



**Wrightington, Wigan and
Leigh Teaching Hospitals**
NHS Foundation Trust

Blood Matters

Blood Matters

A guide to the blood tests used in managing rheumatoid arthritis and adult juvenile idiopathic arthritis

Blood Matters National Rheumatoid Arthritis Society

This guide includes tests used for ongoing monitoring and recording of blood results relevant to rheumatoid arthritis (RA) and juvenile idiopathic arthritis (JIA). Use the table below to add any blood tests that might be particularly relevant to you.

Date	CRP	PV	ESR	Hb
20 Feb 2022	100	100	100	100

Test Names and Purposes

- **C-reactive protein (CRP):** Monitor disease activity.
- **Plasma viscosity (PV):** Also known as 'blood thickness'.
- **ESR (Erythrocyte Sedimentation Rate):** Part of disease activity monitoring.
- **Hb (Haemoglobin):** Part of full blood count.
- **Neutrophils:** Count part of white blood cell.
- **Platelets:** Blood cells found in bone marrow.
- **ALT/AST:** Liver function tests.
- **ALP:** Liver function and bone health.
- **Creatinine:** Kidney function.
- **Vit D:** Vitamin D levels.

For more detailed information, visit our website: www.nras.org.uk/product/blood-matters

About Us

The National Rheumatoid Arthritis Society (NRAS) is the only patient-led charity in the UK focusing specifically on rheumatoid arthritis (RA) and juvenile idiopathic arthritis (JIA),

including adult JIA. We provide information and support services for those affected by RA and JIA, their families, friends, carers, and health professionals.

Our websites offer a wealth of information about RA and JIA and their treatment, the latest research and developments, as well as lifestyle and supported self-management resources.

Connect with NRAS

Our freephone helpline can be contacted by phone on **0800 298 7650** or by email at helpline@nras.org.uk. Our trained helpline staff, supported by an advisory board of medical and healthcare professionals, are there to answer your questions on all aspects of living with RA and JIA.

Here For You Volunteers

If you'd like to talk to someone else with rheumatoid arthritis, the helpline staff can match you with one of our trained telephone support Volunteers, who will then call you back to discuss whatever aspect of living with RA concerns you most. Find out more about the NRAS Here For You Volunteers at www.nras.org.uk/resource/here-for-you.

Visit our websites: www.nras.org.uk and www.jia.org.uk

Our Booklets

NRAS produces a wide range of information booklets about RA and JIA. These can be downloaded or ordered through the website or by email at enquiries@nras.org.uk. If you don't have access to the internet, just call us on **01628 823524**.

Join Us

To find out how to support the work of the charity by becoming a Member of NRAS, visit www.nras.org.uk/join or call our Membership team on **01628 823524**.

Credits

- **Writers:** Victoria Butler (NRAS), Clare Jacklin (NRAS), Dr Maddy Piper (Consultant Rheumatologist), Andrew Potheary (Lead Pharmacist, Rheumatology & Biologics), Dr Luke Sammut (Consultant Rheumatologist)
- **First Editor:** Colin Richardson

- **Additional Editors:** Victoria Butler, Clare Jacklin
- **Design:** MB Creative

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Blood Tests and Monitoring

Blood tests are an important part of both the diagnosis and monitoring of rheumatoid arthritis (RA) and juvenile idiopathic arthritis (JIA). However, the different tests, abbreviations, and numbers can be confusing. It might not always be clear what the purpose of each test is, why it's important, and what the results mean.

We have created this resource because we strongly believe that having a good understanding of your blood tests is important to help you manage your condition and

improve outcomes. This is not to say that it is your responsibility to monitor your blood results; that should always be the responsibility of your healthcare team. But having a good understanding of your blood tests should improve the ‘shared decision-making’ about treatments.

The Importance of Blood Tests

You will have regular blood tests to monitor your condition and/or the effects of your medication. Blood samples are taken at your GP surgery, local hospital, or at your rheumatology clinic, depending on where you live and whether you have a shared care agreement in place. Your rheumatology team or GP will arrange for the tests to be done and will let you know where you need to go.

Your blood samples are sent to a laboratory for testing. Your test results can fluctuate for many reasons, not just because of your arthritis—an infection such as a cold, for example. However, if you monitor your results over time, you can start to see what your normal range is, which may be different from the average. You might also become aware of the causes for some fluctuations: for example, a liver function test might be higher than expected due to recent alcohol consumption, while blood tests showing levels of inflammation in your blood may be lower because of a recent steroid injection or raised due to a recent flare.

Your insight into possible causes for these ups and downs can be invaluable, as can having a general understanding of what looks ‘normal’ for you.

A healthcare professional may only consider a few of your most recent blood test results during an appointment, whereas you can add real value to the consultation by being more aware of your blood tests over a longer period of time.

Blood Matters: JIA Transitioning of Care

This booklet is aimed at those living with RA and adults living with JIA, including young patients with JIA who are transitioning from the care of pediatric rheumatology to care within an adult setting. For more information, see our article on [transition](#) and our [JIA publications](#).

The Disease Activity Score (DAS28)

One of the reasons blood tests are important is because some of them (see CRP and ESR) are used, along with an assessment of your joints and your own assessment of how you are, to calculate a measure of disease activity known as DAS28. A summary of what your DAS level means is given below and more detailed information can be found on our website www.nras.org.uk/resource/the-das28score.

- **DAS score less than 2.6:** RA is in remission
- **DAS score 2.6 to 3.2:** A low level of disease activity
- **DAS score more than 3.2:** Active disease that may require change in treatment. You may be eligible for advanced therapy treatment on a biologic, biosimilar, or JAK inhibitor
- **DAS score more than 5.1:** Severe disease activity

The Impact of COVID-19

Some processes, such as shared care arrangements, frequency of blood tests, and face-to-face appointments, may have been affected by the impact of the COVID-19 pandemic on the NHS. Any such impact is subject to regular changes, and the effects of the pandemic on healthcare services can differ greatly by region. For up-to-date information on COVID-19 and the impact on services, please visit the NRAS website.

Monitoring Your Blood Test Results

Date	Test Name	Meaning	Purpose	Comments
20 Feb 2022	CRP	C-reactive protein	Monitor disease activity	Recent steroid injection
20 Feb 2022	ESR	Erythrocyte Sedimentation Rate	Monitor disease activity	Drank alcohol at birthday party

This table can be used to record the main blood tests used for ongoing monitoring, and includes two 'other' columns to add in any blood tests that might be particularly relevant to you. It is also available to download from our website www.nras.org.uk/product/blood-matters.

Understanding Your Blood Test Results

This booklet is intended to help you understand your blood test results. You can also use it to track your test results over time by recording them in the table at the back (see page 36). How you do this will depend on where you live and your rheumatology team and GP.

Monitoring Your Health

- **Full Blood Count:** Diagnosis and monitoring
- **ALT/AST:** Liver function
- **ALP:** Liver function and bone
- **Creatinine:** Kidney function

After your arthritis has been diagnosed and treatment started, your rheumatology team may set up a shared care arrangement with your GP so that ongoing monitoring blood tests can be done through your local practice. In some areas, blood tests are done by a monitoring clinic attached to the Rheumatology department. Find out what your local arrangements are when you discuss your treatment plan with your Rheumatology team.

Some patients can see their results through Patient Access. If you do not use Patient Access, discuss with your GP or monitoring clinic how to find out your results and how they can be entered into your Blood Matters booklet. Your healthcare team may be able to help you enter your results into your Blood Matters booklet. Be sure to take it with you when you have any appointment connected with your RA or adult JIA or have it by your side if you have a phone consultation.

Reference Ranges Explained

When you are given the results of any blood test, a natural question to ask is 'What does that number mean?' and 'How does that compare to a 'normal' range?'

Reference ranges define the 'normal' range of values for a blood test. Most people (95%) would expect their result to fall between the upper and lower levels of the range. The reference range is indicated on each blood result which is returned to the GP or healthcare professional who took your blood.

Reference ranges are a useful tool for you and your healthcare team, to give you an idea of whether your result is high, low, or around what would be expected for that particular test. However, not every healthy person (5%) will have results that fall within the 'normal' range. So, whilst reference ranges can be a good guide, they do not hold all the answers.

Shared Care Agreements

A Shared Care Agreement is an agreement between you, your GP practice, and your hospital consultant. It allows the care and treatment for a specific health condition, such as RA, to be shared between the hospital and your GP practice. These agreements are mainly used for prescribing and monitoring standard disease-modifying anti-rheumatic drugs (DMARDs) such as methotrexate, sulfasalazine, leflunomide, and hydroxychloroquine.

The way that shared care works may be slightly different from place to place. Most areas will have shared care guidelines in place for various medicines. Your rheumatology team will discuss your treatment with you and prescribe the appropriate treatment after discussion and once a treatment plan has been agreed with you. They will arrange for monitoring, such as blood tests, to be carried out to ensure that the new treatment regime is working for you and that your body is tolerating it.

Once your hospital team is satisfied that you do not need to be monitored as closely, they will write to your GP practice and invite them to take part in shared care. Your GP practice will then take over the prescribing and routine monitoring of your medicine. You will also stay under the care of your rheumatology team but are likely to be seen less often by them if your disease remains well controlled.

Important Considerations

- If you develop new side-effects to your medicine, or your condition changes or gets worse, report this to your GP or rheumatology team.
- If you are planning a pregnancy, inform your rheumatology team as medication may need to be stopped or adjusted.
- If you change your GP practice, a new shared care agreement will need to be arranged.

UK Treatment Guidelines

Treatment guidelines in the four nations of the UK can vary. To find out how blood tests contribute to the treatment pathway in relation to these guidelines, visit our website:

www.nras.org.uk/resource/guidelines-on-the-managementof-ra

The guidelines themselves can be found on the following web pages:

- For England and Wales: NICE guidelines, visit www.nice.org.uk/guidance
- For Northern Ireland: Full details of the NICE guidelines adopted in Northern Ireland are on the NI Department of Health website at www.health-ni.gov.uk
- For Scotland: The SMC website is at www.scottishmedicines.org.uk

Blood Test Directory

We list here the blood tests that you will have at one time or another. There are some that you will only have during the process of diagnosis, while others are only used to monitor your reactions to medication or to assess your general health. Whilst some blood tests will be reviewed regularly, others may be assessed as part of an 'annual review'.

Your annual review is an opportunity to assess how you are managing your condition and to identify any further support you may need. The tests that are used for ongoing monitoring are those that it is useful to track over time. We include a handy table later in this booklet for recording your blood test results (see page 36). If you use this booklet to track your blood test results, please be sure to take it along with you to your appointments.

Diagnosis

National Rheumatoid Arthritis Society

The blood tests in this section are part of the diagnostic process for RA or JIA. However, they cannot be diagnosed by blood tests alone. Instead, they are used along with a number of other tests, including assessment of joints.

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"Blood Matters: A guide to the blood tests used in the diagnosis and monitoring of rheumatoid arthritis and juvenile idiopathic arthritis."

For more information, visit the [National Rheumatoid Arthritis Society website](#).

Diagnosis and Monitoring of Rheumatoid Arthritis

Rheumatoid Factor (RF)

What does it measure? Despite its name, rheumatoid factor (RF) is not a definitive test for RA. It is one of several tests used in diagnosing RA. RF is an auto-antibody found more commonly in the blood of patients with RA, as well as in other conditions like Sjögren's syndrome and connective tissue diseases. It can also be present in healthy individuals as they age.

When is this test used?

- Primarily used at diagnosis.
- Occasionally used in monitoring RA.

How often is the test typically taken?

The test is usually taken when considering a diagnosis of rheumatoid arthritis. If positive, it does not need to be repeated. If negative, it may be repeated during the course of the disease.

Is it used as part of an annual review?

Though unlikely to be re-done for the review, it may be relevant to discussions as part of your annual review, especially when considering ACPA test results.

It is possible to be negative for RF and still have RA, known as 'seronegative rheumatoid arthritis' (around 20% of patients with RA are negative for RF).

Anti-CCP Antibodies (ACPA)

What does it stand for? Anti-cyclic citrullinated peptide auto-antibodies. This includes the CCP (cyclic citrullinated antibody) test and the MCV (Mutated citrullinated vimentin) test.

When is this test used?

- Used for diagnosis.
- A positive CCP/MCV strongly suggests the presence of RA or the risk of developing it in the future.

How often is the test typically taken?

If positive, it does not need to be repeated. If negative, it may be repeated during the course of the disease.

Other Diagnostic Blood Tests

Diagnosis of RA or JIA cannot be made with blood tests alone. Other tests may be used, such as ANA (Anti-Nuclear Antibody), which may be present in conditions like systemic lupus erythematosus (SLE) and Sjögren's syndrome.

C-reactive Protein (CRP)

What does it measure? CRP is an 'inflammatory marker' indicating the level of inflammation in your body.

What is the test used for?

- Diagnosis and ongoing monitoring.

How often is the test typically taken?

CRP is used more often than ESR to calculate the DAS28 score. It is repeated if there is concern of an RA flare and is particularly important in the early months of treating newly diagnosed RA.

Plasma Viscosity (PV)

What does it measure? Plasma viscosity measures the 'thickness of blood' and can be affected by proteins produced in response to inflammation.

How is it used in RA/adult JIA?

Clinicians may request the plasma viscosity blood test at intervals to monitor disease activity. A high result may indicate a flare if no other causes are present.

Erythrocyte Sedimentation Rate (ESR)

What does it measure? ESR is an 'inflammatory marker' that indicates the level of inflammation.

In your body, inflammatory conditions such as RA or infections can indicate an active immune system. **Is it used as part of an annual review?** Yes, plasma viscosity, along with other inflammatory markers like CRP or ESR, helps in diagnosis and monitoring to determine if a medication is effective.

The CRP test is commonly used to calculate the DAS score, but some rheumatology units may still use ESR. It is performed whenever the DAS28 score is calculated and repeated if there is a concern of an RA flare. Some GPs might repeat the ESR test with each monitoring blood test, which, while not essential, can help establish a normal ESR level for the patient and detect early warnings of a flare. A disadvantage of ESR is its slower return to normal levels post-flare or infection compared to CRP.

Is it used as part of an annual review? Yes, it should be reviewed annually to ensure RA is adequately controlled.

How is it used in RA and adult JIA?

ESR aids in diagnosing RA and monitoring its activity, indicating whether medication is effective. Higher ESR levels suggest more active RA, expected to be higher before medication and during flare-ups, and lower after treatment, especially post-steroid injections or during steroid tablet courses. Note that ESR levels can increase with age, which should be considered when discussing results.

ESR also helps monitor overall disease activity by contributing to the DAS28 calculation. Consistency in using either ESR or CRP for DAS28 is crucial for accurate readings. For more information on DAS, consult your rheumatology team.

Blood Matters

Some medications for RA and JIA can affect liver and kidney function. Once medication begins, tests are repeated at intervals to assess suitability and dosage adjustments.

Liver Function Tests (LFTs) | ALT, AST, and Albumin

- **ALT:** Alanine aminotransferase
- **AST:** Aspartate aminotransferase

Liver function tests, or liver blood tests, include a panel of tests on the same blood sample, measuring levels of enzymes, proteins, and other substances produced by the liver. ALT and AST enzymes are released into the blood if liver cells are damaged or inflamed. ALT is mainly in the liver, while AST is found throughout the body, especially in the liver and muscles, including the heart. ALT and AST rise with liver inflammation, potentially triggered by DMARDs. Albumin, the main protein produced by the liver, can be low due to infections

or kidney damage.

When is the test used?

Prior to starting medication and to monitor potential side effects. It is typically checked at intervals per national guidelines, which may vary based on patient, symptoms, and previous results.

Is it used as part of an annual review?

Yes, levels are reviewed to ensure the liver tolerates medication. Abnormal results may indicate other liver issues, necessitating medication adjustment.

How is it used in RA and adult JIA?

The test monitors medication impact, such as side effects. Abnormal liver function tests are common, with most individuals having normal liver function. Factors affecting results include alcohol, medications (e.g., NSAIDs like ibuprofen), and some over-the-counter and herbal treatments. Fatty liver, often associated with increased body weight, and other conditions can also be factors.

Alkaline Phosphatase (ALP)

ALP is an enzyme found throughout the body, particularly in the liver, bones, kidneys, and digestive system. High ALP levels can indicate liver disease or bone disorders.

When is the test used?

Prior to starting medication and to monitor potential side effects. It is reviewed with other monitoring blood tests during annual reviews.

How is it used in RA and adult JIA?

ALP checks liver health during treatment. If levels rise above normal, causes must be reviewed. High ALP is often due to fatty liver, but other causes are possible. Rheumatoid drugs affecting the liver may need adjustment if ALP indicates liver function issues.

Kidney Function Tests | Urea, Creatinine, Sodium, Potassium, and eGFR

The kidney function test, or renal profile, includes tests on the same blood sample. The kidney filters waste products from the blood, excreting them in urine. This test identifies how quickly waste products are removed by the kidneys. Sodium and potassium are salts in body fluids, while urea and creatinine are waste products. Urea results from protein breakdown, and creatinine from muscle wear and tear. eGFR estimates kidney efficiency in removing waste and excess fluid from the blood.

When is the test used?

Prior to starting medication and to monitor potential side effects. It is checked at intervals per national guidelines, which may vary based on patient, symptoms, and previous results.

Is it used as part of an annual review?

Yes.

How is it used in RA and adult JIA?

The test monitors medication impact. If kidney function is impaired before treatment, alternative medications or dosage adjustments may be necessary. Multiple factors affect kidney function tests, including medications, age, and other conditions like high blood pressure and diabetes.

Blood Matters

The Full Blood Count (FBC) may be taken for diagnosis, monitoring medication reactions, or general health monitoring.

Full Blood Count | FBC

- **Red Blood Cells (Erythrocytes):** Contain haemoglobin (Hb) and transport oxygen from the lungs to the body.
- **White Blood Cells (Leucocytes):** Part of the immune system, with different types playing roles in fighting infections.

- **Platelets (Thrombocytes):** Cell fragments that stop bleeding by sticking together when blood vessels are damaged.

The FBC measures the different types of blood cells, providing information on their quantities and health status.

Types of Cells

Red Blood Cells

- **Haemoglobin:** The substance that gives red blood cells their color and allows them to carry oxygen around the body.
- **MCV (Mean Cell Volume):** The average size of red blood cells.
- **MCH (Mean Cell Haemoglobin) and MCHC (Mean Cell Haemoglobin Concentration):** The average amount of haemoglobin in the red blood cells, described in two different ways.

White Blood Cells

- **Differential:** This tells us how many of each of the different types of white blood cell are in your blood. The five most common types included in the differential are neutrophils, lymphocytes, monocytes, eosinophils, and basophils.

Platelets

Platelets are small blood cells that help to form clots and stop bleeding. A low platelet count can be a side-effect of many medications used to treat RA, while a high platelet count can indicate active inflammation.

Full Blood Count (FBC)

The FBC is an essential test used in the diagnostic process and monitoring of conditions like rheumatoid arthritis (RA) and adult juvenile idiopathic arthritis (JIA). It helps in detecting anaemia and monitoring potential side effects of medications.

When is the test used?

- As part of the diagnostic process.

- To screen for abnormalities in the blood.
- To monitor potential side effects of medication.

How often is the test typically taken?

When starting a new treatment, the FBC is usually checked to establish a baseline and then every two weeks until a stable dose is reached. It is then checked monthly for three months and every three months thereafter. Frequency may vary based on individual circumstances.

Is it used as part of an annual review?

Yes, the FBC is part of the annual review to ensure ongoing health and effective treatment management.

Haemoglobin (Hb)

Hb is a key blood test in monitoring medication. It is a protein in red blood cells that carries oxygen to the body's organs and transports carbon dioxide back to the lungs. Chronic inflammation and long-term medication can cause fluctuations in red blood cell levels.

When is the test used?

- Prior to starting medication to ensure the body is fit for treatment.
- To monitor for potential side effects.

How often is the test typically taken?

Hb is checked as part of routine blood monitoring. If levels are abnormal, further tests are conducted to determine the cause.

White Blood Cell Count (WBC)

The WBC measures the number of white blood cells in the blood, which are crucial for the immune system. A high count may indicate an active immune response, while a low count suggests an impaired immune system.

When is the test used?

- At diagnosis to screen for other causes of joint pain and inflammation.
- To ensure safe use of disease-modifying drugs.

How often is the test typically taken?

Initially, to establish a baseline before treatment, and then as part of routine monitoring once treatment begins.

Is it used as part of an annual review?

Yes, it is reviewed alongside other monitoring blood tests.

Neutrophils

Neutrophils are a type of white blood cell. A normal neutrophil count is necessary before starting standard DMARDs or biologics. The count is monitored during treatment to ensure medications are not adversely affecting the bone marrow.

"Blood Matters" - Monitoring blood tests is crucial for managing RA and JIA effectively and ensuring that treatments do not cause adverse effects.

Blood Matters

Blood cells, specifically neutrophils, play a crucial role in fighting bacterial infections. They are produced in the bone marrow, and a normal neutrophil count indicates proper bone marrow function. The neutrophil count is part of the full blood count test, which ensures it falls within the normal range. High levels may indicate infections, particularly bacterial ones, while low levels could be due to other conditions or medications.

When is the Test Used?

The test is conducted during the diagnostic process to ensure symptoms are not due to other conditions. It is typically checked at diagnosis and monitored regularly. If the count is abnormal, more frequent testing may be necessary. It is also part of the annual review to ensure stability.

Lymphocytes

Lymphocytes are white blood cells that combat viral infections. Like neutrophils, they are produced in the bone marrow, and a normal count indicates healthy bone marrow function. The lymphocyte count is also part of the full blood count test, with high levels seen in viral infections.

How is it Used in RA and Adult JIA?

- Checked at diagnosis and monitored regularly.
- Part of the annual review to ensure stability.
- Necessary to be in the normal range before starting standard DMARDs or biologic treatments.

General Health Monitoring

Cholesterol Tests | Lipid Profile

The lipid profile measures cholesterol levels, including HDL ('good' cholesterol) and LDL ('bad' cholesterol), and triglycerides. High LDL levels can lead to plaque build-up in arteries, increasing the risk of heart disease and strokes.

When is the Test Used?

Cholesterol is monitored as part of long-term care for rheumatoid arthritis and adult JIA patients due to increased heart disease risk. It is part of the annual review, with more frequent testing for at-risk patients.

Vitamin D

Vitamin D is crucial for calcium absorption and bone health. It is produced by the skin through sunlight exposure and found in certain foods. The test measures vitamin D levels, especially in patients at risk for osteoporosis.

When is the Test Used?

Checked in patients at risk for osteoporosis, falls, or fractures. RA patients are at increased risk, especially with long-term steroid use. It may be discussed at the annual review.

Immunoglobulins | Igs

Immunoglobulins are antibodies that play a key role in the immune system. The test measures the total amount and types of immunoglobulins (IgA, IgG, IgM) in the blood.

When is the Test Used?

Not generally taken regularly, but required before specific biologic treatments like rituximab. It helps rule out other conditions with similar symptoms and ensures immunoglobulin levels are sufficient for treatment.

Blood Matters

This table can be used to record the main blood tests used for ongoing monitoring, and includes two 'other' columns to add in any blood tests that might be particularly relevant to you. It is also available to download from our website: www.nras.org.uk/product/blood-matters

Test Information

Test Name	Meaning	Purpose
CRP	C-reactive protein	Diagnosis and monitoring DAS28
PV	Plasma viscosity or 'blood thickness'	Monitor disease activity
ESR	Erythrocyte Sedimentation Rate	Monitor disease activity DAS28
Hb	Haemoglobin	Full blood count diagnosis and monitoring
Neutrophils	Part of white blood cell count	Full blood count diagnosis and monitoring
Lymphocytes	Part of white blood cell count	Full blood count diagnosis and monitoring
Platelets	Blood cells found in bone marrow	Full blood count diagnosis and monitoring
ALT/AST	Liver function	Monitoring
ALP	Liver function and bone health	Monitoring
Creatinine	Kidney function	Monitoring

Useful Links

- [Lab tests online UK](#): Information on any blood test, including its use and results.
- [NHS information on blood tests](#): Overview of blood tests and what to expect.
- [Anxiety UK information on needle phobia](#): Evidence-based approaches to treating fear of injections.
- [Yellow Card scheme](#): UK system for collecting and monitoring safety concerns about medicines and medical devices.

2 in 5 lonely or desperate calls to our helpline would go unanswered without Gifts in Wills. To sustain NRAS long into the future, please consider leaving us a gift in your will. Any amount is greatly appreciated. [nras.org.uk/resource/gifts-in-wills](https://www.nras.org.uk/resource/gifts-in-wills)

Other NRAS Publications

- **New2RA:** A self-help guide for people newly diagnosed with rheumatoid arthritis.
- **Living Better with RA:** A self-help guide for people with established disease, including Juvenile Idiopathic Arthritis.
- **Medicines in Rheumatoid Arthritis:** Understanding the use and management of medicines in RA.
- **Fatigue Matters:** Advice and resources for managing fatigue in RA.

For all other NRAS publications, visit www.nras.org.uk/publications. To obtain copies of any of our booklets, or more copies of this one, please call 01628 823 524 or email enquiries@nras.org.uk. Copies can also be downloaded from our website.

Contact Information

Helpline: 0800 298 7650

General: 01628 823 524

Email: helpline@nras.org.uk

Website: www.nras.org.uk | www.jia.org.uk

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