MEDICINEINSIGHT SHORT REPORT

Characteristics of primary care patients recorded as having rheumatoid arthritis using MedicineInsight general practice data

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Contents

ABSTRACT

Background: There is limited information on care provided by general practitioners (GPs) to Australian patients with rheumatoid arthritis (RA).

Aims: To describe the characteristics and management of patients with RA seen in general practice.

Method: A cross-sectional study, using general practice electronic health records data from MedicineInsight, from 1 January 2019 to 31 December 2021, was conducted. The demographics, medicines use, medical test requests and co-morbidities in patients with and without a record of RA was investigated.

Results: Among regularly attending primary care patients aged 45 years or older, the prevalence of recorded RA was 2.2%. Patients with RA had higher levels of co-morbidities than patients without RA. GPs prescribed conventional synthetic disease-modifying anti-rheumatic drugs (csDMARDs) to a third of patients with RA. Consistent with PBS restrictions, biological DMARDs (bDMARDs) were rarely prescribed in general practice. Analgesics, glucocorticoids and vaccines were more commonly given to patients with RA than patients without.

Conclusion: This study provides information about care provided to these patients by GPs compared to patients without RA, including information about co-morbidities, vaccinations and care provided in the months before and after the first record of diagnosis. Patients with RA are more likely to have comorbidities than patients without RA. GPs are more likely to prescribe analgesics, antibiotics and PPIs to patients with RA than without. The data suggests specialists remain largely responsible for prescribing of disease modifying agents. Consistent with Australian guidelines, the data also suggests that patients with suspected RA are referred to specialists.

INTRODUCTION

Care of patients with rheumatoid arthritis (RA) requires both general practitioner (GP) and specialist input. Rheumatologists generally initiate, manage and provide ongoing advice about disease modifying drugs. They also prescribe supporting therapy such as analgesia, non-steroidal anti-inflammatory agents (NSAIDs) and glucocorticoids (a class of corticosteroid). GPs can prescribe some disease modifying anti-rheumatic drugs (DMARDs). They also prescribe supporting therapy, particularly when there is limited access to rheumatologists, and manage comorbidities. Pharmaceutical Benefit Scheme (PBS) criteria generally restrict prescribing of biologic disease modifying anti-rheumatic drugs (bDMARDs) and targeted synthetic disease modifying anti-rheumatic drugs (tsDMARDs) to rheumatologists and immunologists.

An estimated 456,000 Australians, or 1.9% of the total population, have rheumatoid arthritis.[1] However, there is limited information on the characteristics and management of RA in Australian patients. Most of the information about medicines by patients with RA comes from the Australian Rheumatology Association Database (ARAD), a national registry collecting long-term outcome data from patients with inflammatory arthritis.[2] Various studies using this register have reported that approximately three quarters of patients use conventional synthetic disease-modifying anti-rheumatic drugs (csDMARDs), just over half use bDMARDs and 44% use oral glucocorticoids.[3,4] Analgesics are also commonly used with 43% of registry patients using NSAIDs and, despite guidelines that recommend against their routine use,[5] approximately a third using opioids.

MedicineInsight, a national general practice database, contains data on diagnoses, prescriptions, blood glucose control and comorbidities extracted directly from the clinical information software.[6] Previous work using this dataset suggests approximately 1% of regular patients attending MedicineInsight practices have a recorded diagnosis of RA.[7] It also suggests that patients with RA visit their GP quite frequently – in a single year, the average number of GP visits for patients with RA was 11.6, compared with the average of 5.4 GP visits for all MedicineInsight patients.[8]

Some information about GP management is available from 2006–2016 encounter data collected as part of the Bettering the Evaluation and Care of Health (BEACH) program. This found that for every 10,000 GP encounters, 38 were with patients with RA and at least one medicine was prescribed at two-thirds of encounters. The medicines most commonly prescribed during these encounters were csDMARDs (34.8%), corticosteroids (13.2%) and opioids (12.5%).[9] Another study exploring use of long-term opioids among general practice patients with RA found 14.9% of patients had been using opioids for at least 90 days.[10]

This study compares care provided to patients with RA compared with those without RA, including information on vaccination and co-morbidities. It also provides a snapshot of care provided before and after diagnosis of RA.

METHODS

Study design and data source

A cross-sectional study, using Australian general practice electronic health records data from MedicineInsight, from 1 January 2019 to 31 December 2021 was conducted. Historical records outside this study period were included when identifying patient demographics and history of rheumatoid arthritis or specified comorbidities.

MedicineInsight has been described in detail elsewhere.[6] It is a national general practice data program managed by NPS MedicineWise with funding support from the Australian Government Department of Health and Aged Care. MedicineInsight extracts and collates longitudinal, de-identified patient health records from clinical information systems (CIS; 'Best Practice' or 'MedicalDirector') of participating practices. The data includes patient demographics, encounters, diagnoses, prescriptions and pathology tests. Progress notes, recorded by providers in the unstructured area of the medical record, are not collected because they may contain identifiable information.[6] The sociodemographic characteristics of MedicineInsight patients are broadly comparable to the national patient population who visited a GP at least once during a year.[8]

Baseline study population and RA cohort

MedicineInsight is an open cohort meaning patients and practices can leave or join over time. In addition, Australian patients are not registered with a single practice and can visit multiple general practices. To improve data quality and completeness we restricted the study population to regularly attending patients as described below.

Only MedicineInsight practices meeting standard data quality criteria (described elsewhere) were included.[6] Patients with valid, non-missing data for age and sex, who had visited general practice site at least three times (Royal Australian College of General Practitioners [RACGP] definition of 'active' patients [11]) between January 2020 and December 2021 were eligible for inclusion. Patients also had to have at least 1 clinical encounter in 2019, to ensure that they were not patients newly entering the practice and there was sufficient patient history to identify patients with a new diagnosis of RA.

Patients were defined as having RA if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the three diagnosis fields – diagnosis, reason for encounter or reason for prescription – recorded at any time from the patient's earliest record up to the end of 2021 (Table 1). Patients newly diagnosed with RA were patients whose first recorded diagnosis of RA fell within the two-year study period and who had no record of RA prior to diagnosis (index date). Explorations of medicines use and medical testing around the time of diagnosis were undertaken by looking at the period 90 days before the index date and 90 days after the index date.

TABLE 1: CLINICAL DEFINITIONS USED TO IDENTIFY MEDICINEINSIGHT PATIENTS

Condition	Terms used to identify condition
Rheumatoid arthritis	arthritis (juvenile rheumatoid or rheumatoid or seronegative), caplan syndrome, jra, lipoid dermatoarthritis, lipoid rheumatism, multicentric reticulohistiocytosis, RA, rheumatoid arthritis – pneumoconiosis, seronegative rheumatoid arthritis, stills disease
Asthma	allergic asthma, allergy induced asthma, asthma, asthma action plan, asthma care plan, asthma cycle of care, asthma exacerbation, asthma review, exercise induced

	asthma, exertional asthma, occupational asthma, Samter's triad or thunderstorm asthma.
Cardiovascular disease	atherosclerosis, coronary heart disease (including myocardial infarction and angina), peripheral vascular disease, stroke and transient ischaemic attack
Chronic kidney disease (CKD)	anaemia - chronic renal failure, CAPD, catheterisation of peritoneum, chronic kidney disease or CKD (all stages), chronic renal disease (all stages), chronic renal failure, chronic renal failure – hyperparathyroidism, chronic renal insufficiency, continuous ambulatory peritoneal dialysis, CRF, dialysis, haemodialysis, hemodialysis, peritoneal catherisation for dialysis, peritoneal dialysis renal dialysis or surgery -abdomen - dialysis – catheterisation
Chronic obstructive pulmonary disease (COPD)	acute exacerbation of COPD, CAL, chronic airways limitation, chronic bronchitis, chronic obstructive airways disease, chronic obstructive pulmonary disease, COAD, COPD, emphysema
Depression	adjustment disorder with depressed +/- anxious mood, anxiety/depression, depres, depression, (endogenous or major or melancholic or minor or non melancholic or organic or postnatal or psychotic or reactive or recurrent or subsyndromal) depression or depressive disorder or depressive episode, melancholia
Diabetes (excluding gestational diabetes)	diabetes, diabetes (controlled or cortisone induced or unstable), diabetes mellitus (IDDM or NIDDM or type I or type 1 or type II or type 2 or type 3c), IDDM, insulin dependent diabetes mellitus, juvenile onset diabetes, latent autoimmune diabetes of adults, NIDDM, non insulin dependent diabetes mellitus, pancreatogenic diabetes, T2DM, TIIi
Dyslipidaemia	dyslipidaemia, dyslip, familial (hypercholesterolaemia or hypercholesterolemia), HDL, high cholesterol, high cholest, high lipids, hypercholesterolaemia, hyperlipidaemia, hyperlipoproteinaemia (type 2 or type iv or type IIia), hypertriglyceridaemia, hypercho, hyperlip, hypertr
Hypertension	antihypertensive agent prescription, (blood pressure or bp) and (labile or review or unstable), hbp, high blood pressure, ht, hypertension, hypertension (controlled or diastolic or essential or isolated systolic or labile or life style management or malignant or pregnancy or primary or renal or renovascular or review or unstable), pih, pregnancy induced hypertension or severe refractory hypertension
Osteoporosis	osteoporosis, osteoporosis (corticosteroid induced or no fracture or with fracture or disuse or steroid induced), pathological fracture due to osteoporosis, post menopausal osteoporosis, steroid osteopathy

Medicines, vaccinations and medical test requests

Prescriptions were identified using Anatomical Therapeutic Chemical (ATC) codes or the medicine active ingredient recorded in the 'script item' field during the study period (Table 2).

TABLE 2: MEDICINES INCLUDED IN EACH CLASS

Class	Active ingredient	ATC code
bDMARDs	abatacept	L04AA24
	tofacitnib	L04AA29
	baricitinib	L04AA37
	upadacitinib	L04AA44
	anakinra	L04AC03
	etanercept	L04AB01
	infliximab	L04AB02
	adalimumab	L04AB04
	certolizumab	L04AB05
	golimumab	L04AB06
	tocilizumab	L04AC07
	rituximab	L01XC02
csDMARDs	methotrexate	L01BA01, L04AX03
	leflunomide	L04AA13
	sulphasalazine	A07EC01
	hydroxychloroquine	P01BA02
	azathioprine	L04AX01
	cyclosporin	L04AD01
	intramuscular gold	M01CB
	penicillamine	M01CC01
Opioids (excluding codeine)		N02A (except N02AJ06–09, N02AA59 and N02AA79)
Codeine		N02AJ06
		N02AJ07
		N02AJ08
		N02AJ09
		N02AA59
		N02AA79
		R05DA04
NSAIDs		M01A
Antibiotics		J01
Antivirals		J05
Oral glucocorticoids	dexamethasone	H02AB02
	prednisolone	H02AB06
	prednisone	H02AB07
Paracetamol	paracetamol	N02BE01
Proton Pump Inhibitors	PPIs	A02BC

Patients were considered to be vaccinated if they had at least one record of a vaccine (influenza, herpes zoster, pneumococcal or COVID-19) in the immunisation field and the date was during the study period (Table 3). The exception was for the herpes zoster vaccine, which was considered to have been given if there was any record of it being administered at any time

in the patient's medical history up until the end of the study period. Patients may receive vaccines in other settings (pharmacies, state vaccination clinics) and so not all vaccinations may be captured.

TABLE 3: TERMS USED TO IDENTIFY VACCINES

Class	Vaccine name
Influenza vaccine	flu vaccine, influenza, flu injection, fluvax, flu high dose, flu shot, quad flu OR Afluria Quad, Fluad Quad, Fluarix Tetra, Flucelvax Quad, FluQuadri, Influvac Tetra, Vaxigrip Tetra
Herpes zoster vaccine	Shingrix, Zostavax
Pneumococcal vaccine	Prevenar-13/Pneumovax-23
COVID-19 vaccine	Vaxzevria/Comirnaty/Spikevax

Medical tests requested by the GP were identified using the 'REQUESTED_TESTS' field. As GPs often list more than one medical test in the one line in this field, and as GPs may use variations on a test name when requesting a test, we limited analysis to the first 250 characters contained in the line.

Covariates

Socioeconomic status and remoteness

Patient age was calculated at 1 July 2020 based on the patient's year of birth and only patients identified as being male or female were included. Patient postcode was used to assign socioeconomic status using the Australian Bureau of Statistics (ABS) Index of Relative Socioeconomic Advantage and Disadvantage [IRSAD].[12] Patients were stratified by IRSAD quintiles (1 to 5, most disadvantaged to most advantaged). Patient postcode was used to assign a remoteness category (based on the ABS Australian Statistical Geography Standard [ASGS]).[13] Categories include major city, inner regional, outer regional, remote and very remote. Because of low numbers of patients, the very remote category was combined with the remote category.

Comorbidities

Patient co-morbidities were identified using MedicineInsight 'condition flags'. These flags use an algorithm that looks at relevant coded (Docle, Pyefinch) or free text entries in at least one of the three diagnosis fields – diagnosis, reason for encounter or reason for prescription. These can be recorded at any time from the patient's earliest record up to the download date (ie, ever recorded in the medical history). The definitions for each of the study flags used in this study are included in Table 1. To assess the burden of comorbidities, the Charlson Comorbidity Index was calculated for each patient with a higher score indicating a greater comorbidity burden.

Statistical analysis

Analyses were conducted using SAS version 9.4 (SAS Institute Inc., Cary, NC, USA). To indicate the reliability of the estimates of prevalence and proportion, 95% confidence intervals were calculated using robust errors to adjust for clustering by practice site. Non-overlap of 95% CIs and p-value <0.05 were used to indicate statistical significance where appropriate.

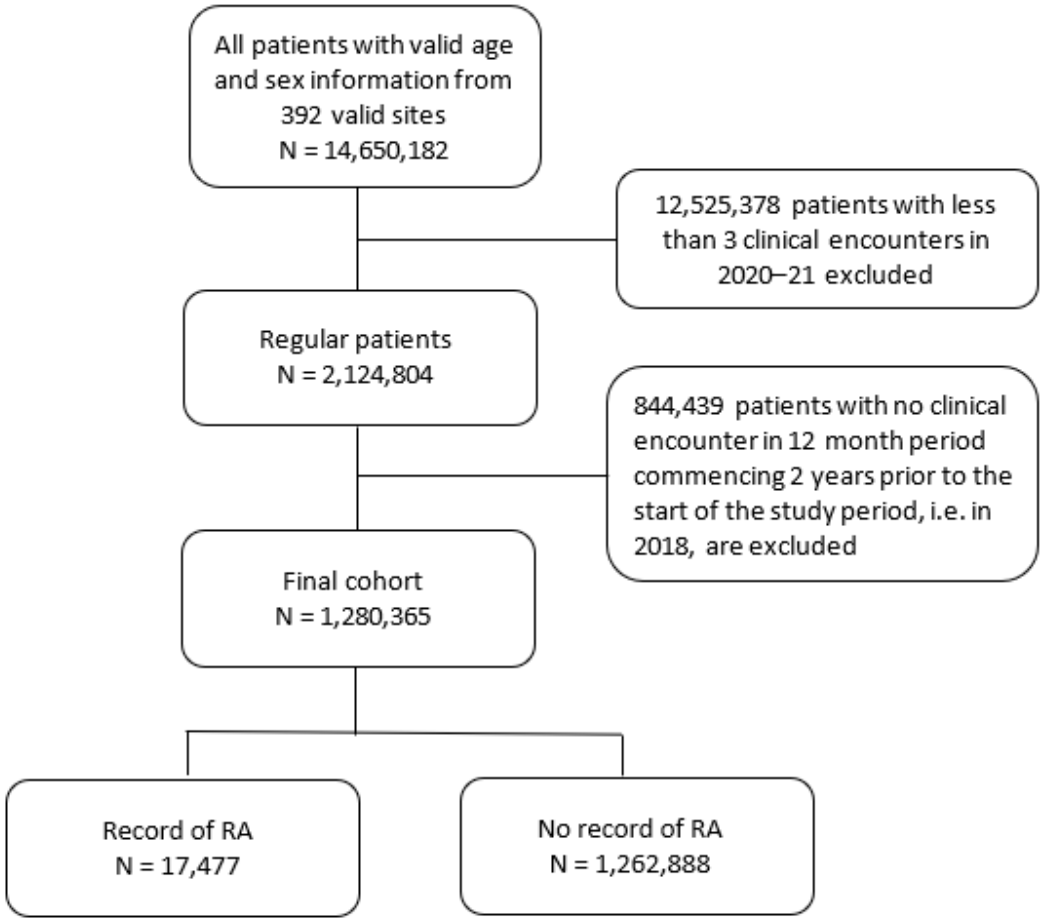
Ethics approval

Approval to conduct this study was granted on 22 October 2021 by the MedicineInsight Independent Data Governance Committee (2021–021). The Royal Australian College of General Practitioners (RACGP) National Research and Evaluation Ethics Committee (NREEC) granted ethics approval for the study on 18 December 2021 (NREEC 21-110).

RESULTS

Of 1.28 million regularly attending patients of all ages, 17,477 (1.4%) had a recorded diagnosis of RA (Table 4, Figure 1).

FIGURE 1: PATIENT INCLUSION CRITERIA FOR STUDY COHORT



Prevalence of RA by patient characteristics

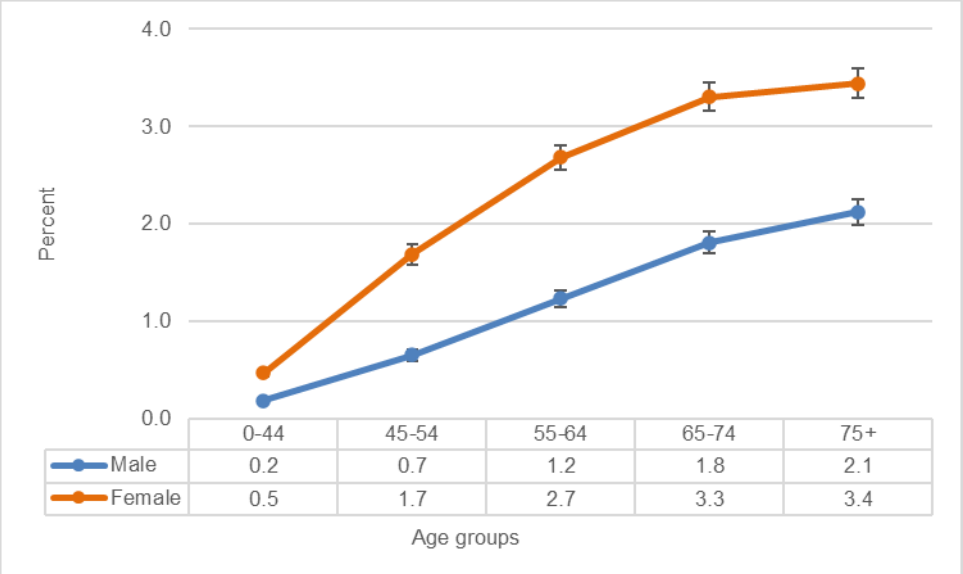
Among patients aged 45 years or older, the prevalence of RA was 2.2%. Consistent with other Australian data sources, the prevalence of RA was higher in women and increased with age (Table 4; Figure 2). The prevalence of RA was significantly higher in Tasmania than in all other states and territories except the ACT. Patients from the most disadvantaged regions had a higher prevalence than those from the least disadvantaged areas.

TABLE 4: PREVALENCE OF RHEUMATOID ARTHRITIS IN ALL REGULARLY ATTENDING PATIENTS (N = 1,280,365) OVERALL AND BY PATIENT CHARACTERISTICS

Patient characteristic	Patients with RA ever recorded		Newly recorded RA	
	n	% (95% CI)	n	% (95% CI)
Total	17,477	1.4 (1.3, 1.4)	1924	0.2 (0.1, 0.2)
Sex				
Male	5099	0.9 (0.9, 1.0)	630	0.1 (0.1, 0.1)
Female	12,378	1.7 (1.6, 1.8)	1294	0.2 (0.2, 0.2)
Age				
≤44	2007	0.4 (0.3, 0.4)	349	0.1 (0.1, 0.1)
45–54	2213	1.2 (1.2, 1.3)	331	0.2 (0.2, 0.2)
55–64	3842	2.0 (1.9, 2.1)	411	0.2 (0.2, 0.2)
65–74	4776	2.6 (2.5, 2.7)	472	0.3 (0.2, 0.3)
75+	4639	2.9 (2.7, 3.0)	361	0.2 (0.2, 0.2)
Age-sex				
Male ≤44	448	0.2 (0.2, 0.2)	84	0.0 (0.0, 0.0)
Male 45–54	493	0.7 (0.6, 0.7)	77	0.1 (0.1, 0.1)
Male 55–64	1069	1.2 (1.2, 1.3)	140	0.2 (0.1, 0.2)
Male 65–74	1561	1.8 (1.7, 1.9)	186	0.2 (0.2, 0.2)
Male 75+	1528	2.1 (2.0, 2.2)	143	0.2 (0.2, 0.2)
Female ≤44	1559	0.5 (0.4, 0.5)	265	0.1 (0.1, 0.1)
Female 45–54	1720	1.7 (1.6, 1.8)	254	0.2 (0.2, 0.3)
Female 55–64	2773	2.7 (2.6, 2.8)	271	0.3 (0.2, 0.3)
Female 65–74	3215	3.3 (3.2, 3.5)	286	0.3 (0.3, 0.3)
Female 75+	3111	3.4 (3.3, 3.6)	218	0.2 (0.2, 0.3)
State				
ACT	453	1.5 (1.2, 1.8)	45	0.1 (0.1, 0.2)
NSW	5711	1.3 (1.2, 1.4)	621	0.1 (0.1, 0.2)
NT	110	1.1 (0.7, 1.4)	10	0.1 (0.0, 0.2)
QLD	3171	1.3 (1.2, 1.4)	357	0.1 (0.1, 0.2)
SA	381	1.3 (1.0, 1.7)	54	0.2 (0.2, 0.2)
TAS	1722	2.0 (1.8, 2.3)	203	0.2 (0.2, 0.3)
VIC	3792	1.3 (1.2, 1.5)	391	0.1 (0.1, 0.2)
WA	2137	1.4 (1.2, 1.5)	243	0.2 (0.1, 0.2)
Remoteness				
Major city	9424	1.2 (1.1, 1.3)	1024	0.1 (0.1, 0.1)
Inner regional	5240	1.6 (1.4, 1.7)	596	0.2 (0.2, 0.2)
Outer regional	2587	1.7 (1.5, 1.9)	259	0.2 (0.1, 0.2)
Remote	226	1.6 (1.2, 2.1)	45	0.3 (0.2, 0.4)

Patient characteristic	Patients with RA ever recorded		Newly recorded RA	
	n	% (95% CI)	n	% (95% CI)
Socio-economic status (SEIFA IRSAD quintile)				
1 (most disadvantaged)	3717	1.7 (1.5, 1.9)	397	0.2 (0.2, 0.2)
2	3937	1.6 (1.5, 1.7)	415	0.2 (0.2, 0.2)
3	3883	1.4 (1.3, 1.4)	449	0.2 (0.1, 0.2)
4	2918	1.1 (1.1, 1.2)	346	0.1 (0.1, 0.2)
5 (most advantaged)	3022	1.1 (1.0, 1.2)	317	0.1 (0.1, 0.1)

FIGURE 2: PREVALENCE OF RHEUMATOID ARTHRITIS BY AGE AND SEX



Patients with a history of RA

Almost 45% of patients without RA were aged 44 years or younger compared with 11.5% of patients with RA (Appendix Table 7). Because the cohort of patients without RA was so much younger than the cohort of patients with RA, explorations of medicines, vaccines, testing, comorbidities and risk factors were restricted to patients aged 45 years or older.

Patients with RA aged 45 years or older had a significantly higher prevalence of all of the co-morbid condition and risk factors than patients aged 45 years or older without RA (Figure 3). The prevalence of osteoporosis in the RA population (32.8%) was double that of patients without RA (16.0%), consistent with the higher number of women in the RA cohort. A third of patients with RA had a record of depression and 21.6% had a record of cardiovascular disease. Patients with RA also had a much higher Charlson Comorbidity Index score CCI (2.2: 95% CI 2.2–2.3) than those without RA (1.0; 95% CI 1.0–1.0), indicating higher levels of comorbities.

FIGURE 3: PREVALENCE OF CO-MORBIDITIES AND RISK FACTORS AMONG PATIENTS AGED 45 YEARS OR OLDER WITH AND WITHOUT RA

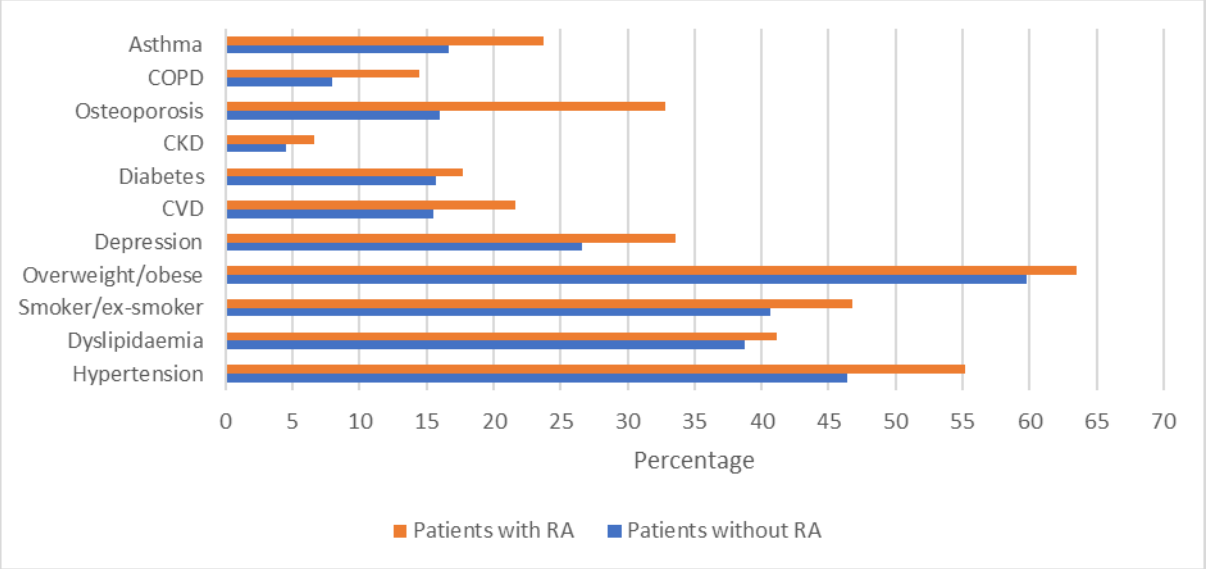


Table 5 shows the proportion of patients with and without RA who have been prescribed a medicine, given a vaccine or requested a pathology test during the study period.

While GPs had prescribed csDMARDs to a third of patients with RA, there was little prescribing of a bDMARD – this is to be expected given the PBS restrictions. Analgesic medicines of all classes were more commonly prescribed to patients with RA than patients without RA. Patients with RA were significantly more likely to have a record of vaccination for all of the listed vaccines apart from the herpes zoster vaccine.

More than half of the patients with RA had full blood counts, lipid studies and liver function tests ordered in the study period. Patients with RA were significantly more likely to have x-rays of the hand or feet and bone mineral density tests requested.

TABLE 5: PROPORTION OF REGULARLY ATTENDING PATIENTS AGED 45 YEARS OR OLDER (N=713,165) WITH AND WITHOUT RA WHO HAVE BEEN PRESCRIBED A MEDICINE, GIVEN A VACCINE OR REQUESTED A PATHOLOGY TEST DURING THE STUDY PERIOD

Patient characteristic	Patients without RA n=697,695		Patients with RA n=15,470	
	n	% (95% CI)	n	% (95% CI)
Medicines				
csDMARDs	5697	0.8 (0.8, 0.9)	5225	33.8 (32.4, 35.1)
Methotrexate	2490	0.4 (0.3, 0.4)	3808	24.6 (23.5, 25.7)
Leflunomide	377	0.1 (0.0, 0.1)	1052	6.8 (6.3, 7.3)
Sulphasalazine	1478	0.2 (0.2, 0.2)	794	5.1 (4.7, 5.6)
Hydroxychloroquine	737	0.1 (0.1, 0.1)	619	4.0 (3.1, 4.9)
Azathioprine	1084	0.2 (0.1, 0.2)	58	0.4 (0.3, 0.5)
Intramuscular gold	5	0.0 (0.0, 0.0)	9	0.1 (0.0, 0.1)
Penicillamine	5	0.0 (0.0, 0.0)	<5	-

Patient characteristic	Patients without RA n=697,695		Patients with RA n=15,470	
	n	% (95% CI)	n	% (95% CI)
bDMARDs	84	0.0 (0.0, 0.0)	101	0.7 (0.5, 0.8)
Opioids (excluding codeine)	91,265	13.1 (12.5, 13.7)	4227	27.3 (26.1, 28.6)
Codeine	105,924	15.2 (14.6, 15.7)	3641	23.5 (22.6, 24.5)
NSAID	141,516	20.3 (19.6, 20.9)	4883	31.6 (30.4, 32.7)
Oral glucocorticoid	66,625	9.5 (9.1, 10.0)	5143	33.2 (31.7, 34.8)
Antiviral	21,620	3.1 (2.9, 3.3)	817	5.3 (4.8, 5.8)
Antibiotic	298,484	42.8 (41.3, 44.2)	8705	56.3 (54.4, 58.2)
Paracetamol	43,352	6.2 (5.8, 6.7)	1775	11.5 (10.6, 12.3)
Proton pump inhibitor	211,740	30.3 (29.4, 31.3)	7406	47.9 (46.5, 49.3)
Vaccines				
Influenza vaccine	375,747	53.9 (51.9, 55.8)	10,715	69.3 (67.4, 71.1)
Pneumococcal vaccine	85,312	12.2 (11.3, 13.2)	2769	17.9 (16.5, 19.3)
Herpes zoster vaccine	136,673	19.6 (18.5, 20.7)	3207	20.7 (19.5, 21.9)
COVID-19 vaccine	369,110	52.9 (50.5, 55.3)	9526	61.6 (59.2, 64.0)
Medical tests				
Rheumatoid factor	22,114	3.2 (3.0, 3.4)	1672	10.8 (10.1, 11.6)
Anti-CCP antibodies	18,381	2.6 (2.4, 2.8)	1358	8.8 (8.1, 9.4)
C-reactive protein	197,791	28.3 (27.0, 29.7)	7982	51.6 (49.6, 53.6)
Full blood count	336,351	48.2 (44.1, 52.4)	7850	50.7 (46.4, 55.0)
Liver function tests	367,442	52.7 (49.1, 56.2)	8507	55.0 (51.3, 58.7)
Lipid studies	408168	58.5 (56.6, 60.5)	8104	52.4 (50.1, 54.7)
HbA1c	285967	41.0 (39.1, 42.9)	6185	40.0 (37.9, 42.0)
Erythrocyte sedimentation rate (ESR)	176420	25.3 (23.8, 26.8)	7338	47.4 (45.6, 49.3)
X-ray of hands or feet	16183	2.3 (2.2, 2.4)	712	4.6 (4.2, 5.0)
Bone mineral density (BMD)	4848	0.7 (0.5, 0.8)	179	1.2 (0.9, 1.4)
Albumin/Creatinine ratio	83484	12.0 (10.8, 13.1)	1901	12.3 (10.9, 13.7)
eGFR	5990	0.9 (0.5, 1.2)	191	1.2 (0.7, 1.8)

Newly diagnosed patients

In the two year study period, 1924 patients (0.2% of patients of all eligible patients) were recorded as having RA for the first time. Patients newly diagnosed with RA were most commonly women aged 55–74 years.

Table 6 shows the proportion of patients newly diagnosed with RA who have been prescribed a medicine, given a vaccine or requested a pathology test in the 90 day periods before and after the first recorded diagnosis.

In the 90-day period before the first recorded diagnosis of RA, the most commonly requested tests were consistent with testing undertaken for diagnostic purposes. The GPs requested testing for the inflammatory markers of C-reactive protein for 28.7% of patients with a newly recorded diagnosis and erythrocyte sedimentation rate (ESR) for 27.1% of patients. Tests for rheumatoid factor (RF) and antibodies to cyclic citrullinated peptides (CCP), which may resolve diagnostic uncertainty, were requested by GPs prior to diagnosis for 17.7% and 16.3% of patients, respectively. X-rays of the hands or feet were requested for 6.0% of patients prior to diagnosis.

In the 90-day period after a patient had been newly recorded as having RA, 14.9% of patients were prescribed a csDMARD by their GP. Most commonly this was methotrexate. The proportion of patients prescribed analgesics (except paracetamol), antivirals and antibiotics was similar in the 90 days before and the 90 days after diagnosis. The proportion of patients who were prescribed PPIs or oral glucocorticoids was significantly higher in the 90 days after diagnosis than pre-diagnosis.

TABLE 6: PROPORTION OF NEWLY DIAGNOSED PATIENTS AGED 45 YEARS OR OLDER (N=1575) PRESCRIBED A MEDICINE OR REQUESTED A MEDICAL TEST IN THE 90 DAYS PRIOR TO THEIR DIAGNOSIS DATE AND THE 90 DAYS AFTER* THEIR DIAGNOSIS DATE

Patient characteristic	90 days prior to diagnosis		90 days after diagnosis*	
	n	% (95% CI)	n	% (95% CI)
Medicines				
csDMARDs	53	3.4 (2.5, 4.2)	234	14.9 (12.8, 16.9)
Methotrexate	36	2.3 (1.6, 3.0)	158	10.0 (8.4, 11.7)
Leflunomide	8	0.5 (0.2, 0.8)	42	2.7 (1.8, 3.5)
Sulphasalazine	<5	-	29	1.8 (1.1, 2.6)
Hydroxychloroquine	7	0.4 (0.1, 0.8)	27	1.7 (1.0, 2.4)
Azathioprine	0	-	<5	-
Intramuscular gold	0	-	0	-
Penicillamine	0	-	0	-
bDMARDs	0	(0.0, 0.0)	<5	-
Opioids (excluding codeine)	208	13.2 (11.2, 15.2)	220	14.0 (12.2, 15.7)
Codeine	155	9.8 (8.3, 11.4)	154	9.8 (8.2, 11.3)
NSAIDs	266	16.9 (15.2, 18.6)	262	16.6 (14.6, 18.7)
Oral glucocorticoids	216	13.7 (11.9, 15.6)	341	21.7 (19.5, 23.8)
Antivirals	14	0.9 (0.4, 1.4)	20	1.3 (0.7, 1.8)
Antibiotics	237	15.0 (13.1, 17.0)	255	16.2 (14.1, 18.3)
Paracetamol	38	2.4 (1.6, 3.2)	42	2.7 (1.9, 3.4)
Proton Pump Inhibitors	235	14.9 (13.1, 16.7)	342	21.7 (19.5, 23.9)
Medical tests				
Rheumatoid factor	278	17.7 (15.7, 19.6)	85	5.4 (4.2, 6.6)
Anti-CCP antibodies	256	16.3 (14.3, 18.3)	101	6.4 (5.1, 7.8)
C-reactive protein	452	28.7 (26.2, 31.2)	349	22.2 (19.9, 24.5)
Full blood count	351	22.3 (19.4, 25.2)	342	21.7 (18.8, 24.7)

Patient characteristic	90 days prior to diagnosis		90 days after diagnosis*	
	n	% (95% CI)	n	% (95% CI)
Liver function tests	329	20.9 (18.4, 23.4)	347	22.0 (19.3, 24.7)
Lipid studies	194	12.3 (10.5, 14.2)	198	12.6 (10.8, 14.4)
HbA1c	185	11.7 (10.0, 13.5)	187	11.9 (10.2, 13.6)
Erythrocyte sedimentation rate (ESR)	427	27.1 (24.8, 29.4)	313	19.9 (17.8, 21.9)
X-ray of hands or feet	94	6.0 (4.6, 7.3)	54	3.4 (2.5, 4.4)
Bone mineral density (BMD)	<5	-	5	0.3 (0.0, 0.6)
Albumin/Creatinine ratio	38	2.4 (1.6, 3.2)	42	2.7 (1.9, 3.4)
eGFR	<5	-	7	0.4 (0.0, 0.9)

*Including diagnosis day

DISCUSSION

This study found a higher prevalence of RA in areas of socioeconomic disadvantage, consistent with other studies.[1,9] These differences could reflect an increased likelihood of developing RA with greater disadvantage. Alternatively, diagnosis with RA may result in social disadvantage if patients are less able to work and therefore more likely to live in more disadvantaged areas where accommodation is cheaper.

Comorbidity rates were higher among people aged 45 years or older with RA than without RA, consistent with other research.[1,14] Patients with RA are at increased risk of cardiovascular disease and osteoporosis[15] and significantly higher prevalences of both conditions were seen in patients with RA than without. Depression was the most prevalent comorbidity identified with a third of patients with RA also having a recorded diagnosis of depression. Almost two thirds of patients were overweight or obese and more than half had also been diagnosed with hypertension.

The proportion of patients who had been prescribed either a csDMARD or a bDMARD was lower than the proportion of patients receiving these medicines reported in specialist registries.[3,4] This indicates that specialists, not GPs, are responsible for prescribing most of these medicines to patients. GPs are not permitted to prescribe bDMARDs on the PBS and while a small number of patients were prescribed bDMARDs by MedicineInsight practices, this may have been prescribing by specialists who share premises and clinical information software with GPs. As no information on clinical users is recorded by MedicineInsight it was not possible for this to be explored further. In contrast, prescribing of opioids, NSAIDs and oral glucocorticoids by GPs was much more common and closer to the prescribing levels reported in the registry studies.

With the exception of csDMARDs, prescribing of medicines in MedicineInsight was two to three times higher than reported in the BEACH study. This is attributable to differences in methodology. The BEACH program collected information on a sample of encounters with patients. In contrast, MedicineInsight captures data from all visits a patient has with their GP over a specified time period. Therefore, the BEACH study captured care provided at a single encounter between a patient and a GP, while MedicineInsight captured all care provided to a single patient over a year. As GPs may not prescribe medicines like opioids, glucocorticoids and other analgesics at every single encounter, the proportion of patients prescribed these medicines will appear lower in BEACH than in MedicineInsight. Similarly, rates of medical test requests appear higher in MedicineInsight than in the BEACH study.

The proportion of patients who had diagnostic tests requested in the 90 days before their first record of RA was relatively low. However, Australian guidelines recommend urgent referral of any patient with symptomatic rheumatoid arthritis to a specialist.[15] Therefore, it is possible that much of the diagnostic testing is being undertaken once a patient has been referred to a specialist.

Prescribing of most medicines was similar in the 90-day period before and after the first record of diagnosis. As would be expected, there was an increase in the use of the csDMARDs and oral glucocorticoids post-diagnosis. Patient with RA are at increased risk of peptic ulcer disease and the proportion who were prescribed proton pump inhibitors increased post-diagnosis.[15]

Strengths and limitations

The study comprised a large sample of data from general practices across Australia allowing a national view of the care provided to patients with RA by GPs. However, a limitation to the study is that which is inherent all studies using electronic health records (EHRs) in that it is dependent upon the completeness of recording in fields from which data can be extracted.[6] As this study was particularly interested in what GPs were requesting and prescribing, no attempt

to collect information that may have recorded about prescribing and test requests from non-MedicineInsight practices, hospitals and specialists was made.

The study period included the COVID-19 pandemic period. The pandemic, and the associated restrictions on movement, may have altered care provided to patient with RA. Patients with RA may have been more reluctant to visit their GP in person, may have been more likely to use the telehealth services introduced by the Australian government in early 2020 or may have seen their GP less frequently. However, many patients with RA had medical test results, for which sample collection would have required an in person visit to either their GP or pathology lab. This suggests that patients with RA continued to seek care throughout the pandemic. Future research could tease out the impact of the pandemic on care provided to patients with RA in more detail.

Conclusion

This study compared general practice patients with a record of RA to those without. Patients with RA had higher levels of co-morbidities and consistent with this GPs appeared to be actively monitoring cardiovascular and other risk factors. While GPs did prescribe csDMARDs to a third of patients, the study suggests prescribing of disease modifying drugs remains largely the responsibility of specialists. However, GPs are more likely to prescribe analgesics, oral glucorticoids, antibiotics and PPIs to patients with RA than without. Consistent with Australian guidelines, the data also suggests that patients with suspected RA are referred to specialists.

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APPENDIX

TABLE 7: SOCIODEMOGRAPHICS OF REGULARLY ATTENDING PATIENTS WITH AND WITHOUT RA AND PATIENTS WITH NEWLY DIAGNOSED RA

	Patients without RA		Patients with RA		Newly diagnosed RA	
	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)
Total	1,262,888	98.6 (98.6, 98.7)	17,477	1.4 (1.3, 1.4)	1924	0.2 (0.1, 0.2)
Sex						
Male	552,821	43.8 (43.3, 44.3)	5099	29.2 (28.3, 30.1)	630	32.7 (30.4, 35.1)
Female	710,067	56.2 (55.7, 56.7)	12,378	70.8 (69.9, 71.7)	1294	67.3 (64.9, 69.6)
Age						
≤44	565,193	44.8 (43.0, 46.5)	2007	11.5 (10.7, 12.3)	349	18.1 (16.2, 20.1)
45–54	174,953	13.9 (13.6, 14.1)	2213	12.7 (11.8, 13.5)	331	17.2 (15.3, 19.1)
55–64	186,193	14.7 (14.4, 15.1)	3842	22.0 (21.2, 22.8)	411	21.4 (19.5, 23.3)
65–74	178,791	14.2 (13.4, 14.9)	4776	27.3 (26.5, 28.2)	472	24.5 (22.4, 26.7)
75+	157,758	12.5 (11.5, 13.5)	4639	26.5 (25.0, 28.1)	361	18.8 (16.6, 20.9)
Age						
Male ≤44	237,304	42.9 (41.2, 44.7)	448	8.8 (7.9, 9.7)	84	13.3 (10.4, 16.2)
Male 44–54	74,720	13.5 (13.2, 13.9)	493	9.7 (8.8, 10.5)	77	12.2 (9.7, 14.8)
Male 55–64	85,580	15.5 (15.1, 15.8)	1069	21.0 (19.7, 22.2)	140	22.2 (18.9, 25.6)
Male 65–74	84,732	15.3 (14.6, 16.1)	1561	30.6 (29.2, 32.0)	186	29.5 (26.0, 33.1)
Male 75+	70,485	12.8 (11.7, 13.8)	1528	30.0 (28.1, 31.8)	143	22.7 (19.2, 26.2)
Female ≤44	327,889	46.2 (44.4, 48.0)	1559	12.6 (11.7, 13.5)	265	20.5 (18.1, 22.9)
Female 44–54	100,233	14.1 (13.8, 14.4)	1720	13.9 (12.9, 14.9)	254	19.6 (17.3, 22.0)
Female 55–64	100,613	14.2 (13.8, 14.5)	2773	22.4 (21.6, 23.3)	271	20.9 (18.7, 23.2)
Female 65–74	94,059	13.2 (12.5, 13.9)	3215	26.0 (25.0, 26.9)	286	22.1 (19.4, 24.8)
Female 75+	87,273	12.3 (11.3, 13.3)	3111	25.1 (23.6, 26.7)	218	16.8 (14.5, 19.2)
State						
ACT	29,913	2.4 (0.5, 4.2)	453	2.6 (0.6, 4.5)	45	2.3 (0.3, 4.4)
NSW	431,459	34.2 (28.4, 39.9)	5711	32.7 (26.9, 38.4)	621	32.3 (26.2, 38.4)
NT	10,345	0.8 (0.1, 1.5)	110	0.6 (0.0, 1.2)	10	0.5 (0.0, 1.1)
QLD	241,768	19.1 (14.7, 23.6)	3171	18.1 (13.7, 22.6)	357	18.6 (13.8, 23.3)
SA	28,052	2.2 (0.8, 3.7)	381	2.2 (0.7, 3.7)	54	2.8 (0.9, 4.7)
TAS	83,787	6.6 (3.2, 10.1)	1722	9.9 (5.1, 14.6)	203	10.6 (5.5, 15.6)
VIC	281,678	22.3 (15.1, 29.5)	3792	21.7 (15.3, 28.1)	391	20.3 (14.3, 26.3)
WA	155,886	12.3 (8.2, 16.5)	2137	12.2 (8.0, 16.4)	243	12.6 (8.2, 17.0)

	Patients without RA		Patients with RA		Newly diagnosed RA	
	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)
Remoteness						
Major city	772,615	61.2 (54.9, 67.4)	9424	53.9 (47.7, 60.1)	1024	53.2 (46.9, 59.6)
Inner regional	330,532	26.2 (21.2, 31.2)	5240	30.0 (24.7, 35.2)	596	31.0 (25.3, 36.6)
Outer regional	145,970	11.6 (8.3, 14.8)	2587	14.8 (10.8, 18.8)	259	13.5 (9.3, 17.6)
Remote or very remote	13,771	1.1 (0.5, 1.7)	226	1.3 (0.6, 2.0)	45	2.3 (1.0, 3.7)
Socio-economic status (SEIFA IRSAD quintile)						
1 (most disadvantaged)	214,117	17.0 (13.4, 20.5)	3717	21.3 (17.2, 25.3)	397	20.6 (16.3, 25.0)
2	241,937	19.2 (16.0, 22.3)	3937	22.5 (18.8, 26.3)	415	21.6 (17.7, 25.4)
3	282,210	22.3 (19.2, 25.5)	3883	22.2 (18.8, 25.6)	449	23.3 (19.4, 27.3)
4	251,464	19.9 (17.1, 22.7)	2918	16.7 (14.1, 19.2)	346	18.0 (14.9, 21.1)
5 (most advantaged)	273,160	21.6 (17.6, 25.7)	3022	17.3 (13.8, 20.8)	317	16.5 (12.8, 20.2)