

Racial/Ethnic Differences in Autoimmune Disease Prevalence in US Claims/EHR Data

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The public health burden of immune-mediated inflammatory diseases (IMIDs), those in which a person's immune system attacks its own organs and tissues, is high. Currently, more than 24 million US adults are estimated to have an IMID, according to the National Institutes of Health.¹ If left undiagnosed or poorly managed, IMIDs can significantly affect quality of life, leading to disability² and death.^{3,4}

Although research has provided valuable information about IMID management and treatment, the focus has been mainly on select IMIDs or select risk factors. Among the areas that can benefit from further study are associations between race and ethnicity and IMIDs and overlap syndrome (ie, the concurrence of 2 or more IMIDs in an individual). Such associations, if significant, can highlight health disparities and potential genetic, socioeconomic, behavioral, and/or environmental factors that predispose an individual to IMIDs or complications from them. For example, findings from studies about systemic lupus erythematosus (SLE) have suggested that Hispanic patients have a distinct disease profile from non-Hispanic White, non-Hispanic Black, and non-Hispanic Asian patients.⁵⁻⁸

Although findings from population- and claims-based studies⁵⁻¹² conducted in the United States have highlighted racial and ethnic differences in the prevalence of IMIDs among non-Hispanic White, non-Hispanic Black, Hispanic, and non-Hispanic Asian adults, those studies have focused on a few specific IMIDs such as SLE,⁵⁻⁸ psoriasis/psoriatic arthritis (Pso/PsA),⁹⁻¹² and ankylosing spondylitis.¹² Furthermore, IMID studies with a racial/ethnic component do not always capture race and ethnicity categories in their entirety. For example, a US health care–based study of several IMIDs evaluated the effects of race but not ethnicity.¹³ One study conducted among patients with giant cell arteritis evaluated differences in prevalence by Hispanic ethnicity, but the sample was small (N < 300) and limited to only White patients.¹⁴ Moreover, many of these studies are based on data collected more than 7 to 10 years ago and seldom cover overlap syndrome.

Nationally representative prospective population-based studies are often well suited to evaluate effects of race and ethnicity on IMID

ABSTRACT

OBJECTIVES: Few studies have evaluated racial and ethnic differences in several immune-mediated inflammatory diseases (IMIDs) or overlap syndrome (the co-occurrence of ≥ 2 IMIDs). We assessed associations between race and ethnicity and prevalence of IMIDs and overlap syndrome using US claims and electronic health records from 2021.

STUDY DESIGN: Retrospective cohort study of 10.8 million adults.

METHODS: We identified the 10 most prevalent IMIDs among frequently discussed IMIDs. We estimated associations between the 5 most prevalent IMIDs and overlap syndrome in Hispanic and non-Hispanic Asian and Black adults using non-Hispanic White adults as the referent and stratifying by sex and age (20-39, 40-59, and ≥ 60 years).

RESULTS: Inflammatory bowel disease (IBD), systemic lupus erythematosus (SLE), multiple sclerosis (MS), and rheumatoid arthritis (RA) were the most prevalent IMIDs in all races and ethnicities. We observed positive associations ($P < .0001$) between Hispanic and non-Hispanic Black adults and SLE, Asian women of all ages and Asian men younger than 60 years and SLE, Black women younger than 60 years and MS, and Hispanic and non-White women 60 years or older and RA. Hispanic and non-White adults of all age groups had inverse associations ($P < .0001$) with IBD. Non-Hispanic Black adults of all ages and Hispanic and non-Hispanic Asian women 40 years or older had inverse associations ($P < .0001$) with psoriasis/psoriatic arthritis. Overlap syndrome was rare among all groups, with some variation in which IMIDs co-occurred.

CONCLUSIONS: We found racial and ethnic differences in the prevalence and co-occurrence of IMIDs in this sample of US adults. Because misdiagnoses are relatively frequent for patients with IMIDs, awareness of racial and ethnic variations in IMIDs could aid early diagnosis and improve disease management.

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prevalence because of their consideration of racial and ethnic representativeness. However, these surveys might not capture recent data for most IMIDs, as in the case with the National Health and Nutrition Examination Survey (NHANES).¹⁵ Electronic health records (EHRs) and claims are increasingly being used by researchers to better characterize and understand patient populations.^{12,13} Such health care data include demographics and comprehensive medical information, from diagnoses and laboratory results to pharmacy data, treatments, and hospitalizations, captured through several health care contacts spanning several years; this volume of information from a single patient allows for data triangulation and hypothesis generation that could otherwise not be possible with data collected for research purposes. Furthermore, because these health care databases are large, with data from millions of patients in any single year, analytical studies of rare diseases, such as many IMIDs, are feasible.

In this study, we used US health care data from 2021 with the goal of understanding the following:

1. Which IMIDs are most prevalent overall and within each racial and ethnic group?
2. Does the prevalence of common IMIDs and overlap syndrome among US adults significantly differ by race and ethnicity?
3. Are associations between race and ethnicity and IMIDs modified by age and sex?

Our study results provide greater understanding of the varied associations between race and ethnicity and IMIDs in the United States; these insights may enable accurate diagnosis in the earlier stages of these diseases, leading to better disease management and improved treatment options. Furthermore, because research on overlap syndrome can provide insights about shared pathology and risk factors,^{16,17} our findings may shed light on groups at greatest risk for poor quality of life, disability, and mortality as well as areas requiring greater patient education, treatment monitoring, and medical research. Lastly, through our assessment of potential effect measure modification by age and gender, we aim to provide a more accurate picture of the association between race and ethnicity and IMIDs.

METHODS

Study Participant Selection

We conducted this study using Clarivate's Real-World Data (RWD) Product (ie, claims and EHR databases).¹⁸ These databases consist of deidentified data (in compliance with the Health Insurance Portability and Accountability Act privacy law) of insured individuals with health care (hospitals, physicians, pharmacies, clinics) contacts since 2012. Data are obtained from an open network of claims

TAKEAWAY POINTS

We use claims/electronic health record (EHR) data to evaluate associations between race and ethnicity and immune-mediated inflammatory diseases (IMIDs) in the United States in 2021.

- ▶ Few recent population- or claims/EHR-based studies have established associations between prevalence of certain IMIDs and race and Hispanic ethnicity.
- ▶ Claims and EHR databases provide a rich source of data that can be used to characterize and evaluate risk factors for rare diseases such as many IMIDs.
- ▶ In this study population, we observed some racial and ethnic differences in the prevalence and co-occurrence of IMIDs.
- ▶ Awareness of racial and ethnic differences in IMID prevalence could lead to improved disease diagnosis, management, and treatment.

(sourced from clearinghouses) and EHR data (from EHR software vendors) from all US states and are normalized and cleaned using proprietary methods; the product provides data on more than 300 million patients, 100 million EHRs, and 2 million health care providers, representing approximately 70% to 80% of the insured US population. More details about Clarivate's RWD Product can be found elsewhere.¹⁸

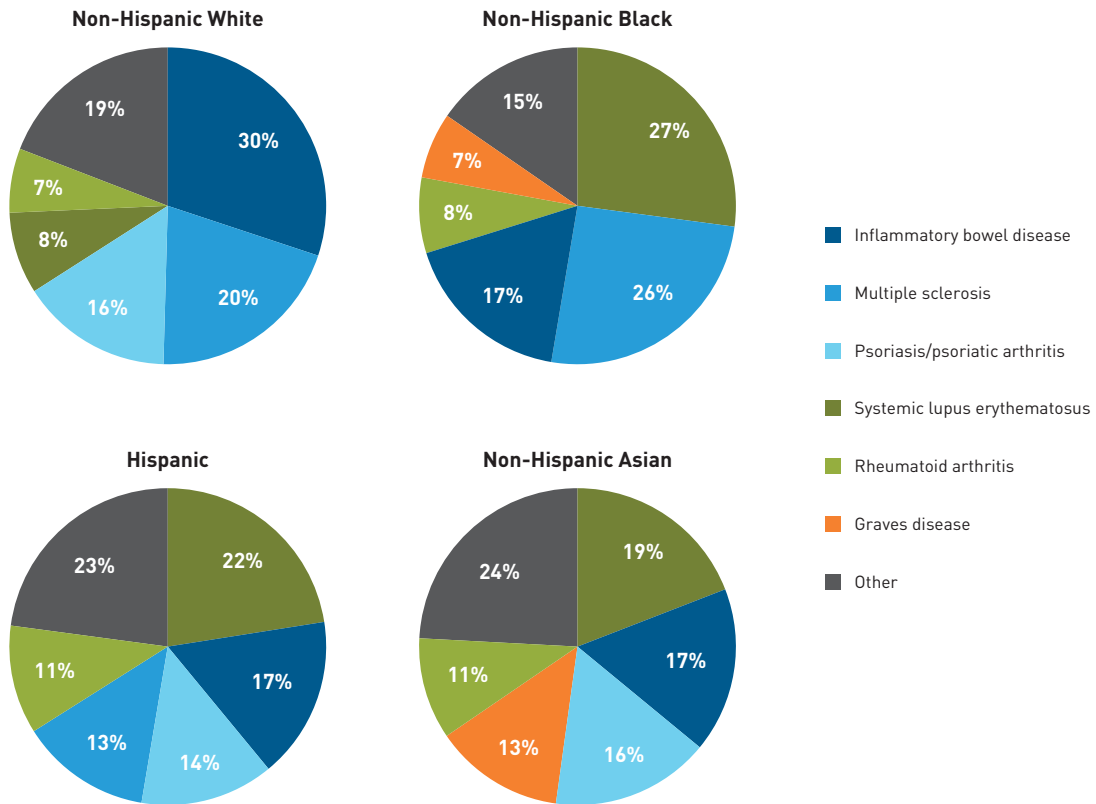
Inclusion/Exclusion Criteria

We included individuals who (1) were present in both the claims and EHR databases; (2) were 20 years or older in 2021; (3) had no missing data on age, sex, race, or ethnicity; and (4) did not have "other," "declined," or "unknown" listed for both race and ethnicity (~30% of adults with race/ethnicity recorded). Of note, only the EHR database includes information on race and ethnicity.

We restricted the analyses to those enrolled from January 1 to December 31, 2021, to allow for annual prevalence estimates and to include individuals likely to be actively enrolled (and not disenrolled) in the database. We assumed active individuals to be those with at least the mean number of claims per age group.

Four racial and ethnic groups were created for the purposes of this study: (1) Hispanic, (2) non-Hispanic Asian, (3) non-Hispanic Black, and (4) non-Hispanic White. In the EHR database, the terms *race* and *ethnicity* were often used interchangeably. Thus, we classified individuals as follows: Adults who self-identified as Hispanic or Hispanic/Latina with respect to either race or ethnicity were classified as Hispanic regardless of their racial identification. Among non-Hispanic adults, those who self-identified as Black or African American with respect to race or ethnicity were classified as non-Hispanic Black, those who self-identified as Asian were classified as non-Hispanic Asian, and those who self-identified as White or Caucasian were classified as non-Hispanic White. To preserve sample size and because less than 0.01% of the non-Hispanic adults were of mixed race, we classified mixed-race White or Asian and Black/African American individuals as non-Hispanic Black adults and mixed-race White and Asian individuals as non-Hispanic Asian adults. Adults who had both race and ethnicity recorded as "other," "declined," or "unknown" were recoded as missing. The "other" category included American Indian, Pacific Islander, and

FIGURE. Most Prevalent Autoimmune Conditions by Race and Ethnicity, 2021 US EHR and Claims Database



EHR, electronic health record.

Alaska Native individuals and people of North African or Arabic descent, among others.

We identified the 10 most prevalent IMIDs in the database from 22 IMIDs frequently discussed^{13,19,20}: SLE, multiple sclerosis (MS), rheumatoid arthritis (RA), inflammatory bowel disease (IBD), Pso/PsA, Graves disease, autoimmune thyroiditis, pernicious anemia, vitiligo, Sjögren syndrome, cutaneous lupus erythematosus, type 1 diabetes, celiac disease, dermatomyositis/polymyositis, systemic sclerosis, mixed connective tissue disease, myasthenia gravis, granulomatosis with polyangiitis, microscopic polyangiitis, giant cell arteritis, other vasculitis, and Marfan syndrome (eAppendix Table [available at ajmc.com]). Because misdiagnoses and misclassification can occur with IMIDs,²¹ we reestimated the prevalence of each IMID to minimize misclassification by ascertaining patients who had at least 2 or more *International Statistical Classification of Diseases, Tenth Revision (ICD-10)* codes separated by a period of 3 months or more. Moreover, we estimated the prevalence of overlap syndrome, defined as the presence of 2 or more concurrent IMIDs (of the 10 more frequent IMIDs), in the overall sample and in each racial and ethnic category.

Statistical Analyses

We ranked the 5 most common IMIDs in the overall population and within each racial and ethnic group (Figure). We evaluated effect measure modification by age and sex by including interaction terms between race and ethnicity and these variables in a multivariable logistic model. In the event of significant effect measure modification, we conducted logistic regression analyses stratified by age groups (20-39 vs 40-59 vs ≥60 years) based on ages of disease onset for different IMIDs²⁰ and sex.

All analyses were conducted using SAS 9.4 (SAS Institute). Our analyses were stratified by 3 age groups and sex with 3 dummy variables included for race/ethnicity. Because we were testing 90 associations using 30 logistic regression models, statistical significance was set at a *P* value less than .0001.

RESULTS

Table 1 represents the demographic characteristics of study participants and the prevalence of IMIDs and chronic conditions in the overall population and by race and ethnicity. We included

Racial/Ethnic Differences in Autoimmune Disease Prevalence

TABLE 1. Characteristics of Study Participants in the Overall Population and by Race and Ethnicity, 2021 US EHR and Claims Databases

Characteristic	Overall population (N = 10,776,406; 100%)		Hispanic adults (n = 1,424,698; 13.2%)		Non-Hispanic Asian adults (n = 414,446; 3.8%)		Non-Hispanic Black adults (n = 1,536,718; 14.3%)		Non-Hispanic White adults (n = 7,400,544; 68.7%)	
	n	%	n	%	n	%	n	%	n	%
Age in years, mean (SD)	54.6 (18.5)		52.0 (18.7)		55.2 (18.8)		53.5 (17.4)		55.3 (18.6)	
Age group in years										
20-29	1,252,689	11.6	213,854	15.0	44,942	10.8	171,225	11.1	822,668	11.1
30-39	1,411,145	13.1	204,177	14.3	58,453	14.1	204,676	13.3	943,839	12.8
40-49	1,487,303	13.8	211,740	14.9	58,210	14.0	222,491	14.5	994,862	13.4
50-59	2,033,044	18.9	263,061	18.5	69,889	16.9	313,684	20.4	1,386,410	18.7
60-69	2,294,034	21.3	241,595	17.0	72,745	17.6	324,151	21.1	1,655,543	22.4
70-79	1,138,121	10.6	183,783	12.9	67,017	16.2	206,773	13.5	680,548	9.2
≥80	1,160,070	10.8	106,488	7.5	43,190	10.4	93,718	6.1	916,674	12.4
Sex										
Male	4,633,499	43.0	517,585	36.3	168,282	40.6	548,159	35.7	3,399,473	45.9
Female	6,142,907	57.0	907,113	63.7	246,164	59.4	988,559	64.3	4,001,071	54.1
IMIDs										
IBD	49,629	0.5	3706	0.3	1001	0.2	4617	0.3	40,305	0.5
MS	37,242	0.3	3001	0.2	257	0.1	6734	0.4	27,250	0.4
Pso/PsA	26,128	0.2	3058	0.2	963	0.2	1329	0.1	20,778	0.3
SLE	24,532	0.2	5050	0.4	1135	0.3	7144	0.5	11,203	0.2
RA	13,915	0.1	2488	0.2	616	0.1	2034	0.1	8777	0.1
AIT	10,455	0.1	1430	0.1	354	0.1	454	0.0	8217	0.1
GD	8868	0.1	1347	0.1	789	0.2	1775	0.1	4957	0.1
SS	7788	0.1	1343	0.1	571	0.1	1089	0.1	4785	0.1
MG	5718	0.1	551	0.0	143	0.0	667	0.0	4357	0.1
PA	4411	0.0	462	0.0	110	0.0	515	0.0	3324	0.0
Number of IMIDs										
0	10,589,462	98.3	1,402,509	98.4	408,584	98.6	1,510,590	98.3	7,267,779	98.2
1	185,221	1.7	21,944	1.5	5786	1.4	25,899	1.7	131,592	1.8
2	1685	0.0	241	0.0	75	0.0	220	0.0	1149	0.0
≥3	38	0.0	4	0.0	1	0.0	9	0.0	24	0.0
Overlap syndrome	1707	0.0	229	0.0	76	0.0	229	0.0	1173	0.0
Other comorbidities										
CAD	582,919	5.4	58,188	4.1	18,325	4.4	77,889	5.1	428,517	5.8
T2D	1,537,100	14.3	263,973	18.5	76,055	18.4	312,715	20.3	884,357	11.9
COPD	649,157	6.0	51,580	3.6	10,838	2.6	100,478	6.5	486,261	6.6
CKD	770,696	7.2	108,526	7.6	31,076	7.5	189,677	12.3	441,417	6.0

AIT, autoimmune thyroiditis; CAD, coronary artery disease; CKD, chronic kidney disease; COPD, chronic obstructive pulmonary disease; EHR, electronic health record; GD, Graves disease; IBD, inflammatory bowel disease; IMIDs, immune-mediated inflammatory diseases; MG, myasthenia gravis; MS, multiple sclerosis; PA, pernicious anemia; Pso/PsA, psoriasis/psoriatic arthritis; RA, rheumatoid arthritis; SLE, systemic lupus erythematosus; SS, Sjögren syndrome; T2D, type 2 diabetes.

10.8 million individuals in our analyses (7.4 million non-Hispanic White, 1.5 million non-Hispanic Black, 1.4 million Hispanic, and 0.4 million non-Hispanic Asian adults). We observed overlap syndrome in 1707 adults in the overall sample and among 0.02% of non-Hispanic White, 0.01% of non-Hispanic Black, 0.02% of Hispanic, and 0.02% of non-Hispanic Asian adults. Most individuals with overlap syndrome had only 2 IMIDs, with few having 3 or more. The most frequently co-occurring autoimmune diseases were IBD

and Pso/PsA overall, IBD and Pso/PsA among non-Hispanic White adults, and SLE and RA among non-Hispanic Black, Hispanic, and Asian adults.

In the overall sample and among non-Hispanic White adults, the 5 most prevalent IMIDs ranked in descending order were IBD, MS, Pso/PsA, SLE, and RA. Among other races and ethnicities, the most prevalent IMID was SLE followed by MS and IBD in non-Hispanic Black adults and IBD and Pso/PsA in Hispanic and Asian adults. Among

TABLE 2. Associations Between Race/Ethnicity and the Most Prevalent Immune-Mediated Inflammatory Diseases, 2021 US EHR and Claims Databases

Disease	Men aged 20-39 years	Women aged 20-39 years	Men aged 40-59 years	Women aged 40-59 years	Men ≥ 60 years	Women ≥ 60 years
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Inflammatory bowel disease						
HA vs NHW	0.60 (0.54-0.67) ^a	0.48 (0.43-0.53) ^a	0.50 (0.46-0.53) ^a	0.38 (0.36-0.42) ^a	0.47 (0.43-0.52) ^a	0.50 (0.46-0.54) ^a
NHA vs NHW	0.44 (0.38-0.52) ^a	0.39 (0.32-0.47) ^a	0.55 (0.50-0.60) ^a	0.32 (0.27-0.37) ^a	0.43 (0.36-0.51) ^a	0.27 (0.22-0.33) ^a
NHB vs NHW	0.34 (0.31-0.38) ^a	0.59 (0.54-0.66) ^a	0.46 (0.43-0.49) ^a	0.56 (0.53-0.60) ^a	0.43 (0.38-0.47) ^a	0.58 (0.54-0.63) ^a
Multiple sclerosis						
HA vs NHW	1.48 (1.11-1.96) ^b	1.04 (0.87-1.24)	1.04 (0.94-1.15)	0.52 (0.49-0.55) ^a	0.37 (0.31-0.43) ^a	0.34 (0.31-0.37) ^a
NHA vs NHW	0.25 (0.11-0.56) ^b	0.24 (0.13-0.42) ^a	0.25 (0.19-0.34) ^a	0.15 (0.12-0.19) ^a	0.13 (0.09-0.21) ^a	0.11 (0.08-0.14) ^a
NHB vs NHW	0.70 (0.51-0.94) ^b	1.77 (1.52-2.07) ^a	1.15 (1.06-1.26) ^b	1.14 (1.09-1.19) ^a	0.84 (0.76-0.93) ^b	0.86 (0.81-0.91) ^a
Psoriasis/psoriatic arthritis						
HA vs NHW	0.96 (0.72-1.28)	0.87 (0.71-1.08)	0.83 (0.74-0.93) ^b	0.61 (0.57-0.66) ^a	0.90 (0.82-0.99) ^b	0.82 (0.76-0.88) ^a
NHA vs NHW	1.05 (0.74-1.49)	1.11 (0.82-1.50)	1.11 (0.95-1.30)	0.58 (0.51-0.67) ^a	0.95 (0.82-1.10)	0.64 (0.56-0.73) ^a
NHB vs NHW	0.22 (0.14-0.33) ^a	0.40 (0.29-0.55) ^a	0.22 (0.18-0.27) ^a	0.28 (0.25-0.31) ^a	0.28 (0.24-0.33) ^a	0.34 (0.31-0.38) ^a
Systemic lupus erythematosus						
HA vs NHW	5.91 (4.01-8.71) ^a	2.93 (2.60-3.30) ^a	3.28 (2.74-3.93) ^a	2.01 (1.91-2.12) ^a	1.74 (1.44-2.12) ^a	1.79 (1.67-1.91) ^a
NHA vs NHW	3.62 (2.15-6.09) ^a	2.77 (2.32-3.31) ^a	2.76 (2.11-3.60) ^a	1.49 (1.34-1.65) ^a	0.98 (0.66-1.45)	1.33 (1.18-1.50) ^a
NHB vs NHW	2.99 (2.01-4.44) ^a	4.53 (4.05-5.06) ^a	3.08 (2.59-3.66) ^a	2.58 (2.46-2.70) ^a	1.75 (1.46-2.10) ^a	2.22 (2.10-2.35) ^a
Rheumatoid arthritis						
HA vs NHW	0.77 (0.27-2.25)	1.44 (1.06-1.96) ^b	0.89 (0.63-1.25)	1.56 (1.44-1.69) ^a	0.86 (0.74-0.99) ^b	1.64 (1.53-1.75) ^a
NHA vs NHW	0.69 (0.16-2.93)	0.55 (0.26-1.16)	0.47 (0.23-0.95) ^b	1.16 (0.99-1.36)	0.99 (0.79-1.22)	1.38 (1.23-1.55) ^a
NHB vs NHW	0.11 (0.02-0.81) ^b	0.40 (0.23-0.70) ^b	0.55 (0.38-0.81) ^b	0.98 (0.90-1.07)	0.71 (0.61-0.82) ^a	1.26 (1.17-1.35) ^a
Overlap syndrome						
HA vs NHW	2.13 (0.39-11.63)	1.26 (0.90-1.75)	0.78 (0.35-1.73)	1.03 (0.84-1.27)	0.44 (0.20-0.94) ^b	1.03 (0.79-1.34) ^b
NHA vs NHW	3.79 (0.70-20.70)	1.10 (0.56-2.15)	1.42 (0.56-3.58)	0.91 (0.61-1.36)	0.99 (0.44-2.25)	1.39 (0.96-2.03) ^b
NHB vs NHW	0.60 (0.07-5.34)	0.74 (0.48-1.13)	0.99 (0.51-1.91)	0.98 (0.80-1.20)	0.32 (0.14-0.73) ^b	0.84 (0.65-1.10)

EHR, electronic health record; HA, Hispanic American; NHA, non-Hispanic Asian; NHB, non-Hispanic Black; NHW, non-Hispanic White.

^a*P* ≤ .0001.

^b*P* < .05.

non-Hispanic Asian and non-Hispanic Black adults, Graves disease was among the 5 most prevalent IMIDs, ranking fourth and fifth, respectively. Pso/PsA was also among the 5 most common IMIDs in all racial and ethnic groups except in non-Hispanic Black individuals.

We detected significant effect measure modification by age and sex for the associations between Hispanic and non-Hispanic Asian and Black races and ethnicities and the 5 most common autoimmune conditions in the study population (*P* < .0001 for 1 or more interaction terms for all outcomes).

Table 2 provides ORs for Hispanic and non-Hispanic Asian and Black adults vs non-Hispanic White adults for the 5 most prevalent IMIDs in the database stratified by age and sex. In Hispanic or non-White adults of all ages, except Asian men 60 years or older, we observed positive associations (*P* < .0001) with SLE. Further, we observed positive associations (*P* < .0001) between non-Hispanic Black women younger than 60 years and MS but inverse associations (*P* < .0001) between Hispanic adults (women ≥ 40 years and men ≥ 60 years), Asian women of all ages, and Asian men 40 years or older and MS. IBD was inversely associated (*P* < .0001) with

Hispanic or non-White adults of all ages, and Pso/PsA was inversely associated (*P* < .0001) with non-Hispanic Black adults of all ages and Hispanic and Asian women 40 years or older (*P* < .0001). We observed positive associations (*P* < .0001) between RA and Hispanic women 40 years or older and non-Hispanic Asian and Black women 60 years or older. Interestingly, an inverse association (*P* < .0001) was observed between Black men 60 years or older and RA. We did not observe positive or inverse associations that reached statistical significance (*P* < .0001) between Hispanic or non-White adults of any age and sex and overlap syndrome.

DISCUSSION

We evaluated associations between race and ethnicity and IMIDs using EHR and claims data of insured adults from all US states. The most prevalent IMIDs in this sample were IBD, MS, Pso/PsA, SLE, RA, and Graves disease; the prevalence of any given IMID was greatest among non-Hispanic White adults, followed by non-Hispanic Black, Hispanic, and non-Hispanic Asian adults. Overall, we did observe

significant variations in the prevalence of these conditions by race and ethnicity ($\chi^2 P < .0001$). Further, we observed significant effect measure modification of these associations by age and sex (P of interaction terms $< .0001$). Lastly, we found a small proportion of the sample with overlap syndrome, with the prevalence of having at least 2 IMIDs relatively similar across all racial/ethnic groups, between 0.01% and 0.02%.

When reviewing the 5 most prevalent IMIDs by race and ethnicity, the greatest increase in odds was observed between non-Hispanic Black women and Hispanic men aged 20 to 49 years and SLE, who had 5 to 6 times the odds compared with non-Hispanic White women and men aged 20 to 49 years, respectively.

We discovered some findings consistent with prior literature as well as some contradictory and new findings when focusing on the most common IMIDs. Our results confirm recent findings from studies that have reported an increasing prevalence of MS in Black adults compared with non-Hispanic White adults.²²⁻²⁴ MS is a condition that was traditionally believed to have a greater disease burden in White individuals than in those of other races. For example, results from a study based on a 2010-2016 US health care database found MS prevalence to be lower among African American than Caucasian individuals.¹³ However, results from a study conducted in 2009-2010 found a comparable prevalence,²³ and results from a more recent study found a greater prevalence.²⁴ This increasing trend is replicated in our data for Black women younger than 60 years, who had 14% to 77% increased odds of MS compared with White women younger than 60 years. Interestingly, we observed an inverse association in Black women 60 years or older.

Our findings for SLE are consistent with prior research, in which greater prevalence or risk of SLE has been suggested among Hispanic or non-Hispanic Black or Asian individuals in population- or claims-based studies conducted in different regions of the United States.^{5-8,13} Further, our results confirm certain findings from a study conducted on the NHANES that evaluated the prevalence of RA by race and Hispanic ethnicity.²⁵ This study reported a higher RA prevalence among Hispanic and non-Hispanic Black women compared with non-Hispanic White women,²⁵ a result that we observed in Hispanic women 40 years or older and non-Hispanic Asian and Black women 60 years or older. Contrary to our study results, however, the NHANES study findings also reported a positive association with non-Hispanic Black men. These differences may have resulted from differences in the study cohorts or the methodology used to report RA diagnoses (self-report in NHANES vs ICD-10 codes in ours). Such differences call for additional studies that evaluate prevalence of RA by race and ethnicity.

Few recent studies have examined associations between race/ethnicity and Pso/PsA in the United States.⁹⁻¹² Earlier studies conducted more than 9 years ago⁹⁻¹¹ found a higher prevalence of Pso/PsA in non-Hispanic White adults compared with other racial and ethnic groups. Our study results confirm these findings for non-Hispanic Black adults and Hispanic and Asian women older than 40 years. Furthermore, we found racial and ethnic differences

in IBD by age and gender, with a lower prevalence in other races and ethnicities compared with non-Hispanic White adults. Although no recent study representative of the general population has estimated the prevalence of IBD by race and ethnicity, results from a study conducted among Medicare fee-for-service recipients older than 67 years found a similar increased prevalence in non-Hispanic White adults compared with other groups.²⁶

The prevalence of overlap syndrome was lower than reported by other studies,^{16,17} but this could be due to differences in how overlap syndrome was defined, including what IMIDs were assessed. We could not compare our findings regarding overlap syndrome with those of other studies due to the lack of other studies that reported the prevalence of overlap syndrome. However, the co-occurrence of SLE and RA in general has been previously documented.²⁷ Further research is needed to understand possible reasons for the higher co-occurrence of SLE and RA among non-White or Hispanic racial and ethnic groups.

Study Limitations and Strengths

A limitation of our study is that approximately 30% of individuals had race and ethnicity coded as “other,” “unknown,” or “declined.” Further, data from racial and ethnic groups such as Native Americans and Pacific Islander individuals, who are at increased risk for IMIDs such as SLE,¹³ were not analyzed because they were coded as “other.” Moreover, the data were limited to those with any insurance coverage. To assess potential bias due to insurance status and missing race and ethnicity data, we compared our analytical sample (ie, RWD) with the racial and ethnic distribution of the 2020 US Census²⁸ and found relatively similar distributions. However, our study population slightly overrepresented women (57% in RWD vs 52% in the US Census), individuals older than 60 years (33% in RWD vs 23% in the US Census), and non-Hispanic White adults (67% in RWD vs 59% in the US Census) and underrepresented Hispanic (13% in RWD vs 18% in the US Census) and non-Hispanic Asian (4% in RWD vs 5% in the US Census) adults compared with their distribution in the United States in 2020.²⁸

Further, because we restricted the data to those with greater than the mean number of claims per given age group, it is possible that individuals included in our analytical sample were less healthy or had more severe disease. However, we found mean length of hospitalizations to be similar in samples with and without the restriction. Furthermore, we compared the prevalence of chronic conditions in our study sample with national data (eg, reported by the CDC) and found a relatively similar prevalence²⁹⁻³² (diagnosed diabetes: 14% in RWD vs 11% in national data²⁹; coronary artery disease^{30,31} and chronic obstructive pulmonary disease³²: 5% and 6%, respectively, in either RWD or national data).

Lastly, due to limited sample size, we could only assess the co-occurrence of the most common IMIDs, potentially leading to underestimation of overlap syndrome.

Despite the limitations, this study has several key strengths, most notably the use of a large US health care database with comprehensive

data on IMIDs and demographics. This allowed analyses to assess effect measure modification by age and sex in the associations between race and ethnicity and several IMIDs, including rarer diseases. We were also able to minimize misclassification of IMIDs by reviewing multiple health care visits with diagnosis codes. These data also allowed for validation analyses of prior studies. To our knowledge, our study is the only study to report the prevalence of several IMIDs and overlap syndrome by race and Hispanic ethnicity using a large US health care database.

CONCLUSIONS

Our findings indicate a relatively similar prevalence of any given IMID across racial and ethnic groups, with some IMIDs, such as IBD, being more prevalent among non-Hispanic White adults and others, such as SLE, being more prevalent in Hispanic and non-Hispanic Asian and Black adults. Furthermore, although the prevalence of 2 or more co-occurring IMIDs was similarly low among all groups, differences by race and ethnicity were noted in which 2 co-occurred most frequently. Awareness of racial and ethnic differences with respect to IMIDs could shorten time to accurate diagnosis, result in significantly improved disease management and better treatment opportunities, and curtail disease progression, morbidity, and mortality. ■

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eAppendix Table.

Autoimmune Diseases	ICD-10 codes
Rheumatoid arthritis (RA)	M05.861, M05.862, M05.869, M05.871, M05.872, M05.879, M05.89, M05.8A, M05.9, M06.00, M06.011, M06.012, M06.019, M06.021, M06.022
Systemic lupus erythematosus (SLE)	M32.10, M32.11, M32.12, M32.13, M32.14, M32.15, M32.19, M32.8, M32.9
Psoriasis and psoriatic arthritis (PsO/PsA)	L40.1, L40.2, L40.3, L40.4, L40.50, L40.51, L40.52, L40.53, L40.54, L40.59, L40.8, L40.9
Irritable bowel disease (IBD)	K50.00, K50.0011, K50.011, K50.012, K50.013, K50.014, K50.018, K50.019, K50.10, K50.111, K50.112, K50.113, K50.114, K50.118, K50.119, K50.80, K50.811, K50.812, K50.813, K50.814, K50.818, K50.819, K50.90, K50.911, K50.912, K50.913, K50.914, K50.918, K51.00, K51.011, K51.012, K51.013, K51.014, K51.018, K51.019, K51.20, K51.211, K51.212, K51.213, K51.214, K51.218, K51.219, K51.30, K51.311, K51.312, K51.313, K51.314, K51.318, K51.319, K51.40, K51.411, K51.412, K51.413, K51.414, K51.418, K51.419, K51.50, K51.511, K51.512, K51.513, K51.514, K51.518, K51.519, K51.80, K51.811, K51.812, K51.813, K51.814, K51.818, K51.819, K51.90, K51.911, K51.912, K51.913, K51.914, K51.918, K51.919
Multiple sclerosis (MS)	G35
Systemic sclerosis (SSc)	M34, M34.0, M34.1, M34.9
Dermatomyositis/Polymyositis	M33.00, M33.01, M33.02, M33.03, M33.09, M33.10, M33.11, M33.12, M33.13, M33.19, M33.20, M33.21, M33.22, M33.29, M33.90, M33.91, M33.92, M33.93, M33.99
Type 1 diabetes	E10.43, E10.44, E10.49, E10.51, E10.52, E10.59, E10.610, E10.618, E10.620, E10.621, E10.628, E10.630, E10.638, E10.641
Celiac disease	K90.0
Autoimmune thyroiditis	E06.3
Grave's disease	E05.00, E05.01, E05.10, E05.11, E05.20, E05.21
Pernicious Anemia	D51.0
Myasthenia gravis	G70.00, G70.01
Cutaneous lupus erythematosus	L93.0, L93.1
Giant cell arteritis	M31.5, M31.6
Granulomatous polyangiitis	M31.30, M31.31
Microscopic polyangiitis	M31.7
Other vasculitis	M31.0, M31.10, M31.19, M31.4, M31.8, M31.9

Marfan's syndrome	Q87.40
Mixed connective tissue disease	M35.0
Vitiligo	L80
Sjogren's syndrome	M35.0
Coronary artery disease (CAD)	I25.10
Type 2 diabetes (T2DM)	E11.00, E11.01, E11.10, E11.11, E11.65, E11.641, E11.649, E11.8, E11.9, E11.40, E11.41, E11.42, E11.49, E11.21, E11.29, E11.319
Chronic obstructive pulmonary disease (COPD)	J44.0, J44.1, J44.9, J42, J43.0, J43.1, J43.2, J43.8, J43.9
Chronic kidney disease (CKD)	N18.1, N18.2, N18.3, N18.30, N1831, N18.32, N18.4, N18.5, N18.6, N18.9