STATEMENT OF INTENT

These clinical practice guidelines (CPG) are meant to be guides for clinical practice, based on the best available evidence at the time of development. Adherence to these guidelines may not necessarily guarantee the best outcome in every case. Every healthcare provider is responsible for the management of his/her unique patient based on the clinical picture presented by the patient and the management options available locally.

UPDATING THE CPG

These guidelines were issued in 2019 and will be reviewed in a minimum period of four years (2023) or sooner if there is a need to do so. When it is due for updating, the Chairman of the CPG or National Advisor of the related specialty will be informed about it. A discussion will be done on the need for a revision including the scope of the revised CPG. A multidisciplinary team will be formed and the latest systematic review methodology used by MaHTAS will be employed.

Every care is taken to ensure that this publication is correct in every detail at the time of publication. However, in the event of errors or omissions, corrections will be published in the web version of this document, which is the definitive version at all times. This version can be found on the websites mentioned above.
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KEY RECOMMENDATIONS

The following recommendations were highlighted by the guidelines Development Group as the key clinical recommendations that should be prioritised for implementation.

Diagnosis and Investigation

**Recommendation**
- Consider rheumatoid arthritis if inflammation involving multiple joints is present for at least six weeks.

**Recommendation**
- Inflammatory markers and rheumatoid factor ± anti-citrullinated peptide antibody should be tested when there is clinical suspicion of rheumatoid arthritis.

Referral

**Recommendation**
- All rheumatoid arthritis (RA) patients should be referred early to the rheumatologists.
- All RA patients should be primarily managed by rheumatologists.
  - Co-management plan with primary healthcare providers may be offered subsequently.

Treatment

**Recommendation**
- Aim to achieve a state of clinical remission or at least low disease activity within six months using a treat-to-target strategy in rheumatoid arthritis.

**Recommendation**
- Patient education should be included in the management of rheumatoid arthritis.

**Recommendation**
- Short-term (less than three months) low-dose corticosteroids may be used in active rheumatoid arthritis.

**Recommendation**
- Methotrexate should be used as the first-line Disease Modifying Anti-Rheumatic Drug in all patients with rheumatoid arthritis unless contraindicated.
LEVELS OF EVIDENCE

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<td>Evidence from at least one properly randomised controlled trial</td>
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<td>Evidence obtained from well-designed controlled trials without randomisation</td>
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<td>Evidence obtained from well-designed cohort or case-control analytic studies, preferably from more than one centre or group</td>
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<td>II-3</td>
<td>Evidence from multiple time series with or without intervention. Dramatic results in uncontrolled experiments (such as the results of the introduction of penicillin treatment in the 1940s) could also be regarded as this type of evidence</td>
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<td>III</td>
<td>Opinions of respected authorities based on clinical experience; descriptive studies and case reports; or reports of expert committees</td>
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SOURCE: US/CANADIAN PREVENTIVE SERVICES TASK FORCE 2001

FORMULATION OF RECOMMENDATION

In line with new development in CPG methodology, the CPG Unit of MaHTAS is in the process of adapting Grading Recommendations, Assessment, Development and Evaluation (GRADE) in its work process. The quality of each retrieved evidence and its effect size are carefully assessed/reviewed by the CPG Development Group. In formulating the recommendations, overall balances of the following aspects are considered in determining the strength of the recommendations:

- overall quality of evidence
- balance of benefits versus harms
- values and preferences
- resource implications
- equity, feasibility and acceptability
GUIDELINES DEVELOPMENT AND OBJECTIVES

GUIDELINES DEVELOPMENT

The members of the Development Group (DG) for these CPG were from the Ministry of Health (MoH), Ministry of Education (MoE) and private sector. There was active involvement of a multidisciplinary Review Committee (RC) during the process of the CPG development.

A systematic literature search was carried out using the following electronic databases/platforms: mainly Medline via Ovid and Cochrane Database of Systemic Reviews and others e.g. Pubmed and Guidelines International Network (G-I-N). Refer to Appendix 1 for Example of Search Strategy. The inclusion criteria are all patients with rheumatoid arthritis regardless of study design. The search was limited to literature published in the last 15 years and on humans and in English. In addition, the reference lists of all retrieved literature and guidelines were searched and experts in the field contacted to identify relevant studies. All searches were conducted from 29 May 2017 to 2 June 2017. Literature search was repeated for all clinical questions at the end of the CPG development process allowing any relevant papers published before 31 January 2019 to be included. Future CPG updates will consider evidence published after this cut-off date. The details of the search strategy can be obtained upon request from the CPG Secretariat.

Reference was also made to other guidelines as listed below:
- Rheumatoid Arthritis in Adults: Management [National Institute for Health and Clinical Excellence (NICE), July 2018]
- Management of Early Rheumatoid Arthritis [Scottish Intercollegiate Guidelines Network (SIGN), February 2011]

The CPGs were evaluated using the Appraisal of Guidelines for Research and Evaluation (AGREE) II prior to being used as reference.

A total of seven main clinical questions were developed under different sections. Members of the DG were assigned individual questions within these sections. Refer to Appendix 2 for Clinical Questions. The DG members met 19 times throughout the development of these guidelines. All literatures retrieved were appraised by at least two DG members using Critical Appraisal Skill Programme checklist, presented in evidence tables and further discussed in each DG meetings. All statements and recommendations formulated after that were agreed upon by both the DG and RC. Where evidence was insufficient, the recommendations were made by consensus of the DG and RC. Any differences in opinion are resolved consensually. The CPG was based largely on the findings of systematic reviews, meta-analyses and clinical trials, with local practices taken into consideration.

The literatures used in these guidelines were graded using the US/Canadian Preventive Services Task Force Level of Evidence (2001) while the grading of recommendation was done using the principles of GRADE (refer to the preceding page). The writing of the CPG follows strictly the requirement of AGREE II.

On completion, the draft CPG was reviewed by external reviewers. It was also posted on the MoH Malaysia official website for feedback from any interested parties. The draft was finally presented to the Technical Advisory Committee for CPG, and the Health Technology Assessment (HTA) and CPG Council, MoH Malaysia, for review and approval. Details on the CPG development by MaHTAS can be obtained from Manual on Development and Implementation of Evidence-based Clinical Practice Guidelines published in 2015 (available at http://www.moh.gov.my/penerbitan/mymahtas/CPG_MANUAL_MAHTAS.pdf)
OBJECTIVES

The objectives of the CPG are to provide evidence-based recommendations on rheumatoid arthritis (RA) on the following aspects:
- diagnosis
- investigations
- treatment (non-pharmacological and pharmacological)
- special considerations
- referral and follow-up

CLINICAL QUESTIONS

Refer to Appendix 2.

TARGET POPULATION

Inclusion Criteria
- All patients with RA (16 years and above)

Exclusion criteria
- Juvenile-onset Idiopathic Arthritis

TARGET GROUP/USER

This CPG is intended to guide those involved in the management of RA either in primary or secondary/tertiary care (public and private practice) namely:
- doctors
- allied health professionals
- trainees and medical students
- policy makers
- patients and their advocates
- professional societies

HEALTHCARE SETTINGS

Primary and secondary/tertiary care settings
DEVELOPMENT GROUP

Chairperson
Datin Dr. Asmahan Mohamed Ismail
Consultant Rheumatologist
Hospital Raja Perempuan Zainab II, Kelantan

Members (alphabetical order)

Dr. Asmah Mohd
Consultant Rheumatologist
Hospital Sultanah Nur Zahirah, Terengganu

Dr. Chong Chin Eu
Principal Assistant Director
Health Technology Assessment Section
Ministry of Health Malaysia, Putrajaya

Dr. Chong Hwee Cheng
Consultant Rheumatologist
Hospital Melaka, Melaka

Ms. Chu Ai Reen
Occupational Therapist
Hospital Tuanku Ja’afar, Negeri Sembilan

Dr. Habibah Mohamed Yusoof
Consultant Rheumatologist
Hospital Selayang, Selangor

Dr. Hazlyna Baharuddin
Lecturer & Consultant Rheumatologist
Faculty of Medicine
Universiti Teknologi MARA, Selangor

Dr. Liza Mohd Isa
Consultant Rheumatologist
Hospital Putrajaya, Putrajaya

Dr. Mohd. Aminuddin Mohd. Yusof
Head of CPG Unit & Public Health Physician
Health Technology Assessment Section
Ministry of Health Malaysia, Putrajaya

Ms. Noornazli Zahirah Abdullah
Pharmacist
Hospital Putrajaya, Putrajaya

Dr. Norhaslira Abdul Rahim
Family Medicine Specialist
Klinik Kesihatan Sg. Besi, Kuala Lumpur

Dr. Shereen Ch’ng Suyin
Consultant Rheumatologist
Hospital Selayang, Selangor

Dr. Tan Bee Eng
Consultant Rheumatologist
Gleneagles Penang, Pulau Pinang

Dr. Zil Azwan Abdullah
Family Medicine Specialist
Klinik Kesihatan Presint 9, Putrajaya
REVIEW COMMITTEE

The draft CPG was reviewed by a panel of experts from both public and private sectors. They were asked to comment primarily on the comprehensiveness and accuracy of the interpretation of evidence supporting the recommendations in the CPG.

Chairperson
Dr. Mollyza Mohd. Zain
Senior Consultant Rheumatologist
(National Head of Clinical Service Rheumatology)
Hospital Selayang, Selangor

Members (alphabetical order)

Dato’ Dr. Azmillah Hj. Rosman
Senior Consultant Rheumatologist
Hospital Selayang, Selangor

Dr. Hjh. Rosaida Hj. Md. Said
Consultant Gastroenterologist & Hepatologist
Hospital Ampang, Selangor

Dr. Chow Sook Khuan
Consultant Rheumatologist
Sunway Medical Centre, Selangor

Assoc. Prof. Dr. Sargunan Sockalingam
Lecturer & Consultant Rheumatologist
Universiti Malaya, Kuala Lumpur

Ms. Ding Mee Hong
Patient Advocate

Dr. Siti Aminah Akbar Merican
Consultant Family Medicine
Klinik Kesihatan Batu Rakit, Terengganu

Dato’ Dr. Gun Suk Chyn
Senior Consultant Rheumatologist
Hospital Tuanku Ja’afar, Negeri Sembilan

Ms. Siti Rabi’atul ‘Adawiyah Nasri
Pharmacist
Hospital Tuanku Ja’afar, Negeri Sembilan

Dr. Junainah Sabirin
Deputy Director
Health Technology Assessment Section
Ministry of Health Malaysia, Putrajaya

Dr. Yoong Kar Yaw
Head of Department & State Physician
Hospital Sultan Ismail, Johor
EXTERNAL REVIEWERS (alphabetical order)

Mr. Ang Yu Joe
Pharmacist
Hospital Selayang, Selangor

Dr. Rozita Zakaria
Consultant Family Medicine Specialist
Klinik Kesihatan Presint 18, Putrajaya

Dr. Foo Meng How
General Practitioner
Klinik Foo Sdn. Bhd., Kelantan

Datuk Dr. Sheikh Mohd. Amin Sheikh Mubarak
Dean of Graduate Studies & Family Medicine Specialist
Academy of Family Physicians of Malaysia (AFPM)

Adj. Prof. Dr. Geoffrey O. Littlejohn
Consultant Rheumatologist
Monash University, Australia

Ms. Tan Foo Lan
Occupational Therapist
Hospital Tengku Ampuan Rahimah, Selangor

Adj. Prof. Dr. Koh Ee Tzun
Consultant Rheumatologist
Tan Tock Seng Hospital, Singapore

Datuk Dr. Tarmizi Thayaparan Abdullah
Part Time Lecturer
International Medical University, Negeri Sembilan

Prof. Dr. Mohd Shahrir Mohamed Said
Consultant Rheumatologist
Universiti Kebangsaan Malaysia

Dr. Yeap Swan Sim
Consultant Rheumatologist
Subang Jaya Medical Centre, Selangor

Prof. Dr. Rohini Handa
Senior Consultant Rheumatologist
Indraprastha Apollo Hospitals, India

Dr. Yoon Chee Kin
Consultant Physician
Hospital Pulau Pinang, Pulau Pinang
ALGORITHM 1. DIAGNOSIS OF RHEUMATOID ARTHRITIS

Inflammatory joint symptoms and/or positive serology (RF ± ACPA)

Yes

Clinical synovitis present?

ACR/EULAR criteria fulfilled?

Yes

RA

No

Musculoskeletal ultrasound

Yes*

Synovitis detected?

ACR/EULAR criteria fulfilled?

Yes

Yes

ACR/EULAR criteria fulfilled?

No

No

• Reassurance
• Consider other diagnosis

No

Yes

• Inflammatory arthritis for close monitoring

Clinical suspicion of RA?

Yes

No

*presence of a first-degree relative with RA
raised inflammatory markers
presence of extra-articular features

ACPA: anti-citrullinated peptide antibody
ACR/EULAR: American College of Rheumatology/European League Against Rheumatism
RA: rheumatoid arthritis
RF: rheumatoid factor

Modified:
ALGORITHM 2. TREATMENT OF RHEUMATOID ARTHRITIS

Fulfilled classification criteria of RA

Non-pharmacological treatment

Patient Education
- Disease information
- Medications
- Lifestyle modification

Allied Health Care
- Physiotherapy
- Occupational therapy

Nurse-led Care

Pharmacological treatment

First Line
Conventional synthetic DMARDs

Second Line
Biologic DMARDs or Targeted synthetic DMARDs

Add-on therapy
- NSAIDs
- Corticosteroids

DMARDs: Disease Modifying Anti-Rheumatic Drugs
NSAIDs: Non-Steroidal Anti-Inflammatory Drugs (selective and non-selective)
RA: Rheumatoid Arthritis
1. INTRODUCTION

Rheumatoid arthritis (RA) is a chronic, progressive autoimmune disease of unknown aetiology causing inflammation of the joints. It is characterised by uncontrolled proliferation of synovial tissue and a wide array of multisystem co-morbidities. The disease has an insidious onset with unpredictable and variable courses. Typically, RA manifests as symmetrical polyarthritis but may also present with non-specific symptoms e.g. fatigue, malaise and mild fever. Bone erosion, destruction of cartilage and complete loss of joint integrity can occur over time if treatment is delayed or inadequate.

Numerous multicentre international studies have shown that disease progression can be minimised with early and appropriate treatment. Treatment paradigm of RA has evolved over the last two decades with the advent of biologics and implementation of treat-to-target (T2T) strategy.

The Malaysian National Inflammatory Arthritis Registry (NIAR) shows that nearly 50% of cases are diagnosed a year after the onset of symptoms. This delay in diagnosis may be due to lack of awareness and understanding of the disease among public and healthcare providers. Furthermore, limited human, financial and infrastructure resources may also contribute to the difficulty of accessing rheumatology care.

This is the first national CPG on the management of RA aimed to increase awareness among health care providers for recognition of early RA, timely referral to rheumatologist and initiation of treatment. We hope that this CPG will foster close collaboration between various stakeholders in providing evidence-based management of RA to improve outcomes and ultimately patients’ quality of life (QoL).

2. CLINICAL FEATURES

Clinical features of RA can be divided into articular and extra-articular manifestations. Extra-articular features may involve multiple organs including the skin, eyes, lungs and blood vessels. Non-specific systemic features such as fever, malaise and weight loss may precede overt joint symptoms.

RA may be associated with other connective tissue diseases and chronic non inflammatory pain e.g. fibromyalgia. It is also an independent risk factor for cardiovascular (CV) diseases and osteoporosis.

The key presenting symptoms of joint inflammation are:
- joint pain and swelling
- early morning stiffness lasting ≥60 minutes

The typical articular pattern of RA is symmetrical polyarthritis affecting:
- metacarpophalangeal (MCP) joints
- proximal interphalangeal (PIP) joints
- interphalangeal joint of thumbs
- wrists
- elbows
- metatarsophalangeal (MTP) joints

The symptoms of joint inflammation should be present for at least six weeks.

Findings on physical examination include:
- clinical synovitis
  - joint tenderness
- boggy swelling (may be subtle in early RA)
- restricted range of motion
- joint deformities e.g. radial deviation of the wrist, ulnar deviation at the MCPs, “swan-neck” [flexion of distal interphalangeal (DIP) joint, hyperextension of PIP] and “boutonniere” (hyperextension of DIP, flexion of PIP) deformities.

Differential diagnosis of polyarthritis should take into consideration:
- duration of symptoms
- pattern of joint involvement
- presence of systemic features and/or other diseases

Important differentials include:
- psoriatic arthritis
- erosive inflammatory osteoarthritis
- polyarticular gout
- arthritis related to infection
- systemic lupus erythematosus

- Early diagnosis and prompt treatment of RA are mandatory to prevent irreversible joint damage.

Recommendation 1
- Consider rheumatoid arthritis if inflammation involving multiple joints is present for at least six weeks.

3. INVESTIGATIONS

Laboratory and imaging investigations are done to assist in diagnosis, screening of pre-existing abnormalities and co-morbidities prior to initiation of Disease Modifying Anti-Rheumatic Drugs (DMARDs) as well as monitoring of treatment-related AEs (adverse events).

3.1 Laboratory test

Relevant laboratory tests in RA are shown in table below.

<table>
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<td>Pre-treatment and co-morbidities screening</td>
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- liver function test (LFT)
- viral hepatitis screening [hepatitis B surface antigen (HBsAg)], hepatitis C screening
- human immunodeficiency virus (HIV) if risk factor present

**Treatment**

**Disease activity monitoring and treatment AEs**
- FBC
- RP
- LFT
- ESR and CRP

**Pre-biologic therapy**
- anti-hepatitis B core if HBsAg negative
- Mantoux ± Interferon Gamma Release Assay (IGRA)
- HIV screening
- Immunoglobulin (Ig) G, A and M [prior to rituximab (RTX)]

*ACPA is the current accepted terminology for anti-cyclic citrullinated peptide and can be used interchangeably.

RF and ACPA have similar diagnostic sensitivity (67% and 79% respectively)\(^1\) but ACPA has higher specificity compared with RF (95 - 98% and 79 - 85% respectively).\(^1\)\(^-\)\(^2\) Presence of both RF and ACPA indicate more severe disease. ACPA should be considered in clinically suspected RA where RF is negative. Both RF and ACPA are not recommended for disease monitoring.

- Positive RF does not equate to RA as it is present in normal population with a higher incidence in the elderly.
- Negative RF does not exclude RA as 30 - 40% of RA are seronegative for RF.\(^3\)\(^-\)\(^4\)

**Recommendation 2**
- Inflammatory markers and rheumatoid factor ± anti-citrullinated peptide antibody should be tested when there is clinical suspicion of rheumatoid arthritis.

### 3.2 Imaging

**3.2.1 Plain Radiograph**

**a. Chest X-Ray**

Chest X-ray is performed at baseline evaluation and repeated on follow-up for assessment of disease complications and co-morbidities. It is also mandatory to be done as part of pre-biologic tuberculosis screening (refer to Appendix 8).

**b. Hand X-Ray**

Plain radiograph is the most common modality used to assess the joints. It may be normal within the first six months of RA onset. The radiograph findings include soft-tissue swelling, juxta-articular demineralisation, joint space narrowing and bone erosions. These changes are symmetrical and spare the distal IP joints. Refer to Figure 1 and 2.
Figure 1. Anteroposterior view (AP) of hands in early RA: (A) periarticular osteopenia and (B) soft tissue swelling

Figure 2. AP and supinator oblique views of hands in advanced RA: (A) Ulnar deviation of fingers at MCP joints (B) hitchhiker thumb deformity (C) Boutonniere deformity. Subchondral cyst (D), sclerosis (E) and joint space narrowing at radiocarpal, PIP, MCP joints and carpal bones.

3.2.2 Musculoskeletal ultrasound
Musculoskeletal ultrasound is a useful bedside tool that is increasingly being used by rheumatologists to aid early diagnosis and management of RA. Ultrasound is more accurate than clinical assessment in early RA patients especially those with negative ACPA:

- Clinical synovitis (tender or swollen joint) vs subclinical synovitis (ultrasound detected):\(^5\), level II-2
  - Gray Scale (GS) ≥1: sensitivity 58.8% vs 78.0%, specificity 79.4% vs 79.4%
  - GS ≥1/Power Doppler (PD) ≥1: sensitivity 58.5% vs 56.2%, specificity 79.4% vs 93.7%
- In patients with negative ACPA, combining ultrasound detected synovitis joint counts with 2010 ACR/EULAR classification criteria increased diagnostic sensitivity from 55.2% to 72.4% and specificity from 78.5% to 87.7%\(^6\), level II-2

Presence of ultrasound detected synovitis increases the prevalence of clinical synovitis. This may classify patients with musculoskeletal symptoms who subsequently require MTX more accurately\(^5\)\(^-\)\(^7\), level II-2
3.2.3 Magnetic Resonance Imaging
Magnetic resonance imaging (MRI) is another imaging modality in detecting synovitis in hands and wrists in early RA which may not be clinically evident:
- In a systematic review, MRI hand and wrist had good accuracy in the diagnosis of RA in patients with <6 months disease duration (AUC=0.81).\textsuperscript{8, level I}
- MRI synovitis in PIP joint is a strong predictor of early RA without typical symptoms (OR=3.1, 95% CI 1.2 to 8.1).\textsuperscript{9, level II-2}

MRI can detect synovitis, bone erosions and bone marrow oedema better than conventional radiography but its use is limited due to cost and availability.

4. CLASSIFICATION CRITERIA

RA should be suspected in patients who present with inflammatory polyarthritis. Initial evaluation of such patients requires a careful history, physical examination and selected laboratory tests to identify features that are characteristics of RA. Patients are classified as RA based on the criteria established by American College of Rheumatology/European League Against Rheumatism (ACR/EULAR) 2010 (refer to Table 2). This classification criteria supersedes the older ACR 1987 revised criteria.

Table 2. The 2010 American College of Rheumatology/European League Against Rheumatism Classification Criteria for Rheumatoid Arthritis

<table>
<thead>
<tr>
<th>Target population (Who should be tested?): Patients who</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) have at least 1 joint with definite clinical synovitis (swelling)</td>
<td></td>
</tr>
<tr>
<td>2) with the synovitis not better explained by another disease</td>
<td></td>
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</tbody>
</table>

Classification criteria for RA (score-based algorithm: add score of categories A - D; a score of ≥6/10 is needed for classification of a patient as having definite RA)

<table>
<thead>
<tr>
<th>A. Joint involvement</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 large joint</td>
<td>0</td>
</tr>
<tr>
<td>2 - 10 large joints</td>
<td>1</td>
</tr>
<tr>
<td>1 - 3 small joints (with or without involvement of large joints)</td>
<td>2</td>
</tr>
<tr>
<td>4 - 10 small joints (with or without involvement of large joints)</td>
<td>3</td>
</tr>
<tr>
<td>&gt;10 joints (at least 1 small joint)</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B. Serology (at least 1 test result is needed for classification)</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative RF and negative ACPA</td>
<td>0</td>
</tr>
<tr>
<td>Low-positive RF or low-positive ACPA</td>
<td>2</td>
</tr>
<tr>
<td>High-positive RA or high-positive ACPA</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C. Acute-phase reactants (at least 1 test result is needed for classification)</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal CRP and normal ESR</td>
<td>0</td>
</tr>
<tr>
<td>Abnormal CRP or abnormal ESR</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D. Duration of symptoms</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;6 weeks</td>
<td>0</td>
</tr>
</tbody>
</table>
A score of ≥6 is classified as having definite RA.
A score of <6 might fulfil the criteria over time.

There are four domains in the classification criteria:

A. Joint involvement (swollen or tender joint on examination, which may be confirmed by imaging evidence of synovitis)
   Large joints refer to shoulders, elbows, hips, knees and ankles.
   Small joints refer to MCPs, PIPs, second through fifth MTPs, thumb IPs and wrists.
   *DIP joints, first carpometacarpal joints and first MTP joints are excluded from assessment.

B. Serology
   High positive refers to International Unit values >3 times upper limit normal.

C. Acute-phase reactants
   Normal or abnormal is determined by local laboratory standards.

D. Duration
   Patient self-report of the duration of signs or symptoms of synovitis

5. PROGNOSTIC FACTORS

Many factors can influence the outcomes of RA and awareness of these will guide healthcare providers on early referral for initiation of treatment.

Poor prognostic factors in RA are:

- older age (OR=1.45, 95% CI 1.08 to 1.94)<sup>10</sup>, level II-2
- female (OR=3.36, 95% CI 1.20 to 9.40)<sup>11</sup>, level II-2
- obesity (OR=5.2, 95% CI 1.8 to 15.2)<sup>12</sup>, level I
- smoking (OR=2.17, 95% CI 1.06 to 4.45)<sup>13</sup>, level I
- presence of ACPA/anti-cyclic citrullinated peptide (anti-CCP) (OR ranging from 1.01 to 4.22)<sup>14</sup>, level II-2; 14, level I; 15-16, level II-2; 17, level III
- presence of RF (OR ranging from 2.483 to 3.64)<sup>10-11</sup>, level II-2; 18, level III
- high CRP (OR ranging from 1.04 to 1.52)<sup>13</sup>, level I; 19, level II-2
- high ESR (OR ranging from 1.72 to 3.20)<sup>11</sup>, level II-2; 13, level I; 15, level II-2
- anaemia<sup>20</sup>, level II-2
- high erosion score at baseline (OR ranging from 2.29 to 18.060)<sup>13</sup>, level I; 16, level II-2; 19, level II-2

6. REFERRAL

All RA patients should be primarily managed by rheumatologists. This is due to the complexity of making a definite diagnosis and ensuring adequate treatment of the disease.

Indications for referral are as listed below:<sup>21-22</sup>

a. Referral for diagnosis
- Clinical suspicion of RA, which is supported by the presence of any of the following:
  - more than three swollen joints
  - MCP/MTP joint involvement with positive squeeze test (refer to Figure 3)
  - early morning stiffness of more than 30 minutes

Figure 3. Positive Squeeze Test

2. Clinical evidence of persistent synovitis of undetermined cause

b. Referral following diagnosis
   1. Development of a co-management plan
   2. Optimisation of therapy in active disease
   3. Disease or treatment related complications e.g. acute flare or severe infection

c. Referral of patients with special considerations
   3. Pre-pregnancy care, pregnancy and lactation
   4. History of hepatitis B and/or hepatitis C
   5. History of malignancy

- Referral of RA cases to rheumatology clinic should provide the following information:
  - Symptoms and signs: duration, joint distribution, severity, impact on activity of daily living and extra-articular involvement
  - Co-morbidities that might require further medical assessment
  - Current medications
  - Relevant investigation results

Recommendation 3
- All rheumatoid arthritis (RA) patients should be referred early to the rheumatologists.
- All RA patients should be primarily managed by rheumatologists.
  - Co-management plan with primary healthcare providers may be offered subsequently.

7. TREATMENT

Optimal care of patients with RA consists of an integrated approach that includes both non-pharmacological and pharmacological treatments (refer to Algorithm 2). Pharmacological treatment should be initiated as soon as RA diagnosis is made to preserve joint function and QoL.

Successful treatment in RA is determined using outcome measures. Although they were originally used in the field of research, the development of effective RA treatment had
promoted their use in clinical practice. There are many validated outcome measures reflecting various RA manifestations such as the underlying disease process, level of discomfort and disability, and organ damage (refer to Appendix 3). The use of these outcome measures allows standardised objective assessments of RA disease activity, which in turn drives treatment decisions.

- Treatment goals in RA include:
  - pain relief and control of inflammation
  - preservation of joint function and QoL
  - minimising systemic complications and managing co-morbidities
- Treat-to-target (T2T) treatment strategy, formulated in 2010, has resulted in better disease outcomes. It includes:\(^2^3\)
  - a defined treatment target (clinical remission or at least low disease activity)
  - shared decision making
  - assessment of disease activity
  - regular adjustment of treatment

**Recommendation 4**

- Aim to achieve a state of clinical remission or at least low disease activity within six months using a treat-to-target treatment strategy* in rheumatoid arthritis.

*Refer to preceding yellow box.

### 7.1 Non-Pharmacological

#### 7.1.1 Patient Education

Patient education is an important non-pharmacological component in the management of RA. It should include information of the diagnosis, nature of the disease including its complications and, benefits and risks of therapeutic options. This may improve patient’s understanding and compliance to treatment (refer to Appendix 4 on Patient Education Leaflet).

#### 7.1.2 Occupational Therapy

Patients with RA may benefit from occupational therapy on joint protection with hand strengthening and mobilisation exercise that is adapted to the disease stage, patient and environment.

Joint protection advice with hand strengthening and mobilisation exercises improve Arthritis Impact Measurement Scale (AIMS) of the upper limb function compared with joint protection and hand mobilisation exercises and, joint protection advice alone in RA at six months (p=0.012).\(^2^4\), level 1

Most of the treatment on joint protection deals with manual activities. They are effective in reducing morning stiffness, pain and functional capacity. These include:

- movement training to facilitate daily activities
- self-exercise programme for hands
- provision of information on assistive devices and handling of orthoses

Refer to Appendix 5 on Joint Protection Principles.

**Figure 4** illustrates the various steps for hand strengthening exercise.
Figure 4. Hand strengthening exercise. Arrows illustrate the directions of the movement. (A) The hand is squeezing the putty. (B) The putty is moved between the wrist proper and the finger tips. (C) The wrist proper is placed in the putty, and then the MCP joints are stretched in the putty. (D) The thumb and fingers are shaping the putty. The fingertips are bent during the motion.

7.1.3 Physiotherapy
Physiotherapy may offer beneficial modalities to help RA patients in reducing pain. These include Transcutaneous Electrical Nerve Stimulation (TENS) therapy and aerobic activities.

TENS therapy reduces pain at rest compared with placebo in RA (WMD in VAS 100 mm = -59.50, 95% CI -76.58 to -42.42).25, level I

When the RA is active, aerobic activities with low impact on the joints or with load alleviation is preferred. Aerobic activity, dynamic muscular reinforcement and patient education are valuable in the non-pharmacological management of RA.26

7.1.4 Podiatry
Every patient with RA should be advised on proper footwear. Customised orthotic insoles are recommended for patients with foot pain from weight-bearing and deformities as it may reduce pain on walking and improve functional capacity. Custom manufactured rigid foot orthoses under podiatry supervision has been shown to be more effective compared with foot orthoses prescribed under normal medical care.27, level I

7.1.5 Dietetics
At present, there is no strong evidence that dietary interventions help in reducing disease activity in RA.

Recommendation 5
- Patient education should be included in the management of rheumatoid arthritis (RA).
- Joint protection advice with hand strengthening and mobilisation exercise should be offered in RA.

7.2 Pharmacological
Pharmacological treatment should be initiated as soon as RA diagnosis is made. It consists of non-steroidal anti-inflammatory drugs (NSAIDs), corticosteroids and DMARDs. Refer Appendix 6 on Pharmacological Treatment of RA.

7.2.1 Non-Steroidal Anti-Inflammatory Drugs
NSAIDs are used to relieve pain and reduce inflammation in RA. Although there are a variety of preparations, topical and oral forms are the most widely used. This category of medications encompasses non-selective NSAIDs (e.g. ibuprofen, ketoprofen, diclofenac and naproxen) and selective NSAIDs [cyclooxygenase-2 (COX-2)] inhibitors (e.g. meloxicam, etoricoxib and celecoxib). Important side-effects involve the gastrointestinal, renal and CV systems.
A randomised controlled trial (RCT) showed the use of ketoprofen patch for two weeks was more effective than placebo in relieving local pain [mean percentage change in Visual Analogue Scale (VAS) score (%) ± SD: 31.2±30.3, 95% CI 28.0 to 34.4 and as safe (overall incidence and laboratory AEs) as placebo in RA. The most common AE was contact dermatitis.\textsuperscript{28, level I}

In another RCT, naproxen 500 mg twice daily was more effective than placebo:\textsuperscript{29, level I}
- reduction in tender and swollen joints (MD= -1.39, 95% CI -4.96 to -1.36 and MD= -3.16, 95% CI -2.60 to -0.19 respectively)
- patient global assessment (PGA) of disease activity (MD= -10.0, 95% CI -13.7 to -6.32)
- investigator global assessment (IGA) (MD= -0.51, 95% CI -0.66 to -0.35)
- health assessment questionnaire disability (HAQ disability) (MD= -0.29, 95% CI -0.38 to -0.20)
- PGA of pain (MD= -10.46, 95% CI -14.25 to -6.66)
- American College of Rheumatology 20 (ACR20) responder criteria (MD=16.68, 95% CI 7.80 to 25.57)

The same RCT showed that etoricoxib was more effective than placebo but comparable to naproxen in improving signs and symptoms of RA.\textsuperscript{29, level I}
- Etoricoxib 90 mg daily vs placebo
  - tender and swollen joints (MD= -3.42, 95% CI -4.89 to -1.94)
  - PGA of disease activity (VAS 0 - 100 mm) (MD= -9.93, 95% CI -12.96 to -6.90)
  - IGA (0 - 4 Likert scale) (MD= -0.43, 95% CI -0.55 to -0.30)
  - HAQ 0-3 scale (MD= -0.20, 95% CI -0.28 to -0.13)
  - PGA of pain (VAS 0 - 100 mm) (MD= -9.62, 95% CI -12.73 to -6.51)
  - ACR20 responder criteria (MD= 17.83, 95% CI 10.55 to 25.12)
- Etoricoxib 90 mg daily vs naproxen 500 mg twice daily
  - tender and swollen joints (MD= -0.26, 95% CI -2.05 to 1.54)
  - PGA of disease activity (VAS 0-100 mm) (MD=0.09, 95% CI -3.61 to 3.79)
  - investigator global assessment (0-4 Likert scale) (MD=0.08, 95% CI -0.08 to 0.24)
  - HAQ 0-3 scale (MD=0.08, 95% CI -0.08 to 0.24)
  - PGA of pain (VAS 0-100 mm) (MD=0.84, 95% CI -2.96 to 4.63)
  - ACR20 responder criteria (MD=1.15, 95% CI -7.74 to 10.03)

A Cochrane review involving eight RCTs concluded that celecoxib 200 mg daily was more effective than placebo in RA:\textsuperscript{30, level I}
- ACR20 improvement (RR=1.53, 95% CI 1.25 to 1.86)
- alleviation of pain (VAS) (NNT= 4, 95% CI 3 to 6)
- improvement in physical function (HAQ) (3.3% absolute improvement, 95% CI 9.6% better to 3.3% worse)

In assessment of ACR20, alleviation of pain (VAS) and HAQ, celecoxib 200 mg daily was as effective as traditional NSAIDs (naproxen 1000 mg daily, diclofenac 150 mg daily and meloxicam 15 mg daily).\textsuperscript{30, level I}

Etoricoxib 90 mg daily has better gastrointestinal (GI) tolerability than diclofenac 75 mg twice daily for up to 24 months:\textsuperscript{31, level I}
- abdominal pain and gastritis (HR=0.70, 95% CI 0.53 to 0.93)
- changes in alanine aminotransferase (ALT) and aspartate aminotransferase (AST) (HR=0.14, 95% CI 0.04 to 0.48)

However, it has significantly more renovascular AEs (oedema and hypertension). There is no difference in cardiac AEs and renal dysfunction.\textsuperscript{31-32, level I}
Celecoxib 200 mg daily is as safe as placebo in the incidence of gastroduodenal ulcers ≥3 mm but safer compared with traditional NSAIDs (NNH=9, 95% CI 8 to 10). There is no conclusive evidence that celecoxib has more CV events than traditional NSAIDs.30, level I

A Cochrane systematic review concluded that there are no studies to guide clinicians on the best choice of pharmacotherapy for pain management in RA patients with CV and renal co-morbidities.33, level I

- NSAIDs are in reducing pain and improving function of patients with RA. However, concerns of gastrointestinal, renal and CV adverse effects limit their use in the general population.
- NSAIDs do not have disease modifying property in the treatment of RA.
- Use NSAIDs judiciously in RA patients especially those with co-morbidities.

**Recommendation 6**
- Non-steroidal anti-inflammatory drugs may be used as an adjunct to DMARDs for pain relief in rheumatoid arthritis.

### 7.2.2 Corticosteroids
Corticosteroids such as cortisone, hydrocortisone and prednisolone are useful in the treatment of inflammatory diseases. Prednisolone is preferred over other long-acting corticosteroids (betamethasone, dexamethasone) in the treatment of RA since it causes less inhibition of the hypothalamic-pituitary-adrenal axis. Long-term use of corticosteroids predisposes to several complications, in particular osteoporosis and infection (refer to **Appendix 6**). Hence patients on corticosteroids should be supplemented with calcium and vitamin D, and have regular surveillance for infection.

In a large, multicentre RCT, inclusion of low-dose prednisolone (10 mg daily) in a methotrexate (MTX)-based treatment strategy for tight control in early RA significantly improved erosion score at two years compared with MTX-placebo. It also improved Disease Activity Score 28 (DAS28) at three and six months. The time to first sustained remission was shorter by five months (p=0.001).34, level I

In a Cochrane systematic review of moderate quality primary papers, addition of a low-dose prednisolone (≤10 mg) or step-down corticosteroids regime to DMARDs was effective compared with placebo or active control in early active RA at one year:35, level I

- erosion (SMD= -0.39, 95% CI -0.52 to -0.26)
- joint space narrowing (SMD= -0.27, 95% CI -0.50 to -0.04)

In terms of safety profile, there was no significant difference in adverse effects between MTX-prednisolone and MTX-placebo treatment strategies.34, level I However, two cohort studies showed corticosteroids was associated with increased risk of myocardial infarction and cerebrovascular accidents in RA.36 - 37, level II-2

- Corticosteroids can be used as an add-on therapy to conventional synthetic or biologic DMARDs.

**Recommendation 7**
- Short-term* low-dose corticosteroids may be used in active rheumatoid arthritis.
7.2.3 Disease Modifying Anti-Rheumatic Drugs (DMARDs)
DMARDs are used as soon as RA is diagnosed to retard disease progression. Treatment options include:
- conventional synthetic DMARDs (csDMARDs)
- targeted synthetic DMARDs (tsDMARDs)
- biologic DMARDs (bDMARDs)
- biosimilar bDMARDs
The treatment options are guided by disease severity, presence of co-morbidities, patient’s compliance and physician’s experience.

a. Conventional synthetic DMARDs
The four commonly used csDMARDs are MTX, sulfasalazine (SSZ), hydroxychloroquine (HCQ) and leflunomide (LEF). They may be used as monotherapy or in combination to achieve treatment target. In general, csDMARDs may take up to eight weeks to exert their effects hence the need for bridging therapy with corticosteroids.

i. Methotrexate
MTX is the mainstay treatment of RA. In a Cochrane systematic review, patients on MTX monotherapy were more likely to achieve ACR50 at one year compared with placebo. The improvement of parameters included number of tender and swollen joints and inflammatory markers;\textsuperscript{38}, level I
- improvement of ACR50 (RR=3.03, 95% CI 1.53 to 5.98)
- reduction of tender joint count (TJC) (RR= -0.64, 95% CI -0.88 to -0.41) and swollen joint count (SJC) (RR= -0.73, 95% CI -0.97 to -0.49)
- reduction of inflammatory markers at 52 weeks; ESR (RR= -12.60, 95% CI -18.97 to -6.23) and CRP (RR= -1.56, 95% CI -2.11 to -1.01).

In another Cochrane systematic review on different groups of populations receiving MTX;\textsuperscript{39}, level I
- MTX-naïve patients - MTX monotherapy was as effective as MTX combination therapy with other non-biologic DMARDs
  - improvement in ACR50 (RR=1.76, 95% CI 0.64 to 4.85)
- MTX-inadequate response patients - combination MTX with non-biologic DMARDs was more effective than MTX monotherapy
  - improvement of ACR50 (RR=4.54, 95% CI 2.51 to 8.20)
  - reduction of TJC (SMD= -0.51, 95% CI -0.69 to -0.33) and SJC (SMD= -0.45, 95% CI -0.63 to -0.27)
  - reduction of CRP (SMD= -12.1, 95% CI -19.84 to -4.36)
- Non-MTX DMARDs inadequate response patients - MTX combination therapy was as effective as MTX monotherapy in improvement of ACR50, but was more effective than MTX monotherapy in reduction of TJC and SJC
  - improvement of ACR50 (RR=1.68, 95% CI 0.94 to 2.99)
  - reduction of TJC (WMD= -4, 95% CI -6.82 to -1.18) and SJC (SMD= -0.66, 95% CI -1.15 to -0.17)

Significant AEs experienced by patients on MTX were infection (commonly upper respiratory tract infections, bronchitis and pneumonia), liver enzyme abnormalities, stomatitis, oral ulcers, alopecia and gastrointestinal (GI) AEs.

Patients on MTX were less likely to discontinue medication compared with placebo (RR=0.73, 95% CI 0.62 to 0.88). The main reason for discontinuation in the MTX group was due to liver enzyme abnormalities (RR=3.75, 95% CI 1.59 to 8.84);\textsuperscript{38}, level I
Combination therapy of MTX with other non-biologic DMARDs had significantly more GI AEs [MTX+SSZ (RR=1.75, 95% CI 1.14 to 2.67); MTX+LEF (RR=1.67, 95% CI 1.17 to 2.40)] and abnormal LFT [MTX+LEF (RR=4.30, 95% CI 2.58 to 7.15)].

- Subcutaneous (SC)/intramuscular (IM) MTX can be used in patients intolerant to MTX.
- Folic acid (minimum 5 mg/week) should be given to prevent MTX-related AEs.
- MTX is contraindicated in pregnancy and breastfeeding. It should be stopped for at least three months in women prior to conception.

### Recommendation 8

- Methotrexate should be used as the first-line Disease Modifying Anti-Rheumatic Drug in all patients with rheumatoid arthritis unless contraindicated.

#### ii. Sulfasalazine

In a Cochrane systematic review, SSZ was more effective compared with placebo for the following outcome measures:

- tender joint (SMD= -0.49, 95% CI -0.75 to -0.36)
- swollen joints (SMD= -0.49, 95% CI -0.79 to -0.12)
- pain (SMD= -0.42, 95% CI -0.72 to -0.12)
- ESR (WMD= -17.6 mm, 95% CI -21.93 to -13.23).

Patients on SSZ were significantly less likely to withdraw from treatment due to lack of efficacy (OR=0.23, 95% CI 0.14 to 0.37). However, adverse reactions requiring withdrawal of therapy were three times more frequent in the treatment group, with gastrointestinal and mucocutaneous symptoms being the most frequent.

#### iii. Hydroxychloroquine

A Cochrane systematic review showed that HCQ was more effective than placebo in improving clinical outcomes i.e.:  

- tender joints (SMD= -0.33, CI -0.50 to -0.17)  
- swollen joints (SMD= -0.52, CI -0.69 to -0.36)  
- pain (SMD= -0.45, CI -0.50 to -0.17)

In terms of safety profile, there were no significant withdrawal in HCQ group compared with placebo due to adverse reaction. None of the studies which conducted ophthalmologic evaluations reported withdrawals due to ocular toxicity.

- All patients on HCQ should have a baseline eye examination and ophthalmological review while they are on treatment.

#### iv. Leflunomide

In a meta-analysis on RA of moderate quality primary papers, LEF monotherapy was:

- more effective than placebo in  
  - ACR50 at one year (RR=1.45, 95% CI 1.07 to 1.96)  
  - total reduction in TJC (WMD= -5.02, 95% CI -6.41 to -3.64) and SJC (WMD= -3.21, 95% CI -4.32 to -2.09)  
  - ESR (WMD= -9.22, 95% CI -12.37 to -6.07)  
- as effective as MTX monotherapy at one year in total reduction of TJC, SJC and ESR except for ACR50 where LEF was more effective (RR=1.45, 95% CI 1.07 to 1.96)

- Folic acid (minimum 5 mg/week) should be given to prevent MTX-related AEs.
- MTX is contraindicated in pregnancy and breastfeeding. It should be stopped for at least three months in women prior to conception.
• as effective as SSZ monotherapy at one year in improvement of ACR50 and total reduction of TJC, SJC and ESR; however, it was more effective in ACR50 after two years of treatment (RR=2.10, 95% CI 1.25 to 3.53)

LEF was significantly associated with alopecia, elevation of liver enzymes, diarrhoea and allergic reactions compared with placebo. More patients on LEF monotherapy experienced pruritus, hypertension, diarrhoea and alopecia compared with MTX, while less patients on LEF experienced mouth ulceration and liver enzyme elevation (more than three times upper limit normal). When compared with SSZ, more patients on LEF experienced diarrhoea.42, level I

b. Targeted Synthetic DMARDs
i. Tofacitinib
In a meta-analysis, tofacitinib 5 mg BD was more effective in ACR50 compared with placebo and adalimumab at 12 weeks in MTX-resistant RA,43, level I
• placebo: RR=2.91, 95% CI 2.03 to 4.16
• adalimumab: RR=1.95, 95% CI 1.00 to 3.80

In an RCT, tofacitinib 5 mg BD monotherapy was more effective in ACR50 than MTX in early (<1 year) compared with established RA at 24 months (p<0.001 vs p<0.05).44, level I

No difference in safety profile was observed between patients on tofacitinib and placebo.43, level I

ii. Baricitinib
Two RCTs reported that baricitinib 4 mg was effective in treating RA compared to placebo in patients with:
• insufficient response or intolerance to one or more conventional synthetic DMARDs45, level I
• inadequate response to or experience unacceptable side effects associated with one or more tumour necrosis factor inhibitors, other biologic DMARDs or both46, level I

No difference in safety profile was observed between patients on baricitinib and placebo.45-46, level I

c. Biologics
bDMARDs are agents designed to specifically target immune cells involved in the pathogenesis of RA. There are a number of bDMARDs that have shown to be effective and safe. bDMARDs are considered when the treatment target is not achieved with csDMARDs and in the presence of poor prognostic factors. Early introduction of bDMARDs has been shown to retard the development of clinically relevant radiographic progression.19, level II-2

bDMARDs currently available and approved in Malaysia for RA are:
• anti-Tumour Necrosis Factor (anti-TNF): infliximab (IFX), etanercept (ETN), adalimumab (ADA) and golimumab (GOL)
• Interleukin-6 (IL-6) receptor blocker: tocilizumab (TCZ)
• Anti-B cell agent: RTX

The use of bDMARDs for the treatment of RA has increased the risk of tuberculosis (TB) reactivation especially in patients treated with anti-TNF.47, level I Thus, screening for latent tuberculosis infection (LTBI) or active TB infection must be done prior to starting bDMARDs (refer to Table 1 and Appendix 8). Mantoux test is the main screening test but where available, IGRA may be considered as an alternative or complementary screening test.
i. **Infliximab**

A meta-analysis showed that IFX at doses of 3 mg/kg or 5 mg/kg in combination with MTX had better ACR50 in the following comparisons:\(^{48}\) level I

- vs MTX monotherapy or combined DMARDs
  - at 20 weeks (RR=2.45, 95% CI 1.73 to 3.48)
  - at 52 weeks (RR=1.47, 95% CI 1.25 to 1.74)
- vs DMARDs in early RA (RR=1.47, 95% CI 1.02 to 2.14)
- vs DMARDs in established or late RA (RR=2.11, 95% CI 1.48 to 3.01)
- vs DMARDs in patients who were MTX-naïve (RR=1.44, 95% CI 1.18 to 1.76)
- vs DMARDs in patients who failed or had insufficient response to MTX (RR=2.13, 95% CI 1.53 to 2.97)

The combination of IFX+MTX favoured clinical remission (RR=1.92, 95% CI 1.35 to 2.74) and showed lower radiographic progression [MD for total Sharp score (TSS)= -2.57, 95% CI -3.64 to -1.49] (in particular those who had insufficient response to MTX or MTX-naïve) compared with DMARDs.\(^{48}\) level I

There was no significant difference in AEs of infection, serious infection, serious adverse event, tumour and death between groups. However, infusion reactions occurred more frequently in IFX+MTX group.\(^{48}\) level I

ii. **Etanercept**

Results from a Cochrane systematic review showed that SC etanercept (ETN) 25 mg twice weekly in combination with DMARD (MTX or SSZ) was more effective than DMARD monotherapy (MTX or SSZ) in reducing disease activity and disability as well as delaying joint radiographic progression:\(^{49}\) level I

- ETN+DMARD vs DMARD
  - ACR50 at 12 months (RR=1.52, 95% CI 1.36 to 1.70)
  - remission at 12 months (RR=1.95, 95% CI 1.61 to 2.35)
  - improvement in HAQ score at six months (MD in HAQ score= -0.49, 95% CI -0.77 to -0.21)
  - delay in radiographic progression, regardless of response to treatment, at three years [MD for TSS= -6.09 (95% CI -9.22 to -2.96)]
- ETN+DMARD vs ETN
  - ACR50 at 12 months (RR=1.43, 95% CI 1.22 to 1.69)
  - remission at 12 months (RR=2.18, 95% CI 1.57 to 3.03)
  - delay in radiographic progression, regardless of response to treatment, at three years [MD for TSS= -1.75 (95% CI -3.27 to -0.23)]

These findings are supported by another meta-analysis which analysed ETN as monotherapy or combination but with a longer follow-up:\(^{50}\) level I

- ETN ± combination vs MTX
  - ACR50 at one to three years (RR=1.37, 95% CI 1.22 to 1.53)
- ETN vs MTX
  - delay in radiographic progression at three years (MD in TSS= -4.34, 95% CI -7.56 to -1.12)

In terms of safety profile, there was no statistical difference in infection rate between ETN+DMARD vs DMARD monotherapy.\(^{49}\) level I

iii. **Adalimumab**

A systematic review showed that SC ADA 40 mg every two weeks either as monotherapy or in combination with DMARD (mainly MTX) was more effective than DMARD in the treatment of RA\(^{51}\) level I
• ADA vs placebo at 24 weeks
  o ACR50 of RR=3.19, 95% CI 1.81 to 5.62
• ADA+DMARD vs placebo+DMARD at 24 weeks
  o ACR50 of RR=3.23, 95% CI 2.35 to 4.44
  o HAQ reduction: MD= -0.32, 95% CI -0.40 to -0.24
• ADA+MTX vs MTX at 52 and 104 weeks
  o TSS increased by 0.8 vs 2.7 (p<0.01)

There was no statistical significant difference in safety except for injection site reactions in ADA-treated group up to 52 weeks (RR=1.32, 95% CI 1.02 to 1.71).\textsuperscript{51}, level I

iv. Golimumab

A systematic review showed that SC GOL at 50 mg every four weeks combined with MTX was more effective than MTX monotherapy in active RA up to 24 weeks.\textsuperscript{52}, level I
  • ACR50: RR=2.57, 95% CI 1.34 to 4.94
  • DAS remission: RR=5.12, 95% CI 1.67 to 15.66

A multicentre double-blind RCT showed improvements in disease activity and physical function as well as less radiographic progression in SC GOL 50 mg combined with MTX compared with MTX monotherapy at 24 weeks. Extension of the study showed that the improvements were maintained up to five years in the combination group.\textsuperscript{53}, level I
  • ACR50: 49.4% vs 36.1%
  • HAQ-Disability Index (DI) ≥0.25: 67.4% vs 58.6%
  • estimated annual rate of radiographic progression (mean±SD): 0.35±1.22 vs 0.63±1.83

An RCT showed that IV GOL 2 mg/kg in combination with MTX given at 0, 4 and subsequently every 8 weeks was more effective than MTX monotherapy in active RA:\textsuperscript{54}, level I
  • ACR50: 34.9% vs 13.2% at 24 weeks (p<0.001)
  • increase in HAQ score 0.50 vs 0.15 at 14 weeks (p<0.001)
The responses were seen as early as two weeks.

There was no significant difference in the number of AEs and serious adverse events (SAEs) in SC GOL+MTX vs placebo+MTX.\textsuperscript{52}, level I Safety findings through five years follow-up were generally consistent with studies of other anti-TNF agents.\textsuperscript{53}, level I There were similar AEs between IV GOL+MTX vs placebo+MTX but SAE particularly infection was higher in IV GOL+MTX.\textsuperscript{54}, level I

v. Tocilizumab

Results from four meta-analyses and two RCTs showed that intravenous (IV) TCZ as monotherapy or in combination with DMARDs was more effective than MTX and combination DMARDs in improving clinical and functional outcomes in RA:

• TCZ monotherapy 8 mg/kg vs MTX
  o ACR50: 44% vs 34% (p=0.002)\textsuperscript{55}, level I
  o DAS28-ESR remission at 24 weeks: RR=3.70, 95% CI 2.47 to 5.55\textsuperscript{56}, level I
  o sustained remission (DAS28 <2.6, swollen joint count ≤4, persisting for at least 24 weeks): RR=1.86, 95% CI 1.48 to 2.32\textsuperscript{57}, level I
  o radiographic progression at 104 weeks: 1.45 vs 1.53 (p=0.0381)\textsuperscript{57}, level I
• TCZ combination vs DMARD
  o ACR50: - OR=4.67, 95% CI 2.63 to 8.29\textsuperscript{58}, level I
    - RR=3.79, 95% CI 2.39 to 6.00\textsuperscript{59}, level I
  o DAS28-ESR remission at 24 weeks: RR=4.77, 95% CI 3.19 to 7.14\textsuperscript{56}, level I
  o sustained remission: RR=2.00, 95% CI 1.59 to 2.51\textsuperscript{57}, level I
o reduction in HAQ score: -0.81 vs -0.64 (p=0.0024)\textsuperscript{56}, level I
o radiographic progression at 104 weeks:
  - 1.18 vs 1.53 (p=0.0207)\textsuperscript{57}, level I
  - 0.37 vs 1.96 (p<0.0001)\textsuperscript{60}, level I

In patients with inadequate response to anti-TNF, TCZ+MTX was shown to be more effective than MTX monotherapy (28.8% vs 3.8%, p<0.0001).\textsuperscript{55}, level I; 58, level I

An RCT showed that SC and IV TCZ were comparable in ACR50, DAS28, HAQ DI and safety.\textsuperscript{61}, level I

TCZ in combination with MTX as compared with placebo or DMARD is associated with a slight increased risk of AEs [OR=1.53 (95% CI 1.26 to 1.86)] and infection [OR=1.30 (95% CI 1.07 to 1.58)]. No increased incidence of malignancy, TB reactivation or hepatitis has been observed.\textsuperscript{62}, level I

vi. Rituximab
A Cochrane systematic review showed that IV RTX (given two weeks apart) in combination with MTX was more effective in improving clinical, functional and radiographic outcomes compared with MTX monotherapy at 24 weeks.\textsuperscript{53}, level I

- RTX (1000 mg at D1 and D15)+MTX vs MTX
  o ACR50: RR=3.25, 95% CI 2.31 to 4.58
  o HAQ-DI minimal clinically important difference (MCID) of -0.22: RR=1.61, 95% CI 1.22 to 2.12
  o no radiographic progression: RR=1.18, 95% CI 1.03 to 1.35
- RTX (500 mg at D1 and D15)+MTX vs MTX
  o ACR50: RR=2.69, 95% CI 1.85 to 3.90
  o HAQ-DI MCID of -0.22: RR=1.58, 95% CI 1.18 to 2.11
  o no radiographic progression: RR=1.33, 95% CI 1.07 to 1.64

A greater proportion of patients receiving RTX (1000 mg x 2 doses) in combination with MTX developed infusion reaction after the first infusion compared with those receiving MTX monotherapy and placebo infusions (RR=1.6, 95% CI 1.3 to 1.9). However, no significant differences were noted in the rates of SAEs.\textsuperscript{63}, level I

- bDMARDs and tsDMARDs are effective in both early-onset and established RA.

**Recommendation 9**
- Biologic Disease Modifying Anti-Rheumatic Drugs (bDMARDs) and targeted synthetic DMARDs (tsDMARDs) should be considered when the treatment target is not achieved with conventional synthetic DMARDs.
- All patients should be screened for tuberculosis, hepatitis B and C, and human immunodeficiency virus prior to treatment with bDMARDs or tsDMARDs.

d. Biosimilars
Biosimilars are products which are highly similar to the reference biologics and have no clinically meaningful differences in efficacy and safety. A recent systematic review demonstrated comparable effectiveness and safety outcomes between the pivotal trials of originators (IFX, ADA and ETN) and their respective biosimilars in DMARDs-experienced RA patients.\textsuperscript{64}, level I
i. **Biosimilar Infliximab**  
CT-P13 (Remsima) infusion in combination with MTX is effective, well tolerated and highly comparable with reference IFX.⁶⁵, level I Results from a meta-analysis also showed no significant differences between the efficacy of IFX-biosimilar and other biologics.⁶⁶, level I

ii. **Biosimilar Adalimumab**  
Biosimilar adalimumab (Exemptia) is also effective, well tolerated and highly comparable with reference ADA in DMARDs-naïve patients.⁶⁷, level I

8. **TRADITIONAL AND COMPLEMENTARY MEDICINES**

Traditional and complementary medicines (TCM) is often part of the cultural practice in Malaysian society in maintaining health. The intake of nutritional supplements as well as Chinese herbal medicine and Ayurvedic therapies are common practices among patients with RA.

- There is insufficient evidence on safety and efficacy of TCM to support its use in the treatment of RA.

9. **RHEUMATOLOGY NURSE-LED CARE**

The escalating demand for rheumatology care has extended the role of nurses in addressing unmet management needs of patients with RA. In some countries, rheumatology nurse-led care had been established to provide follow-up care for patients with RA which includes monitoring of laboratory results, disease activity assessment, patient education and psychosocial support.

The effectiveness of nurse-led care in rheumatology was reported in three systematic reviews. Short-term (12 - 24 months) rheumatology nurse-led care was as effective as medical-care involving rheumatologists, physicians and general practitioners in the management of RA (DAS28, HAQ, pain and fatigue scores).⁶⁸, level I There was no significant difference in RA disease activity at one to two years follow-up between nurse-led care and care by rheumatologists and junior hospital doctors.⁶⁹ - ⁷⁰, level I

Nurse-led care was safe in the management of patients with RA when compared with medical care involving rheumatologists, physicians and general practitioners. The outcome measures were out of range blood test, monitoring adherence, healthcare contacts, hospitalisations and death.⁷¹, level I

**Recommendation 10**
- Rheumatology nurse-led care should be considered in the management of rheumatoid arthritis.

10. **SPECIAL CONSIDERATIONS**

10.1 **Co-morbidity management on treatment**

10.1.1 **Infection**
All DMARDs should be discontinued in the presence of serious infection but can be recommenced once the infection has resolved.\textsuperscript{71}

**10.1.2 Elective surgery**

csDMARDs may be continued throughout the perioperative period in patients undergoing elective joint replacement surgery. tsDMARDs and bDMARDs should be withheld close to one dosing cycle prior to elective surgery and restarted after evidence of wound healing, typically 14 days, in the absence of infection (refer to Table 3).\textsuperscript{72}

**Table 3. Guideline for the Perioperative Management of bDMARDs and tsDMARDs in Patients with Rheumatic Diseases Undergoing Elective Surgery**

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Schedule surgery (relative to last dose administered) during</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adalimumab</td>
<td>Week 2 or 3</td>
</tr>
<tr>
<td>Etanercept</td>
<td>Week 2</td>
</tr>
<tr>
<td>SC Golimumab</td>
<td>Week 5</td>
</tr>
<tr>
<td>IV Golimumab</td>
<td>Week 9</td>
</tr>
<tr>
<td>Infliximab</td>
<td>Week 5, 7 or 9 (depending on dosing interval of every 4, 6 or 8 weekly)</td>
</tr>
<tr>
<td>Rituximab</td>
<td>Month 7</td>
</tr>
<tr>
<td>SC Tocilizumab</td>
<td>Week 2</td>
</tr>
<tr>
<td>IV Tocilizumab</td>
<td>Week 5</td>
</tr>
<tr>
<td>Tofacitinib</td>
<td>7 days after last dose</td>
</tr>
<tr>
<td>Baricitinib</td>
<td>1 day after last dose (withhold on day of surgery)</td>
</tr>
</tbody>
</table>


**10.2 Pregnancy and lactation**

RA often affects women in their reproductive years. The disease activity may improve, stabilise or become active during pregnancy.\textsuperscript{73, level II-3} Although there are medications to control disease activity, several are contraindicated in pregnancy and lactation due to limited available safety data. Refer to Appendix 6.

Pre-conception counselling includes disease course and medication safety during pregnancy and lactation. These must be addressed in women with RA, as well as men, who wish to father a child to ensure favourable pregnancy outcomes.

**10.3 Vaccination**

Vaccinations are important in the management of RA since the patients are at higher risk of infections compared with general population. This is due to the underlying autoimmune disease and immunosuppressive therapies (e.g. corticosteroids and DMARDs). The 2012 ACR recommendations regarding the use of vaccines in patients with RA are outlined in Table 4.
Table 4. 2015 ACR recommendations regarding the use of vaccines in RA on DMARDs or biologic agents.

<table>
<thead>
<tr>
<th>RA treatment</th>
<th>Killed vaccines</th>
<th>Recombinant</th>
<th>Live attenuated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pneumococcal</td>
<td>Influenza (IM)</td>
<td>Hepatitis B</td>
</tr>
<tr>
<td>Before initiating therapy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMARDS monotherapy</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Combination DMARDs</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Anti-TNF biologics</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Non-TNF biologics</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>While on therapy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMARDS monotherapy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combination DMARDs</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Anti-TNF biologics</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Non-TNF biologics</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>


- Killed and conjugate vaccines are safe and may be considered in RA patients.

11. MONITORING AND FOLLOW-UP

Many drugs used in the treatment of RA have potential side-effects and may aggravate comorbidities associated with the underlying disease. Combination of DMARDs are often needed to control disease activity and this may pose a greater risk for AEs. Hence, an integral part in the management of RA include the healthcare provider's understanding of the safety profiles of each therapy and vigilance in monitoring for potential harms to patients. Nurse- and/or pharmacy-led patient counselling on the importance of routine laboratory tests and recognition of adverse symptoms may enable early detection of drug toxicity and appropriate action to be taken to minimise harm.

An overview of laboratory abnormalities of each drug and a summary of current guidelines for laboratory monitoring as well as recommendation on frequency of monitoring is provided in the Appendix 7.

12. IMPLEMENTING THE GUIDELINES

Implementation of CPG is important as it helps in providing quality healthcare services based on best, recent available evidence applied to local scenario. Various factors and resource implications should be considered for the success of the uptake in the CPG recommendations.
12.1 Facilitating and Limiting Factors

The facilitating factors in implementing the CPG are:
1. availability of CPG to healthcare providers (hardcopies and softcopies)
2. conferences and updates on management of RA including those involve professional bodies (e.g. Malaysian Society of Rheumatology)
3. Key Performance Indicator on Rheumatology Services monitored by MoH (i.e. screening for viral hepatitis on RA patients prior to starting MTX)
4. related registries - Malaysian NIAR (myNIAR) and Malaysian Rheumatology Biologics Registry (MARBLE)
5. public awareness during World Arthritis Day

Limiting factors in the CPG implementation include:
1. limited awareness and knowledge in management of RA among healthcare providers
2. insufficient resources in RA care e.g. expertise, diagnostic tests and medications
3. poor access to rheumatology services
4. misconception on the disease and its management by the public

12.2 Potential Resource Implications

To implement the CPG, there must be strong commitments to:
1. ensure widespread distribution of CPG to healthcare providers via printed copies and online accessibility
2. reinforce training of healthcare providers via regular seminars and workshops
3. involve multidisciplinary team at all levels of health care
4. improve the diagnostic and therapeutic facilities
5. train more experts and develop rheumatology nurse-led care in the field of RA
6. strengthen related national registries on RA

To assist in the implementation of the CPG, the following are proposed as clinical audit indicators for quality management:

- Percentage of patients with clinical suspicion of RA tested for CRP±ESR and RF±ACPA* = Number of patients with clinical suspicion of RA tested for CRP±ESR and RF±ACPA in a period × 100% Number of patients with clinical suspicion of RA within the same period

  *Target of 70%

- Percentage of RA patients prescribed with MTX as first-line DMARD** = Number of RA patients prescribed with MTX as first-line DMARD in a period × 100% Number of RA patients prescribed with DMARD within the same period

  *Unless contraindicated; Target of 80%

Implementation strategies will be developed following the approval of the CPG by MoH which include Quick Reference and Training Module.
REFERENCES


APPENDIX 1

EXAMPLE OF SEARCH STRATEGY

Clinical Question: Is methotrexate effective and safe in the treatment of RA?

1. ARTHRITIS, RHEUMATOID/
2. rheumatoid arthritis.tw.
3. 1 or 2
4. METHOTREXATE/
5. amethopterin.tw.
6. mexate.tw.
7. 4 or 5 or 6
8. 3 and 7
9. limit 8 to (English language and humans and last 15 years)
CLINICAL QUESTIONS

1. Are the following investigations accurate in supporting the diagnosis of RA?
   - musculoskeletal ultrasound
   - MRI
2. What are the poor prognostic factors of RA?
3. What are the effective and safe non-pharmacological treatments of RA?
   - patient education
   - smoking cessation
   - physiotherapy
   - occupational therapy
   - podiatry
   - dietetics
4. Is rheumatology nurse-led care effective and safe in the treatment of RA?
5. What are the effective and safe pharmacological treatments of RA?
   - NSAIDs
   - corticosteroids
   - analgesics (paracetamol, opioids)
   - DMARDs (synthetic, biologic)
6. Is TCM effective and safe in the treatment of RA?
7. What are the indications for referral to secondary/tertiary care?
## Outcome Measures

<table>
<thead>
<tr>
<th>Measurement of RA disease activity and improvement</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Clinical Disease Activity Index (CDAI)**        | A composite index based on a summation of four parameters without using acute phase reactant, which are:  
- TJC  
- SJC  
- PGA of disease activity based on VAS 0 - 10 cm  
- physician global assessment of disease activity based on VAS 0 - 10 cm.  
The 28 joints assessed are PIP joints (10 joints), MCP joints (10), wrists (2), elbows (2), shoulders (2) and knees (2).  
Definition of RA disease activity (ranges from 0-76):  
- Remission: ≤2.8  
- Low disease activity: >2.8 to ≤10  
- Moderate disease activity: >10 to ≤22  
- High disease activity: >22 |
| **Simplified Disease Activity Index (SDAI)**      | A composite index based on summation of parameters similar to CDAI but with the VAS core using cm and addition of CRP in mg/dL.  
Definition of RA disease activity (ranges from 0-86):  
- Remission: ≤3.3  
- Low disease activity: >3.3 to ≤11  
- Moderate disease activity: >11 to ≤26  
- High disease activity: >26 |
| **Disease Activity Score (DAS28)**               | A composite calculation of four parameters which includes TJC and SJC (based on 28 joints assessment), ESR (or CRP) and PGA (VAS 0-100mm).  
Definition of RA disease activity based on DAS28-ESR:  
- Remission: ≤2.6  
- Low disease activity: >2.6 to ≤3.2  
- Moderate disease activity: >3.2 to ≤5.1  
- High disease activity: >5.1 |
| **American College of Rheumatology 50 (ACR50)** | A composite measure defined as improvement of 50% in number of tender and number of swollen joints AND in three of the following five criteria:  
- PGA  
- physician global assessment  
- functional ability measurement  
- visual analogue pain scale  
- ESR and CRP |
| **Measurement of functional status and quality of life** | **Health Assessment Questionnaire (HAQ)**  
A patient-filled questionnaire to assess functional status in adults with arthritis, specifically 20 specific functions to evaluate patient difficulty with activities of daily living over the past week; it covers eight categories including dressing and grooming, arising, eating, |
walking, hygiene, reaching, gripping and, errands and chores, as well as the use of specific aids or devices and the need for assistance from another person

<table>
<thead>
<tr>
<th><strong>Short Form 36 Health Survey (SF36)</strong></th>
<th>A 36-item, patient-reported survey of patient health, used to measure health status and QoL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measure of radiological changes</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Total Sharp Score (TSS)</strong></td>
<td>A scoring system used to quantify the radiological changes in patients with RA; the system describes 16 areas of erosions (evaluated from 0 to 5 points) and 15 areas of narrowing of the joint space (evaluated from 0 to 4 points) of 27 small joints of the hand, including the carpal bones</td>
</tr>
</tbody>
</table>

**Source:**
A. Disease Information

I. How does RA affect the joints?

- RA causes inflammation in the joints. This leads to pain and stiffness in the morning, lasting more than 30 minutes. Other symptoms include redness, warmth and swelling at the joint.
- RA affects joints by causing inflammation at the synovium (refer Figure 5). If untreated, the inflammation may damage cartilage and bone.
- The commonly affected joints are the small joints of the hands and feet but other joints like shoulders, elbows, knees and ankles may also be affected.
- In some people, RA may also affect other parts of the body including the eyes, lungs and blood vessels. Other associated symptoms include fatigue and mild fever.

II. Causes

- RA is caused by a problem in the immune system, unlike osteoarthritis which is usually caused by ‘wear and tear’.
- The exact cause of RA is still unclear but certain factors thought to increase the risk of developing it:
  - environment - e.g. infection
  - genes - the chance of developing RA is partly genetic
  - hormones - women are more likely to have RA
  - lifestyle - smoking cigarettes can double the risk of developing RA

III. Diagnosis

- There is no single test to diagnose RA. The diagnosis is made based on symptoms, physical examination, x-rays and/or ultrasound and blood tests.

B. Medication

There is no cure for RA but treatment is available to control joint pain, minimise joint damage and ultimately, improve physical function and QoL. Types of medications commonly prescribed:

- NSAIDs to relieve joint pain and swelling
- DMARDs to treat joint inflammation and slow the disease process; used long-term
- corticosteroids to treat joint inflammation; used short-term
- biologics and targeted DMARDs when DMARDs are not effective or not tolerated
Treatment is individualised and not all medications work for everyone. Hence, it is important to discuss treatment options and inform your doctor if there are any issues with the prescribed medications. Your doctor will monitor for any possible side effects from medications and adjust treatment as needed. It is important to adhere to your clinic appointments and treatment for optimal management of your RA.

C. Lifestyle Modification
Lifestyle modification is also important to improve RA symptoms and QoL. By staying active, eating well and limiting stress, overall health can be optimised.

I. Physical activity
- It is best to rest the joint when it is actively inflamed (painful and swollen).
- Regular, gentle exercise can be done once inflammation has resolved. This will improve joint flexibility and general well-being. They include:
  - low impact aerobic exercises e.g. line dancing, water-aerobic
  - strengthening exercises e.g. walking, swimming, stationary cycling
  - stretching and range-of-motion exercises e.g. tai chi, yoga

II. Daily tasks
You may need to make some adaptations to your daily tasks to make it safer and easier to be performed. Some examples include:
- At home
  - change door knobs to lever type
  - replace squatting toilets with sitting toilets
  - place regularly used items on reachable shelves
  - replace heavy appliances with lighter ones
- At work
  - arrange the workspace to make it easier to complete tasks with the least amount of physical strain
  - take breaks from repetitive motion tasks

III. Healthy eating
There is no specific diet that improves or worsens RA. A healthy and well-balanced diet is important to maintain a healthy weight and prevent other diseases e.g. diabetes mellitus and heart disease. In general, a healthy dietary habit includes the following:
- consume more fresh fruits and vegetables
- reduce sugar and salt
- avoid processed food and high saturated fat diet
- if you drink alcohol, do so in moderation; some people on certain RA medications may need to avoid alcohol completely

IV. Emotional health
Living with RA can be a challenge. It is normal to feel angry or frustrated because tasks that used to be done routinely may now be difficult. Emotional stress may make it harder to deal with pain. Some steps that you can take to understand and control your emotional health include:
- avoid things that cause you stress e.g. make changes to your daily routine to reduce physical strain
- make time for things that you enjoy e.g. listening to music
- find positive ways to cope with stress e.g. joining a support group
- learn relaxation techniques e.g. deep breathing technique

V. Smoking
Smoking is one of the poor prognostic factors for RA. Cessation of smoking is advisable in view of its association with high CV risk.
Talk to a health care worker if you are experiencing symptoms of depression, having relationship problems or facing sleep difficulties.
PRINCIPLES OF JOINT PROTECTION

The purpose of joint protection is to allow patient to participate in daily activities with the least amount of damage to the affected joints. Following these guidelines can help reduce pain, inflammation and injury resulting from too much joint stress.

The Principles of Joint Protection:

1. Respect pain
   There are many factors influencing the onset and intensity of joint pain that is activity-related.

   **Time** - the length of time one spends on an activity can influence pain. For example, five minutes of an activity may be manageable, but an hour of the same task may result in pain that lasts for a few days.

   **Weight** - weight can influence pain in more than one way. Carrying a small bag of groceries a few times may not cause any difficulties but a full 5 kg bag can cause or worsen hand or knee pain depending on the vulnerable joints. Pain can also occur from carrying too much body weight.

   **Repetition** - the number of repetitions of an activity that cause or worsen pain are notable. Stapling a few sheets of paper may not cause any pain, but stapling 50 hand-outs may cause significant pain that lingers for hours or days.

2. Distribute the load over stronger joints and/or larger surface areas
   Distribute the load over stronger joints and/or larger surface areas. Large joints are stronger than small ones. Using larger joints will reduce strain that can overstretch ligaments and create instability (a). Small hand joints are vulnerable to pain or inflammation when used too much or too often (b). When possible, spread the load over several joints or a greater surface area.

3. Avoid maintaining the same joint position for prolonged periods
   Joints kept in one position for prolonged periods of time are inclined to get stiff. Immobilisation of a joint for days or weeks can lead to muscle atrophy and joint contractures. Frequently shifting weight, stretching or changing positions can alleviate the pain and stiffness.
4. Use good posture and body mechanics
Each joint should be used in its most anatomically stable and functional plane. Good body mechanics and posture can have a powerful impact by minimising musculoskeletal strain and thereby preventing or reducing pain. While it takes more energy initially, once it becomes a habit, it takes less energy to maintain good posture.

5. Use the minimum amount of force necessary to complete the job
Squeezing and pinching activities (a) should be avoided, as they tend to further injure soft tissue as well as increase deformities of the hand. Less force (b) can be used consciously by holding equipment with less effort, taking rest breaks and using special equipment.
6. **Simplify work by using efficiency principles: plan, organise, balance work with rest**
   Planning, organising and balancing work with rest are useful principles to be employed in reducing stress on joints.

7. **Maintain strength and range of motion**
   Remain active to maintain/increase strength and range of motion. Exercise plays an important role in control of body weight, CV fitness and prevention of coronary heart disease. When individualised for people with arthritis, exercise is expected to improve rather than worsen joint pain and function.

### PHARMACOLOGICAL TREATMENT OF RHEUMATOID ARTHRITIS

<table>
<thead>
<tr>
<th>Drug</th>
<th>Administration</th>
<th>Recommended Dosage</th>
<th>Possible Adverse Events</th>
<th>Pregnancy and Lactation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ibuprofen</td>
<td>Oral</td>
<td>400 - 800 mg TDS (maximum: 3200 mg daily)</td>
<td>• GI intolerance</td>
<td>Pregnancy</td>
</tr>
<tr>
<td>Diclofenac</td>
<td>Oral</td>
<td>50 mg TDS</td>
<td>• Rash</td>
<td>Traditional NSAIDs can be used if needed to control symptoms but use is restricted to first and second trimester</td>
</tr>
<tr>
<td>Naproxen</td>
<td>Oral</td>
<td>250 - 500 mg BD (equivalent to 275 - 550 mg naproxen sodium)</td>
<td>• Peripheral oedema</td>
<td>Selective cyclooxygenase-2 (COX-2) inhibitors should be avoided in pregnancy</td>
</tr>
<tr>
<td>Meloxicam</td>
<td>Oral</td>
<td>7.5 - 15 mg OD</td>
<td>• Changes in ALT/AST</td>
<td></td>
</tr>
<tr>
<td>Etiricoxib</td>
<td>Oral</td>
<td>60 - 90 mg OD</td>
<td>• Elevated blood pressure</td>
<td></td>
</tr>
<tr>
<td>Celecoxib</td>
<td>Oral</td>
<td>200 mg OD or BD</td>
<td>• Contact dermatitis at application site</td>
<td>Lactation</td>
</tr>
<tr>
<td>Ketoprofen</td>
<td>Patch</td>
<td>Apply for 12 hours</td>
<td>• Body fluid retention</td>
<td>NSAIDs are compatible with lactation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Elevated blood pressure</td>
<td>Celecoxib is compatible with lactation, other CO-2 inhibitors should be avoided</td>
</tr>
</tbody>
</table>

#### Non-steroidal anti-inflammatory drugs

<table>
<thead>
<tr>
<th>Drug</th>
<th>Administration</th>
<th>Recommended Dosage</th>
<th>Possible Adverse Events</th>
<th>Pregnancy and Lactation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corticosteroids</td>
<td>Oral</td>
<td>Low dose as suggested in Recommendation 6</td>
<td>• Body fluid retention</td>
<td>Pregnancy</td>
</tr>
<tr>
<td></td>
<td>IM</td>
<td>Example: Triamcinolone 40-80mg or equivalent</td>
<td>• Elevated blood pressure</td>
<td>Can be continued at lowest effective dose</td>
</tr>
<tr>
<td></td>
<td>IA</td>
<td>Dose depends on the site of injection</td>
<td>• Acne</td>
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<td></td>
<td></td>
<td></td>
<td>• Decreased body growth</td>
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<td></td>
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<td></td>
<td>• Hyperglycaemia</td>
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<td>• Osteoporosis</td>
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<td></td>
<td></td>
<td></td>
<td>• Muscle weakness</td>
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<td></td>
<td>• Headache</td>
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<td></td>
<td></td>
<td></td>
<td>• Injection site infection</td>
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</tbody>
</table>

**Glucocorticoids**

- **Oral**: Low dose as suggested in [Recommendation 6](#). Example: Triamcinolone 40-80mg or equivalent
- **IM**: Dose depends on the site of injection
- **IA**: Dose depends on the site of injection

**Possible Adverse Events**

- GI intolerance
- Rash
- Peripheral oedema
- Changes in ALT/AST
- Elevated blood pressure

**Pregnancy**

- Traditional NSAIDs can be used if needed to control symptoms but use is restricted to first and second trimester
- Selective cyclooxygenase-2 (COX-2) inhibitors should be avoided in pregnancy

**Lactation**

- NSAIDs are compatible with lactation
- Celecoxib is compatible with lactation, other CO-2 inhibitors should be avoided
<table>
<thead>
<tr>
<th>Drug</th>
<th>Administration</th>
<th>Recommended Dosage</th>
<th>Possible Adverse Events</th>
<th>Pregnancy and Lactation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methotrexate</td>
<td>Oral SC</td>
<td>7.5 - 20 mg weekly</td>
<td>• GI intolerance</td>
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<tr>
<td></td>
<td>Intramuscular (IM)</td>
<td>Dose adjustment for renal impairment:</td>
<td>• Alopecia</td>
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<tr>
<td></td>
<td></td>
<td>CrCl (ml/min /1.7m²)</td>
<td>% Standard dose</td>
<td>• Mucositis</td>
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<td></td>
<td></td>
<td>≥60</td>
<td>Full dose</td>
<td>• Photosensitivity, rash</td>
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<td></td>
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<td>30-59</td>
<td>50</td>
<td>• Abnormal FBC</td>
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<td></td>
<td>&lt;30</td>
<td>Contraindicated</td>
<td>• Elevated ALT/AST</td>
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<td></td>
<td>• Interstitial pneumonia (acute/chronic)</td>
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<td></td>
<td></td>
<td>• Contraindicated in pregnancy</td>
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<td></td>
<td>• Stop at least three months in women prior to conception</td>
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<tr>
<td>Sulfasalazine</td>
<td>Oral</td>
<td>500 - 1500 mg BD</td>
<td>• Pruritus</td>
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<td></td>
<td></td>
<td></td>
<td>• Rash</td>
<td>Pregnancy</td>
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<td></td>
<td></td>
<td></td>
<td>• GI intolerance</td>
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<td>• Abnormal FBC</td>
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<td></td>
<td>• Elevated ALT/AST</td>
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<td></td>
<td>• Oligospermia</td>
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<td>Pregnancy</td>
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<td>• Compatible in pregnancy with folate supplementation</td>
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<td>Lactation</td>
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<td>• Breastfeeding is safe in a healthy, full-term infant</td>
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<td>• Caution in premature infant, hyperbilirubinemia, and glucose-6-phosphate dehydrogenase (G6PD) deficiency</td>
</tr>
<tr>
<td>Hydroxychloroquine</td>
<td>Oral</td>
<td>200 - 400 mg OD (not exceeding 6.5mg/kg ideal body weight)</td>
<td>• Retinal disorder</td>
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<td>*BSR 2017</td>
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<tr>
<td>Leflunomide</td>
<td>Oral</td>
<td>10 - 20 mg OD</td>
<td>• Alopecia</td>
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<td></td>
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<td></td>
<td>• Abnormal FBC</td>
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<td></td>
<td>• Elevated ALT/AST</td>
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<td>• Elevated blood pressure</td>
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<td></td>
<td>Pregnancy</td>
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<td></td>
<td></td>
<td>• Avoid in pregnancy and lactation</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>• A washout procedure should be completed pre-conception</td>
</tr>
<tr>
<td>Drug</td>
<td>Administration</td>
<td>Recommended Dosage</td>
<td>Possible Adverse Events</td>
<td>Pregnancy and Lactation</td>
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<tr>
<td><strong>Targeted Synthetic DMARDs</strong></td>
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<tr>
<td>Tofacitinib</td>
<td>Oral</td>
<td>5 mg BD</td>
<td>• Increased low-density lipoprotein and high-density lipoprotein level</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>5 mg OD (CrCl 30-60mL/min)</td>
<td>• Herpes Zoster infection</td>
<td><strong>Pregnancy</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Elevated ALT/AST</td>
<td>• Avoid in pregnancy</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Gut perforation (especially in diverticulitis)</td>
<td>• Should be stopped 2 months before conception</td>
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<td></td>
<td><strong>Lactation</strong></td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>• Insufficient data to support safety in pregnancy and lactation</td>
</tr>
<tr>
<td>Baricitinib</td>
<td>Oral</td>
<td>4 mg OD</td>
<td>• Elevated ALT/AST</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>2mg OD (CrCl 30-60mL/min)</td>
<td>• GI intolerance</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>• Herpes Zoster infection</td>
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<td></td>
<td>• Abnormal FBC</td>
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<td></td>
<td></td>
<td></td>
<td>• Increased low-density lipoprotein, high-density lipoprotein level and triglycerides</td>
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<tr>
<td><strong>Biologic DMARDs</strong></td>
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<td></td>
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</tr>
<tr>
<td>Infliximab</td>
<td>IV</td>
<td>3 mg/kg every 8 weeks</td>
<td>• Rash</td>
<td><strong>Pregnancy</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>May increase to 5 mg/kg</td>
<td>• GI intolerance</td>
<td>• Can be continued up to gestational week 20; if indicated can be used throughout pregnancy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Infusion related reaction</td>
<td><strong>Lactation</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Infections (including TB)</td>
<td>• Compatible with lactation</td>
</tr>
<tr>
<td>Etanercept</td>
<td>SC</td>
<td>50 mg every week</td>
<td>• Injection site reaction</td>
<td><strong>Pregnancy</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Infections (including TB)</td>
<td>• Can be continued up to gestational week 30-32; if indicated can be used throughout pregnancy</td>
</tr>
<tr>
<td>Adalimumab</td>
<td>SC</td>
<td>40 mg every 2 weeks</td>
<td>• Injection site reaction</td>
<td><strong>Pregnancy</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Rash</td>
<td>• Can be continued up to gestational week 20; if indicated</td>
</tr>
<tr>
<td>Drug</td>
<td>Administration</td>
<td>Recommended Dosage</td>
<td>Possible Adverse Events</td>
<td>Pregnancy and Lactation</td>
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<tr>
<td>Golimumab</td>
<td>SC</td>
<td>50 mg every month</td>
<td>• Injection site reaction&lt;br&gt;• Rash&lt;br&gt;• Infections (including TB)&lt;br&gt;• Elevated ALT/AST</td>
<td>Pregnancy&lt;br&gt;• Limited evidence hence consider alternative treatments&lt;br&gt;<strong>Lactation</strong>&lt;br&gt;• Compatible with lactation</td>
</tr>
<tr>
<td></td>
<td>IV</td>
<td>2 mg/kg every 8 weeks</td>
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</tr>
<tr>
<td>Tocilizumab</td>
<td>SC</td>
<td>162 mg every week</td>
<td>• Injection site reaction&lt;br&gt;• Rash&lt;br&gt;• GI intolerance&lt;br&gt;• Elevated ALT/AST&lt;br&gt;• Abnormal FBC&lt;br&gt;• Infections (including TB)&lt;br&gt;• Gut perforation (especially in diverticulitis)&lt;br&gt;• Increased low-density lipoprotein level</td>
<td>Pregnancy&lt;br&gt;• Contraindicated in pregnancy and lactation &lt;br&gt;<strong>Lactation</strong>&lt;br&gt;• Compatible with lactation</td>
</tr>
<tr>
<td></td>
<td>IV</td>
<td>4 - 8 mg/kg every 4 weeks</td>
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</tr>
<tr>
<td>Rituximab</td>
<td>IV</td>
<td>1000 mg on day 1 and day 15 May be repeated every 6 months</td>
<td>• Peripheral oedema&lt;br&gt;• Pruritus&lt;br&gt;• Rash&lt;br&gt;• GI intolerance&lt;br&gt;• Abnormal FBC&lt;br&gt;• Infections&lt;br&gt;• Infusion related reaction&lt;br&gt;• Low IgG/IgA/IgM</td>
<td>Pregnancy&lt;br&gt;• Can be used in exceptional cases in early gestation; if used at later stages of pregnancy, clinician should be aware of risk of B cell depletion and other cytopaenias in the neonate&lt;br&gt;<strong>Lactation</strong>&lt;br&gt;• Avoid in lactation</td>
</tr>
</tbody>
</table>

**OD=**daily; **BD=**twice daily; **TDS=**thrice daily

**Adapted:**


## Drug Monitoring

<table>
<thead>
<tr>
<th>csDMARDs</th>
<th>Drug</th>
<th>Baseline investigation</th>
<th>Subsequent investigations</th>
<th>Frequency of monitoring</th>
<th>Additional monitoring</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methotrexate</td>
<td>FBC</td>
<td>FBC</td>
<td>2-4 weekly for the first 3 months or at every dose increase, then 3-monthly</td>
<td>-</td>
<td>Contact rheumatology team urgently or consider interruption in treatment if any of the following occurs: i. WBC &lt;3.5 x 10^9/L ii. Neutrophils &lt;1.6 x 10^3/L iii. Unexplained eosinophilia &gt;0.5 x 10^3/L iv. MCV &gt;105 fL v. Platelet &lt;140 x10^9/L vi. Creatinine increase &gt;30% vii. AST/ALT &gt; 3x ULN (upper limit normal) viii. Unexplained reduction in albumin &lt;30 g/L</td>
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<td></td>
<td>Serum creatinine</td>
<td>Serum creatinine</td>
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<td></td>
<td>ALT and/or AST</td>
<td>ALT and/or AST</td>
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<td>Albumin</td>
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<td>HBsAg</td>
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<tr>
<td></td>
<td>Anti-hepatitis C virus</td>
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<td></td>
<td>Chest X-ray</td>
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<td></td>
<td>BP and weight at each visit</td>
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<tr>
<td>Sulfasalazine</td>
<td>FBC</td>
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<td>ALT and/or AST</td>
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<td>Albumin</td>
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<td>HBsAg</td>
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<td>Anti-hepatitis C virus</td>
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<td>Leflunomide</td>
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<td>Serum creatinine</td>
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<td>Rituximab</td>
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<td>• During and up to 12 months after treatment</td>
<td>• IgG level</td>
<td>• Hepatitis B virus reactivation</td>
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**Source:**
2. Cosentyx® (Secukinumab) [package insert]. East Hanover, NJ. Novartis Pharmaceuticals Corp; 2018
5. Olumiant® (Baricitinib) [product insert]. Indianapolis, IN. Eli Lilly & Co; 2018.
TUBERCULOSIS WORKUP PRIOR TO BIOLOGIC THERAPY IN RHEUMATOID ARTHRITIS

History and physical examination suggestive of TB OR Previous history of TB OR Abnormal chest X-ray

Yes

Investigations to confirm TB

TB positive

Anti-TB regime

TB negative

Adequate TB treatment previously?

Yes

Monitor and reassess if symptoms develop

No

Refer chest physician for further assessment

Mantoux test

<5 mm*

<5 mm*

No action

≥5 mm*

≥5 mm*

Positive

Treat as LTBI

IGRA

Positive

No action

Negative

No action

IGRA: Interferon Gamma Release Assay
LTBI: latent tuberculosis infection
TB: tuberculosis

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<td>ACR</td>
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<td>ADA</td>
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<td>AE</td>
<td>adverse events</td>
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<td>AGREE</td>
<td>Appraisal of Guidelines for Research and Evaluation</td>
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<td>AIIIRD</td>
<td>autoimmune inflammatory rheumatic diseases</td>
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<td>AIMS</td>
<td>Arthritis Impact Measurement Scale</td>
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<td>ALT</td>
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<td>AP</td>
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<td>anti-CCP</td>
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<td>AUC</td>
<td>area under the curve</td>
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<td>CI</td>
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ACKNOWLEDGEMENT

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- Panel of external reviewers who reviewed the draft
- Technical Advisory Committee of CPG for their valuable input and feedback
- Health Technology Assessment and Clinical Practice Guidelines Council for approval of the CPG
- All those who have contributed directly or indirectly to the development of the CPG

DISCLOSURE STATEMENT

The panel members of both Development Group and Review Committee had completed disclosure forms. None held shares in pharmaceutical firms or acts as consultants to such firms. Details are available upon request from the CPG Secretariat.

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