

A retrospective database analysis of healthcare resource utilization in patients with warm autoimmune hemolytic anemia in the United States



Key takeaways

- ✔ This retrospective database analysis is among the first to evaluate a representative real-world sample of patients with wAIHA in the United States
- ✔ HCRU remained high in both 12-month periods preceding and following the initial wAIHA diagnosis
- ✔ These findings suggest that wAIHA is associated with a high disease burden and persisting disease instability due to the episodic and relapsing nature of wAIHA
- ✔ Opportunities remain to improve disease control for patients after initial wAIHA diagnosis

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Introduction

Warm autoimmune hemolytic anemia (wAIHA) is a rare, life-threatening autoimmune disorder that is caused by autoantibodies and associated with an increased risk of morbidity and mortality¹

There have been limited assessments of healthcare resource utilization (HCRU) and outcomes in real-world patients with wAIHA in the United States²

Objectives

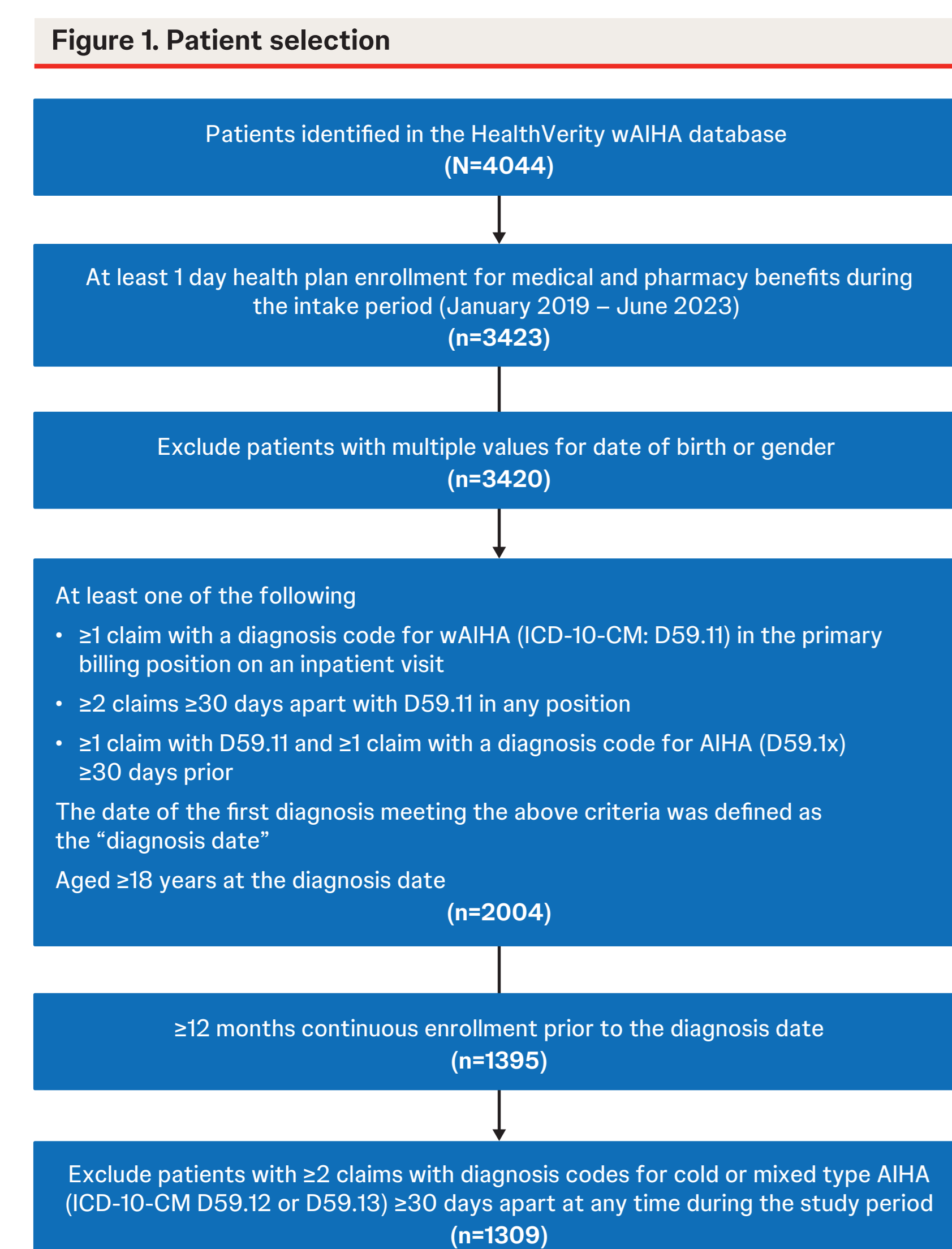
The objectives of this analysis were to describe patient demographics, clinical characteristics, and HCRU among patients with wAIHA in the 12 months prior to initial diagnosis (baseline period), and to describe HCRU in the 12 months after diagnosis (follow-up period)

Methods

- This retrospective study sourced data from HealthVerity, which consisted of large, nationally representative, de-identified US closed medical and pharmacy insurance claims databases and data collected directly from diagnostic laboratories
- Patients were required to have one of the following between January 2019 and June 2023:
 - ≥1 claim with a diagnosis code for wAIHA (International Classification of Diseases, 10th Revision, Clinical Modification [ICD-10-CM]: D59.11) in the primary billing position on an inpatient visit
 - ≥2 claims ≥30 days apart with D59.11 in any position
 - ≥1 claim with D59.11 and ≥1 claim with a diagnosis code for AIHA (D59.1x) ≥30 days prior
- The date of the first diagnosis meeting the above criteria was defined as the diagnosis date
- Included patients were aged ≥18 years on the diagnosis date and had ≥12 months' continuous enrollment in the dataset before diagnosis
- Patients were excluded if they had ≥2 claims with diagnosis codes for cold or mixed-type AIHA (ICD-10-CM: D59.12 or D59.13) ≥30 days apart at any time during the study period
- Outcomes were assessed separately for cohorts of patients with:
 - Secondary wAIHA: defined as ≥1 claim during the baseline period with ≥1 additional claim ≥30 days apart at any time during the study period with diagnosis codes for select hematologic, lymphoproliferative, immune, or inflammatory disorders or infections
 - Primary wAIHA: defined as those without the specified/underlying conditions
- All analyses were descriptive in nature and no statistical comparisons were made between the baseline and follow-up periods or between cohorts

Results

- A total of 1309 patients were included in the study: 763 with primary wAIHA and 546 with secondary wAIHA (Figure 1)



AIHA=autoimmune hemolytic anemia; ICD-10-CM=International Classification of Diseases, 10th Revision, Clinical Modification; wAIHA=warm autoimmune hemolytic anemia.

Baseline characteristics

- For patients with primary wAIHA, the mean (standard deviation [SD]) age was 49.30 (18.65) years, and 67.8% were female (Table 1)
- The mean (SD) age for patients with secondary wAIHA was 51.59 (17.99) years, and 63.2% were female
- The mean (SD) baseline Quan Charlson Comorbidity Index score was 1.74 (2.11) and 3.51 (2.81) in the primary and secondary wAIHA cohorts, respectively
- The most common comorbidities affecting patients with primary and secondary wAIHA included deficiency anemias (64.0% and 78.8%, respectively), hypertension uncomplicated (45.6% and 50.7%), fatigue (36.4% and 49.1%), and obesity (35.3% and 34.6%), respectively
- For psychiatric/behavioral comorbidities, anxiety impacted 26.7% and depressive disorders impacted 21.2% of patients with wAIHA

Table 1. Demographics and baseline clinical characteristics

Characteristics measured during the baseline period	All patients (N=1309)		Patients with primary wAIHA (n=763)		Patients with secondary wAIHA (n=546)	
	n ^a (%)		n ^a (%)		n ^a (%)	
Age at diagnosis						
Mean	50.26		49.30		51.59	
SD	18.41		18.65		17.99	
95% CI	(49.26, 51.25)		(47.97, 50.62)		(50.08, 53.10)	
Age group at diagnosis						
18–34 years	325 (24.8)		208 (27.3)		117 (21.4)	
35–49 years	306 (23.4)		175 (22.9)		131 (24.0)	
50–64 years	389 (29.7)		225 (29.5)		164 (30.0)	
≥65	272 (20.8)		145 (19.0)		127 (23.3)	
Missing/unknown	17 (1.3)		10 (1.3)		7 (1.3)	
Sex						
Female	862 (65.9)		517 (67.8)		345 (63.2)	
Race						
White	410 (31.3)		257 (33.7)		153 (28.0)	
African American or Black	141 (10.8)		75 (9.8)		66 (12.1)	
Asian	32 (2.4)		17 (2.2)		15 (2.7)	
Hispanic	125 (9.5)		69 (9.0)		56 (10.3)	
Other	48 (3.7)		20 (2.6)		28 (5.1)	
Missing/unknown	553 (42.2)		325 (42.6)		228 (41.8)	
Quan Charlson Comorbidity Index						
Mean	2.48		1.74		3.51	
SD	2.58		2.11		2.81	
95% CI	(2.34, 2.62)		(1.59, 1.89)		(3.28, 3.75)	
Quan Charlson Comorbidity Index distribution by score						
0	381 (29.1)		317 (41.5)		64 (11.7)	
1	111 (15.2)		111 (14.5)		88 (16.1)	
2	231 (17.6)		124 (16.3)		107 (19.6)	
3	122 (9.3)		67 (8.8)		55 (10.1)	
≥4	376 (28.7)		144 (18.9)		232 (42.5)	
Elixhauser comorbidities^b						
Hypertension, uncomplicated	625 (47.7)		348 (45.6)		277 (50.7)	
Chronic pulmonary disease	285 (21.8)		136 (17.8)		149 (27.3)	
Liver disease	307 (23.5)		150 (19.7)		157 (28.8)	
Coagulation deficiency	419 (32.0)		159 (20.8)		260 (47.6)	
Obesity	458 (35.0)		269 (35.3)		189 (34.6)	
Fluid and electrolyte disorders	397 (30.3)		195 (25.6)		202 (37.0)	
Deficiency anemias	918 (70.1)		488 (64.0)		430 (78.8)	
Depression	271 (20.7)		156 (20.4)		115 (21.1)	
Psychiatric/behavioral comorbidities^b						
Anxiety disorders	350 (26.7)		190 (24.9)		160 (29.3)	
Depressive disorders	278 (21.2)		161 (21.1)		117 (21.4)	
Other conditions that may be a focus of clinical attention	379 (29.0)		209 (27.4)		170 (31.1)	
Fatigue and/or malaise	546 (41.7)		278 (36.4)		268 (49.1)	

^aFactors occurring in only 0–10 patients were excluded from this table. ^bComorbidities reported in >20% of all patients are reported here. CI=confidence interval; SD=standard deviation; wAIHA=warm autoimmune hemolytic anemia.

- In the secondary wAIHA cohort, the most common defining conditions included systemic lupus erythematosus (19.2%), solid tumors (14.1%), immune thrombocytopenia (13.6%), chronic lymphoid leukemia (9.9%), and rheumatoid arthritis (8.1%) (Table 2)

Table 2. Conditions that defined secondary wAIHA cohort

Conditions measured during the baseline period	Patients with secondary wAIHA (n=546)	
	n ^a (%)	
Hematologic disorders and lymphoproliferative diseases		
Chronic lymphoid leukemia	54 (9.9)	
B-cell lymphoma/Hodgkin lymphoma	25 (4.6)	
Autoimmune neutropenia	27 (4.9)	
Evans syndrome	29 (5.3)	
Immune thrombocytopenia	74 (13.6)	
Autoimmune and inflammatory diseases		
Systemic lupus erythematosus	105 (19.2)	
Antiphospholipid syndrome	31 (5.7)	
Rheumatoid arthritis	44 (8.1)	
Thyroiditis	14 (2.6)	
Autoimmune hepatitis	12 (2.2)	
Ulcerative colitis	19 (3.5)	
Infections		
Infections ^b	23 (4.2)	
Primary immunodeficiencies		
Common variable immunodeficiency	15 (2.7)	
Solid tumors		
Solid tumors	77 (14.1)	

^aFactors occurring in only 0–10 patients were excluded from the table. ^bIncludes human immunodeficiency virus, Epstein-Barr virus, hepatitis C, cytomegalovirus, tuberculosis, brucellosis, babesiosis. wAIHA=warm autoimmune hemolytic anemia.

HCRU and treatment patterns

- During the 12-month baseline period and during the 12-month follow-up period, a substantial portion of the HCRU measures were high both before and after diagnosis of wAIHA (Table 3)
 - Of all patients with wAIHA, 53.6% required inpatient hospitalization and 57.4% of inpatient hospitalization stays lasted ≥2 days during the 12-month baseline period
 - For outpatient hospitalizations, 79.8% of patients had ≥2 visits during the 12-month baseline period
 - Between the 12-month periods before and after diagnosis, both the primary and secondary wAIHA cohorts showed a slight numerical decrease in mean inpatient hospitalization length of stay in days (8.7 to 8.3 and 10.4 to 8.3, respectively), and inversely, an increase in mean number of outpatient visits (8.6 to 13.7 and 13.4 to 17.7, respectively)
- For all patients with wAIHA, 65.9% received maintenance therapy (non-steroidal immunosuppressants, oral corticosteroids, and/or rituximab) and 50.1% received rescue therapy (erythropoiesis-stimulating agents, intravenous immunoglobulin, subcutaneous immunoglobulin, intravenous methylprednisolone, plasma exchange, splenectomy, and/or blood transfusions) 12 months post diagnosis (Figure 2)
 - Factors occurring in 0–10 patients were excluded from the figure and include subcutaneous immunoglobulin and plasma exchange

Figure 2. Use of maintenance and rescue therapies and procedures during the 12-month period after wAIHA diagnosis (follow-up period)

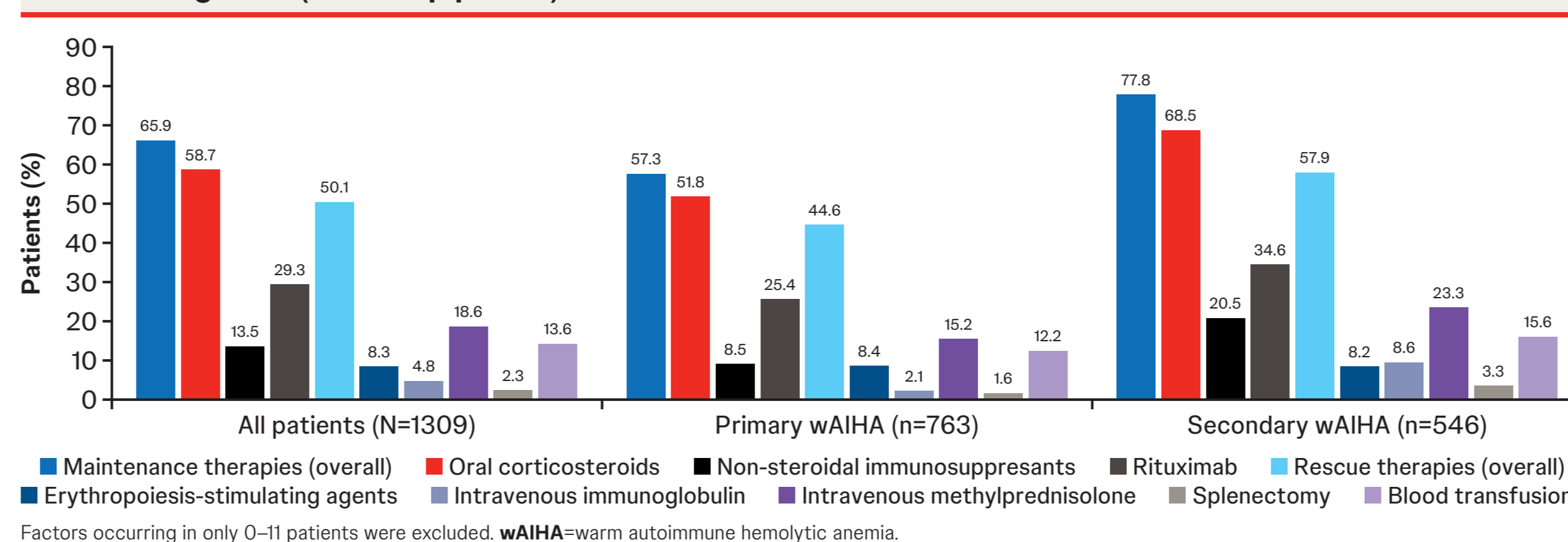


Table 3. HCRU during the 12-month period prior to wAIHA diagnosis (baseline) and during the 12-month period after wAIHA diagnosis (follow-up)

	All patients (N=1309)		Patients with primary wAIHA (n=763)		Patients with secondary wAIHA (n=546)	
	Baseline	Follow-up	Baseline	Follow-up	Baseline	Follow-up
Inpatient hospitalizations						
Yes	701 (53.6)	523 (40.0)	384 (50.3)	284 (37.2)	317 (58.1)	239 (43.8)
No	608 (46.4)	786 (60.0)	379 (49.7)	479 (62.8)	229 (41.9)	307 (56.2)
Length of stay (days)						
Mean (SD)	9.43 (27.60)	8.29 (26.59)	8.72 (30.19)	8.30 (29.99)	10.41 (23.49)	8.28 (20.92)
95% CI	(7.93, 10.92)	(6.85, 9.73)	(6.58, 10.87)	(6.17, 10.43)	(8.44, 12.39)	(6.52, 10.04)
0	525 (40.1)	787 (60.1)	379 (49.7)	480 (62.9)	146 (26.7)	307 (56.2)
1	33 (2.5)	4 (0.3)	2 (0.3)	3 (0.4)	31 (5.7)	1 (0.2)
≥2	751 (57.4)	518 (39.6)	382 (50.1)	280 (36.7)	369 (67.6)	238 (43.6)
Emergency department visits (number of admissions)						
Mean (SD)	2.17 (4.13)	2.16 (4.84)	2.01 (4.41)	2.06 (5.43)	2.40 (3.70)	2.31 (3.87)
95% CI	(1.95, 2.39)	(1.90, 2.42)	(1.69, 2.32)	(1.67, 2.44)	(2.09, 2.71)	(1.98, 2.63)
0	424 (32.4)	610 (46.6)	276 (36.2)	402 (52.7)	148 (27.1)	208 (38.1)
1	351 (26.8)	235 (18.0)	214 (28.0)	127 (16.6)	137 (25.1)	108 (19.8)
≥2	534 (40.8)	464 (35.4)	273 (35.8)	234 (30.7)	261 (47.8)	230 (42.1)
Outpatient hospitalizations (number of visits)						
Mean (SD)	10.6 (15.08)	15.38 (17.90)	8.58 (12.55)	13.69 (16.43)	13.43 (17.65)	17.73 (19.55)
95% CI	(9.79, 11.42)	(14.41, 16.35)	(7.69, 9.47)	(12.52, 14.86)	(11.95, 14.92)	(16.09, 19.38)
0	102 (7.8)	102 (7.8)	75 (9.8)	76 (10.0)	27 (4.9)	26 (4.8)
1	162 (12.4)	85 (6.5)	116 (15.2)	63 (8.3)	46 (8.4)	22 (4.0)
≥2	1045 (79.8)	1122 (85.7)	572 (75.0)	624 (81.8)	473 (86.6)	498 (91.2)
Office visits with specialist (number of visits)						
Mean (SD)	3.23 (9.25)	3.85 (9.06)	2.46 (4.23)	3.46 (6.08)	4.31 (13.36)	4.40 (12.03)
95% CI	(2.73, 3.73)	(3.36, 4.34)	(2.16, 2.76)	(3.03, 3.89)	(3.19, 5.43)	(3.39, 5.41)
0	555 (42.4)	458 (35.0)	351 (46.0)	279 (36.6)	204 (37.4)	179 (32.8)
1	205 (15.7)	220 (16.8)	124 (16.3)	143 (18.7)	81 (14.8)	77 (14.1)
≥2	549 (41.9)	631 (48.2)	288 (37.7)	341 (44.7)	261 (47.8)	290 (53.1)
Primary care office visits (number of visits)						
Mean (SD)	4.91 (7.77)	8.10 (9.40)	3.65 (6.70)	6.85 (8.29)	6.66 (8.75)	9.84 (10.53)
95% CI	(4.49, 5.33)	(7.59, 8.61)	(3.18, 4.13)	(6.26, 7.44)	(5.93, 7.40)	(8.96, 10.73)
0	347 (26.5)	237 (18.1)	249 (32.6)	171 (22.4)	98 (17.9)	66 (12.1)
1	200 (15.3)	108 (8.3)	131 (17.2)	74 (9.7)	69 (12.6)	34 (6.2)
≥2	762 (58.2)	964 (73.6)	383 (50.2)	518 (67.9)	379 (69.4)	446 (81.7)
Skilled nursing visits						
Mean (SD)	0.23 (0.71)	0.51 (3.82)	0.25 (2.68)	0.45 (3.67)	0.21 (2.76)	0.59 (4.02)
95% CI	(0.08, 0.38)	(0.30, 0.71)	(0.05, 0.44)	(0.19, 0.71)	(–0.02, 0.44)	(0.25, 0.93)
0	1284 (98.1)	1262 (96.4)	747 (97.9)	739 (96.9)	537 (98.4)	523 (95.8)
1	6 (0.5)	5 (0.4)	3 (0.4)	3 (0.5)	3 (0.5)	2 (0.4)
≥2	19 (1.5)	42 (3.2)	13 (1.7)	21 (2.8)	6 (1.1)	21 (3.8)
Telehealth visits (number of calls)						
Mean (SD)	1.42 (3.93)	1.71 (5.53)	1.18 (3.63)	1.44 (4.22)	1.75 (4.30)	2.1 (6.94)
95% CI	(1.21, 1.63)	(1.41, 2.01)	(0.92, 1.44)	(1.14, 1.74)	(1.39, 2.12)	(1.52, 2.88)
0	824 (62.9)	791 (60.4)	517 (67.8)	506 (66.3)	307 (56.2)	285 (52.2)
1	198 (15.1)	193 (14.7)	109 (14.3)	87 (11.4)	89 (16.3)	106 (1