

The Economic Impact of Adrenomyeloneuropathy (AMN) on Direct Medical Costs in Commercially Insured US Adults: A Retrospective Study

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INTRODUCTION

- X-linked adrenoleukodystrophy (X-ALD) is a genetic, metabolic condition with an incidence of 1:16,800 caused by a *ABCD1* gene mutation.^{1,2}
- Males with the mutation develop adrenomyeloneuropathy (AMN) in adulthood. Symptom onset is typically observed around the late 20s to 30s. Women may also develop symptoms, though onset is observed later in life.³⁻⁵
- AMN is neurodegenerative – characterized by progressive myeloneuropathy that causes spastic paraparesis, sensory ataxia, incontinence, and sexual dysfunction. Eventually walking is severely affected and mobility is impaired.^{3,6-8}
- There are currently no effective treatments in stabilizing or reversing the progression of AMN. Moreover, suggested and practiced care varies based on the symptoms experienced by each person.⁹
- AMN's impact on healthcare resource utilization (HRU) and mortality is unknown.

Objective

- This goal of this study was to quantify for healthcare costs for commercially insured male and female adults with AMN in the US.

Methods

- Direct medical costs were assessed using IQVIA's PharMetrics Plus commercial claims database (1/01/2006-6/30/2021), with nationally representative demographic, enrollment and claims data.
- Study subjects were individuals ages 18-64y with ≥ 1 inpatient or ≥ 2 outpatient claims containing an AMN or X-ALD diagnosis (ICD-10-CM: E71.52x; ICD-9-CM 277.86), no evidence of childhood cerebral adrenoleukodystrophy or other peroxisomal disorders and no pregnancy or labor and delivery.
- AMN study patients were 1:4 propensity score matched to non-AMN controls on demographic characteristics and enrollment window.
- Patients and controls were followed for as long as they were observable in the claims data.
- Costs paid to providers by payers were estimated per patient per month (PPPM) and annualized to represent costs per patient per year (PPPY).

Results

- A total of 806 individuals with evidence of AMN (Males:303; Females: 503) were matched to 2,726 (Males: 1,037; Females: 1,689) similar in age, sex, geography, and length of enrollment.

Results (cont.)

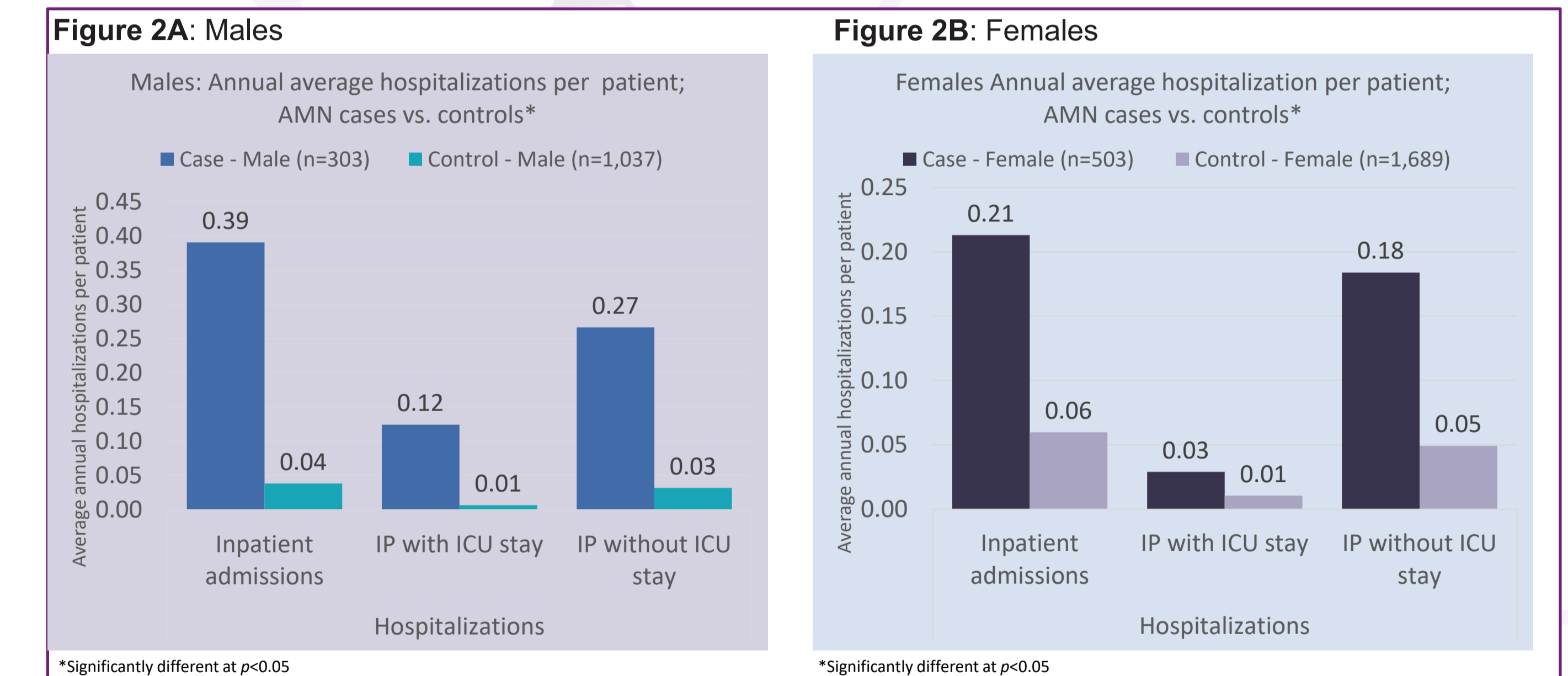
- Most individuals with AMN were between ages 18-35y, mean age 35.1y \pm 13.81 (males) and 35.0 \pm 11.56 (females).
- Mean follow-up in males was 29.0 \pm 27.69 months and female 18.9 \pm 19.74 months.
- Mean Charlson Comorbidity Index (CCI) scores were 0.67 \pm 0.94 (males) and 0.34 \pm 1.33 (females).

Figure 1: Annual All-cause Healthcare Costs AMN vs. Controls, By Sex



- Across all AMN patients, mean all-cause healthcare monthly per patient costs paid by payers were \$2,028 \pm 21,491, considerably higher than controls (\$369 \pm 3,931), $p < 0.05$
- Inpatient admissions accounted for nearly half of all monthly per patient costs (\$950 \pm 21,017, 47%), with outpatient services (\$684 \pm 2,876; 34%) and prescription medications (\$394 \pm \$1,850; 19%) constituting the remainder.
- Annualized costs for both males (n=303) and females (n=503) with AMN were substantially greater than costs for male and female controls.
 - All-cause annual average total costs were \$26,247 higher per patient among males with AMN vs. male controls, $p < 0.05$ (Figure 1A).
 - All-cause annual average total costs were \$14,205 higher per patient among the females with AMN vs. female controls, $p < 0.05$ (Figure 1B).
 - Costs for inpatient admissions, outpatient services, and pharmacy fills were significantly higher for male and female AMN patients vs. controls, $p < 0.05$ (Figures 1A and 1B).
- Annual hospitalization rates were much higher for individuals with AMN vs. controls, with the largest differences in male patients compared with controls (Figure 2).

Figure 2: Annual average hospitalizations PPPY: AMN vs. Controls



CONCLUSIONS

- All-cause direct medical costs for commercially insured adult men and women aged 18-64 years old with AMN are much higher than adults without AMN, particularly for male patients.
- Higher costs for AMN patients suggest greater disease-related healthcare issues for patients than has been previously recognized and constitute a substantial overall financial and healthcare burden.
- These costs do not include indirect, societal, or patient paid costs and thus do not represent a full cost assessment for patients with AMN.
- The increased costs for both men and women with AMN suggest a need for improved care options.

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