is the CIDP index date). CCI, Charlson Comorbidity Index; CE, continuous enrollment; CIDP, chronic inflammatory demyelinating polyneuropathy; Dx, diagnosis; NCT, nerve conduction test.

Patients with CIDP and disability

- Adult patients with ≥2 CIDP Dx ≥30–≤365 days apart between Jan 2017 to Dec 2022 (selection period) and a confirmatory NCT ±90 days of the first CIDP Dx (the date of first observed CIDP Dx was defined as CIDP index), with ≥1 CIDP Dx following the NCT within 365 days.
- ≥1 claim for disability observed after the CIDP index date and before December 2022.
  - *First observed disability claim after CIDP index was defined as the disability index date.*
- Continuous enrollment for ≥1 year pre- and post-disability index.[‡]
- Without ≥2 claims of the same exclusionary Dx[^] during the study period (2016–2023).

Patients with CIDP and without disability (control)

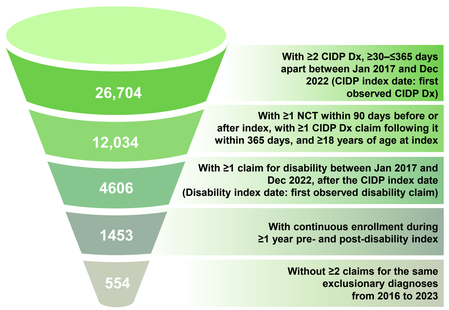
- Adult patients with ≥2 CIDP Dx ≥30–≤365 days apart between Jan 2017 to Dec 2022 (selection period) and a confirmatory NCT ±90 days of the first CIDP Dx (the date of first observed CIDP Dx is defined as CIDP index), with ≥1 CIDP Dx following the NCT within 365 days.
- No disability-related claim observed during the study period (2016−2023).
- Direct matching (with replacement) by categorical age, gender, and CIDP index year to a patient in the disability cohort was employed to assign synthetic index dates.
  - *Synthetic index was assigned based on time to disability index from CIDP index of their matched counterpart.*
- Continuous enrollment for ≥1 year pre- and post-synthetic index.
- Without ≥2 claims of same exclusionary Dx[^] during the study period (2016–2023).

[#]Variables included in the IPTW adjustment were age, gender, geography, CCI, race, ethnicity, insurance status and presence of diabetes with chronic complications, osteoarthritis, hypothyroidism, hypertension, and hypercholesterolemia at index.
[‡]Excluding patients who died before the end of the 1-year look-forward period from their disability index.
[^]Exclusionary diagnoses included amyloidosis, amyotrophic lateral sclerosis, autoimmune hemolytic anemia, B12 deficiency, celiac disease, chronic lymphocytic leukemia, dermatomyositis, fibromyalgia, Guillain-Barre syndrome, familial neuropathy, human immunodeficiency virus, immune thrombocytopenic purpura, inclusion body myositis, bone marrow transplant, Kawasaki disease, multifocal motor neuropathy, multiple myeloma, multiple sclerosis, myasthenia gravis, necrotizing fasciitis, nonfamilial hypogammaglobulinemia, primary secondary immunodeficiency, sarcoidosis, organ transplant, systemic lupus erythematosus, toxic neuropathy, cancer chemotherapy, paraneoplastic syndrome.

RESULTS

Patient selection, demographics, and characteristics

Figure 2. Patient selection for the disability cohort



CIDP, chronic inflammatory demyelinating polyneuropathy; Dx, diagnosis; NCT, nerve conduction test.

Table 1. Baseline characteristics

Baseline measures	Unadjusted (pre-IPTW)			Adjusted (post-IPTW)		
	Disability (n=554)	Controls (n=710)	SMD	Disability (n=554)	Controls (n=710)	SMD
Age, years*						
Mean (SD)	65.3 (13.8)	60.5 (12.5)	0.36	63.1 (14.4)	63.1 (12.5)	-
Gender, n (%)*						
Female	217 (39%)	252 (35%)	-0.08	207 (37%)	266 (37%)	-
CCI score*						
Mean (SD)	3.3 (2.7)	1.5 (1.9)	0.81	2.3 (2.1)	2.3 (2.3)	-
Payer channel, n (%)*						
Commercial	150 (27%)	377 (53%)	-0.54	212 (38%)	271 (38%)	-
Medicare	301 (54%)	235 (33%)	0.43	252 (46%)	323 (46%)	-
Medicaid	63 (11%)	45 (6%)	0.18	48 (9%)	62 (9%)	-
Unknown	39 (7%)	53 (7%)	-0.01	42 (8%)	53 (8%)	-
Top 10 most prevalent comorbidities, n (%)						
Neuropathic pain	543 (98%)	670 (94%)	0.19	541 (98%)	670 (94%)	0.17
Hypertension*	441 (80%)	410 (58%)	0.48	392 (71%)	503 (71%)	-
Hypercholesterolemia*	390 (70%)	422 (59%)	0.23	359 (65%)	459 (65%)	-
Back pain	336 (61%)	305 (43%)	0.35	316 (57%)	344 (48%)	0.17
Osteoarthritis*	282 (51%)	193 (27%)	0.48	222 (40%)	285 (40%)	-
Diabetes without chronic complication	247 (45%)	191 (27%)	0.37	196 (35%)	259 (37%)	-0.03
Sleep disorder	242 (44%)	170 (24%)	0.42	221 (40%)	190 (27%)	0.28
Diabetes with chronic complication*	199 (36%)	129 (19%)	0.40	147 (27%)	189 (27%)	-
Anxiety	199 (36%)	157 (22%)	0.31	178 (32%)	160 (23%)	0.22
Peripheral vascular disease	182 (33%)	97 (14%)	0.47	127 (23%)	146 (21%)	0.05

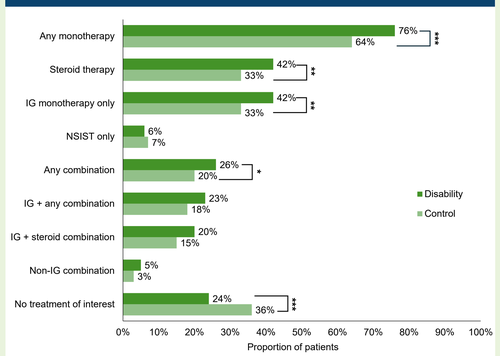
*Variables indicated were included in the IPTW model (list is not exhaustive); all covariates had SMD <0.1 post-IPTW, meeting the threshold for well-balanced cohorts.
CCI, Charlson Comorbidity Index; CIDP, chronic inflammatory demyelinating polyneuropathy; IPTW, inverse probability of treatment weighting; SD, standard deviation; SMD, standardized mean difference.

- Approximately 38% (n=4606/12034) of adult patients identified with confirmed CIDP between 2017 and 2022 had evidence of disability (**Figure 2**).
- A total of 554 patients with CIDP and disability (disability) were included in the study (**Figure 2**), and a comparator cohort of 710 patients with CIDP and without disability (control) was identified separately.
- Before IPTW adjustment, patients with CIDP and disability trended older (65.3 vs. 60.5 years), with a greater proportion enrolled in government insurance compared to controls (**Table 1**).
- Patients with CIDP and disability also had a higher mean Charlson Comorbidity Index (CCI; 3.3 vs.1.5), with a higher proportion of patients with comorbidities, compared to controls (notable differences observed for osteoarthritis and hypertension).
- After IPTW, cohorts were well-balanced with regard to the baseline variables included in the model; some differences in comorbidities remained post-IPTW (**Table 1**).

CIDP treatment utilization over the 1 year after disability or synthetic index

- A larger proportion of patients with CIDP and disability had at least 1 claim for most CIDP therapies over the 1 year after index, which was most commonly steroid and immunoglobulin, compared to controls (**Figure 3**).

Figure 3. Adjusted treatment utilization during the 1 year after index

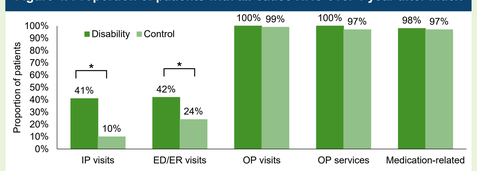


*$P<0.05$, **$P<0.01$, ***$P<0.001$
IG, immunoglobulin; NSIST, nonsteroidal immunosuppressive treatment.

All-cause and CIDP-related HRU over the 1 year after disability or synthetic index

- Compared to controls, a significantly higher proportion of patients with CIDP and disability had at least 1 all-cause inpatient (IP) or emergency department/room (ED/ER) visit in the 1 year after index (**Figure 4**). A similar trend was observed for CIDP-related HRU during the 1 year after index.
- Compared to controls, patients with CIDP and disability had significantly higher mean adjusted all-cause and CIDP-related HRU across all care categories during the 1 year after index (**Table 2**).

Figure 4. Proportion of patients with all-cause HRU over 1 year after index



*Indicates *P*-value <0.001.
ED/ER, emergency department/emergency room; HRU, healthcare resource utilization; IP, inpatient; OP, outpatient.

Table 2. Adjusted all-cause/CIDP-related HRU and costs during the 1 year after index

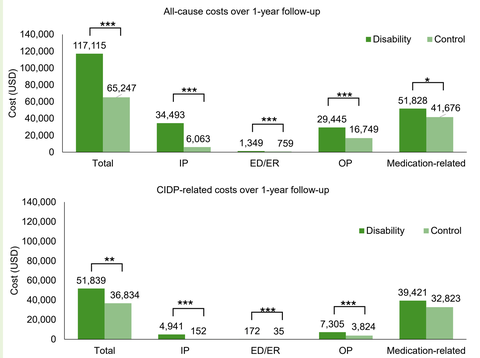
	All-cause			CIDP-related		
	Disability (n=554)	Control (n=710)	*P*-value	Disability (n=554)	Control (n=710)	*P*-value
Mean HRU						
IP visits	0.8	0.2	**<0.001**	0.09	0.01	**<0.001**
ED/ER visits	0.7	0.4	**<0.001**	0.11	0.02	**<0.001**
OP visits	51.0	27.8	**<0.001**	14.9	6.7	**<0.001**
OP services	69.2	46.0	**<0.001**	12.9	6.9	**<0.001**
Medication-related	73.2	57.8	**<0.001**	18.0	12.7	**0.002**

Significant *P* values denoted in bold.
CIDP, chronic inflammatory demyelinating polyneuropathy; ED/ER, emergency department/emergency room; HRU, healthcare resource utilization; IP, inpatient; OP, outpatient.

All-cause and CIDP-related costs over the 1 year after disability or synthetic index

- Mean total adjusted all-cause costs over the 1 year after index for patients with CIDP and disability were 1.8 times higher compared to controls ($117,115 vs. $65,247; $P<0.001$) (**Figure 5**).
- CIDP-related trends were similar to all-cause costs; mean total adjusted CIDP-related costs over the 1 year after index were 1.4 times higher for patients with CIDP and disability compared to controls ($51,839 vs. $36,834; $P=0.001$), making up 44% of total all-cause costs (**Figure 5**).

Figure 5. Adjusted all-cause/CIDP-related costs during the 1 year after index



*$P<0.05$, **$P<0.01$, ***$P<0.001$
CIDP, chronic inflammatory demyelinating polyneuropathy; ED/ER, emergency department; HRU, healthcare resource utilization; IP, inpatient; OP, outpatient.

Exploratory analysis: Patients with CIDP and wheelchair use

- Approximately 19% (n=2252/12034) of adult patients with confirmed CIDP between 2017 and 2022 had evidence of wheelchair use. A total of 210 and 1020 patients with CIDP who did and did not have wheelchair use (controls), respectively, were compared. Outcomes were assessed over the 1 year after the wheelchair index or synthetic index.
- Compared to controls, a significantly greater proportion of patients with CIDP and wheelchair use had at least 1 all-cause IP and ED/ER visits over the 1 year after index (IP: 49% vs. 15%; ER: 42% vs. 28%; $P<0.001$), with higher mean adjusted all-cause HRU in IP and OP settings; similar trends were observed for CIDP-related HRU.
- For patients with CIDP and wheelchair use, mean total adjusted all-cause costs over the 1 year after index were 1.5 times higher compared to controls ($124,300 vs. $86,836; $P<0.001$). Mean total adjusted CIDP-related costs trended higher for patients with CIDP and wheelchair use compared to controls ($44,528 vs. $35,012; $P=0.11$), making up 36% of total all-cause costs.

SUMMARY

Patients with CIDP and disability (38%) had a significantly higher all-cause and CIDP-related economic burden compared to patients with CIDP and without disability over the 1-year follow-up period.

The mean total all-cause healthcare costs for patients with CIDP who experienced disability were 1.8 times higher than those of patients with CIDP without disability over the 1-year follow-up period.

Similar trends of high economic burden were also observed among patients with CIDP who used wheelchairs (19%) when compared to patients with CIDP and without wheelchair use.

Limitations

- This study captured only the direct burden of disability using administrative claims data and excluded indirect impacts due to loss of productivity, employment, and quality of life.
- As this was a claims-based study, a proxy-based approach was used to identify disability due to CIDP.
- Findings may not fully represent the broader global or national CIDP population due to variations in healthcare systems, insurance coverage, and regional treatment practices.

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DISCLOSURES:
This study was funded by argenx. Swapna Karkare, Cécile Blein, and Arash Mahajerin are employees of argenx. Rucha Kulkarni, Tania Banerji, Namith Dharani, Aazim Ajmal Shaukathali P, Anthony Nguyen, and Amit Goyal are employees of ZS Associates and serve as paid consultants for argenx.

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