Rheumatology Blueprint

Certification Examination (CERT)

Purpose of the exam

The exam is designed to evaluate the knowledge, diagnostic reasoning, and clinical judgment skills expected of the certified rheumatologist in the broad domain of the discipline. The ability to make appropriate diagnostic and management decisions that have important consequences for patients will be assessed. The exam may require recognition of common as well as rare clinical problems for which patients may consult a certified rheumatologist.

Exam content

Exam content is determined by a pre-established blueprint, or table of specifications. The blueprint is developed by ABIM and is reviewed annually and updated as needed for currency. Trainees, training program directors, and certified practitioners in the discipline are surveyed periodically to provide feedback and inform the blueprinting process.

The primary medical content categories of the blueprint are shown below, with the percentage assigned to each for a typical exam:

Medical Content Category	% of Exam
Basic and Clinical Sciences	7%
Crystal-induced Arthropathies	5%
Infections and Related Arthritides	6%
Metabolic Bone Disease	5.5%
Osteoarthritis and Related Disorders	5%
Rheumatoid Arthritis	13%
Spondyloarthritis	6.5%
Other Rheumatic and Connective Tissue Disorders (ORCT)	16.5%
Lupus Erythematosus	9%
Nonarticular and Regional Musculoskeletal Disorders	7%
Nonrheumatic Systemic Disorders	9%
Vasculitides	8.5%
Miscellaneous Topics	2%
	100%

Exam questions in the content areas above may also address clinical topics in geriatrics, pediatrics, pharmacology and topics in general internal medicine that are important to the practice of rheumatology.

ABIM is committed to working toward health equity and believes that board-certified physicians should have an understanding of health care disparities. Therefore, health equity content that is clinically important to each discipline will be included in assessments, and the use of gender, race, and ethnicity identifiers will be re-evaluated.

Exam format

The exam is composed of up to 240 single-best-answer multiple-choice questions, of which approximately 40 are new questions that do not count in the examinee's score. Most questions describe patient scenarios and ask about the work done (that is, tasks performed) by physicians in the course of practice:

- Making a diagnosis
- Ordering and interpreting results of tests
- Recommending treatment or other patient care
- Assessing risk, determining prognosis, and applying principles from epidemiologic studies
- Understanding the underlying pathophysiology of disease and basic science knowledge applicable to patient care

Clinical information presented may include patient photographs, radiographs, micrographs, DXA scans, electrocardiograms, angiograms, and other media to illustrate relevant patient findings. Learn more information on how exams are developed.

A tutorial including examples of ABIM exam question format can be found at http://www.abim.org/certification/exam-information/rheumatology/exam-tutorial.aspx.

The blueprint can be expanded for additional detail as shown below. Each of the medical content categories is listed there, and below each major category are the content subsections and specific topics that *may* appear in the exam. Please note: actual exam content may vary.

Basic and Clinical Sciences — **7%** of Exam

Anatomy, biology, and structure of musculoskeletal tissues <2%

- Joints and ligaments, intervertebral discs, synovium, and cartilage
- Connective tissue cells, matrix components, and macromolecules
- Bone
- Muscles, tendons, and bursae
- Blood vessels
- Nerves

Immunology 2.5%

- Anatomy and cellular elements of the immune system
  - Lymphoid organs: gross and microscopic anatomy and function
  - Organization of immune system: innate and adaptive responses
  - Specific cell types: ontogeny, structure, phenotype, function, and activation markers and cell membrane receptors
- Immune and inflammatory mechanisms
  - Antigens: types, structure, processing, presentation, and elimination
  - Components and regulation of innate immune system
  - Major histocompatibility complex: structure, function, and nomenclature
  - B-cell receptors and immunoglobulins: structure, function, antigen binding, signaling, genetic basis, and effector function
  - T-cell receptors: structure, function, antigen binding, signaling, and genetic basis
  - Receptor-ligand interactions, adhesion molecules, complement receptors, Fc receptors, and signal transduction
  - Complement and kinin systems: structure, function, and regulation
  - Acute-phase reactants and enzymatic defenses
- Cellular interactions, immune regulation, and immunomodulation
  - Activating and inhibitory immune receptors
  - Cellular activation, suppression, and regulation of each cell type
  - Origin, structure, effect, site of action, metabolism, and regulation of cytokines, chemokines, and other inflammatory mediators
  - Mechanisms of immune tolerance

- Immune responses
  - IgE-mediated: acute- and late-phase reactions
  - Immunoglobulin-mediated: opsonization, complement fixation, and antibody-dependent cellular cytotoxicity
  - Immune complex-mediated: physiochemical properties and clearance of immune complexes
  - Cell-mediated: cells and effector mechanisms in cellular cytotoxicity and granuloma formation
  - Mucosal immunity: interactions between gut and bronchus-associated lymphoid tissue and secretory IgA
  - Natural killer cells, lymphokine-activated killer cells, and graft-versus-host reaction
  - Autoantibodies
- Tissue destruction and repair
  - Cellular and molecular mediators
  - Proteases and collagenases

Research principles in basic and clinical investigation <2%

- Design of experimental protocols, clinical trials, and outcomes research
  - Outcome assessment techniques: scales, questionnaires, performance-based and capacity-based measurements, health status, disease activity, and functional assessment
  - Controls, validity, reliability, and responsiveness
  - Other design of experimental protocols, clinical trials, and outcomes research
- Principles of epidemiology and health services research
  - Prevalence and incidence
  - Measurement of disease frequency
  - Application of epidemiologic data
  - Data analysis, biostatistics, meta-analysis, and medical informatics
  - Principles of quality assessment and improvement
- Ethical and legal issues
  - Bioethics of basic research and clinical trials
  - Patient rights and confidentiality
- Laboratory and research techniques
  - Serologic: enzyme-linked immunosorbent assay (ELISA), radioimmunoassay (RIA), radial immunodiffusion (RID),

nephelometry, immunoblots, protein electrophoresis, and circulating immune complex assays

Cellular: lymphocyte proliferation, flow cytometry

Histochemistry and immunofluorescence of biopsied tissues

Molecular: Northern, Southern, and Western blotting, polymerase chain reaction, genetic mapping techniques, gene sequencing, and gene expression analysis

Monoclonal antibody production

Transgenic and gene knockout animals

Principles of genetic and proteomic analysis: genetic epidemiology, gene transcription, and protein expression analysis

Clinical analysis <2%

Synovial fluid analysis

Appropriate use and interpretation of serologic, chemical, biochemical, and microbiologic laboratory tests

Diagnostic imaging techniques

Plain radiographs: in the assessment of normal and diseased joints, bones, and periarticular structures and prosthetic joints

Computed tomography, magnetic resonance imaging, radionuclide scanning, bone densitometry, and arteriography: principles of imaging of joints, bones, and periarticular structures and tissues

Ultrasonography: principles of imaging of joints and periarticular structures and tissues

Electromyograms and nerve conduction studies: indications for and interpretation of results

Biopsy and pathology: diagnostic interpretation of pathologic specimens of specific tissues

Pharmacology: dosing, pharmacokinetics, metabolism, mechanisms of action, adverse effects, and drug interactions 2.5%

Nonsteroidal anti-inflammatory drugs

Glucocorticoids: topical, intra-articular, and systemic

Systemic antirheumatic drugs

Conventional synthetic disease-modifying antirheumatic drugs (DMARDs)

- Targeted synthetic DMARDs
- Biologics
- Urate-lowering therapy
- Agents for bone health
- Opioid and nonopioid analgesics
- Colchicine
- Plasma exchange
- Vaccines
- Intravenous immunoglobulin (IVIG)
- Vasodilator medications
- Anti-fibrotic agents
- Agents to prevent opportunistic infections

Crystal-induced Arthropathies — **5%** of Exam

- **Gout** — 2.5%
  - Primary gout
    - Asymptomatic hyperuricemia
    - Acute gout
    - Intercritical periods
    - Tophaceous gout
    - Conditions associated with gout
    - Lead intoxication
  - Secondary gout
- **Calcium pyrophosphate dihydrate deposition** (CPPD) — <2%
  - Familial
  - Secondary to primary metabolic disorders
  - Idiopathic CPPD
- **Basic calcium phosphate crystal deposition** — <2%

Infections and Related Arthritides — **6%** of Exam

- **Infections** — 5%
  - Bacterial (nongonococcal and gonococcal)
    - Native joint
    - Prosthetic joint
    - Spine

Bone	
Soft tissue	
Mycobacterial	
Spirochetal (syphilis, Lyme disease)	
Viral (human immunodeficiency virus [HIV], hepatitis B virus, hepatitis C virus, parvovirus, chikungunya virus, and others)	
Fungal	
Parasitic	
Whipple disease	
Related arthritides	<2%
Acute rheumatic fever and poststreptococcal arthritis	
Arthritis associated with bacterial endocarditis	
Postimmunization arthritis	

Metabolic Bone Disease — **5.5%** of Exam

Low bone mass	<2%
Osteoporosis	2.5%
Primary	
Postmenopausal	
Male	
Secondary	
Other causes of bone loss	<2%
Paget disease of bone	<2%
Bone disease related to renal disease	<2%
Osteomalacia	<2%

Osteoarthritis and Related Disorders — **5%** of Exam

Osteoarthritis	3%
Diffuse idiopathic skeletal hyperostosis (DISH)	<2%
Hypertrophic osteoarthropathy	<2%
Malignant and nonmalignant tumors of bones, tendons, and joints	<2%
Benign tumors	
Malignant tumors	
Osteonecrosis	<2%

Rheumatoid Arthritis — **13%** of Exam

- **Seropositive rheumatoid arthritis** 8%
  - Early disease
  - Established disease
  - Feltys syndrome
- **Seronegative inflammatory polyarthritis** <2%
- **Complications of established disease** 4%
  - Extra-articular manifestations
  - Cardiovascular disease: atherosclerotic cardiovascular disease and congestive heart failure
  - Malignancy
  - Vasculitis
  - Immunologic considerations

Spondyloarthritis — **6.5%** of Exam

- **Axial spondyloarthritis** **2%**
  - Ankylosing spondylitis <2%
    - Skeletal manifestations
    - Extra-articular manifestations
  - Nonradiographic axial spondyloarthritis <2%
    - Skeletal manifestations
    - Extra-articular manifestations
- **Reactive arthritis** <2%
  - Skeletal manifestations
  - Extra-articular manifestations
- **Arthritis associated with inflammatory bowel disease (IBD)** <2%
  - Skeletal manifestations
  - Extra-articular manifestations
- **Psoriatic arthritis** 2%
  - Skeletal manifestations
  - Extra-articular manifestations
- **Arthritis associated with other skin diseases** <2%
  - SAPHO syndrome (synovitis, acne, pustulosis, hyperostosis, and osteitis)
- **Peripheral spondyloarthritis** <2%
  - Skeletal manifestations
  - Extra-articular manifestations

Other Rheumatic and Connective Tissue Disorders (ORCT)	**16.5%** of Exam

Raynaud phenomenon	<2%
Primary	
Secondary	
Primarily fibrosing rheumatic diseases	3%
Systemic sclerosis	
Skin	
Gastrointestinal	
Cardiac	
Pulmonary	
Renal	
Scleroderma mimics	
Eosinophilic fasciitis	
Retroperitoneal fibrosis (Ormond disease)	
Myopathies	3%
Idiopathic inflammatory myopathies	
Metabolic myopathies	
Medication-associated	
Critical illness-associated	
Sjögren syndrome	<2%
Primary antiphospholipid antibody syndrome	<2%
Skin-associated rheumatic diseases	<2%
Erythema nodosum	
Other forms of panniculitis	
Multicentric reticulohistiocytosis	
Fever-associated rheumatic disorders	<2%
Autoinflammatory disorders	
Adult-onset Still disease (AOSD)	
Hemophagocytic lymphohistiocytosis and macrophage activation syndrome (HLH/MAS)	
Joint-associated rheumatic diseases	<2%
Polymyalgia rheumatica (PMR)	
Remitting seronegative symmetric synovitis with pitting edema (RS3PE)	
Palindromic rheumatism	
Miscellaneous rheumatic disorders	2%
Autoimmune hearing loss	

- Autoimmune eye disease
- IgG4-related disease
- Relapsing polychondritis
- Overlap syndromes
- Undifferentiated connective tissue disease
- Mixed connective tissue disease
- Autoimmune encephalitis
- VEXAS

Pediatric disorders 2%

- Juvenile idiopathic arthritis (JIA)
  - Childhood disease
  - Complications in adulthood
- Kawasaki disease (KD)
- Juvenile dermatomyositis (JDM)
- Juvenile localized scleroderma (JLS)
- Pediatric joint disorders seen in adulthood
  - Developmental dysplasia of the hip (DDH)
  - Slipped capital femoral epiphysis (SCFE)
  - Legg-Calvé-Perthes disease

Lupus Erythematosus — **9%** of Exam

Drug-induced <2%

Cutaneous <2%

- Isolated
- In systemic disease

Systemic 7.5%

- Renal
  - Immune-mediated glomerular and tubular disease
  - Antiphospholipid antibody syndrome and microangiopathies
  - Renal insufficiency and hypertension
  - Urologic complications
- Neurologic
  - Central nervous system: inflammatory, vaso-occlusive, microangiopathies, and others
  - Spinal cord
  - Peripheral nerves
  - Neuromyelitis optica

- Pulmonary
  - Pneumonitis
  - Thromboembolism
  - Pulmonary hypertension
- Cardiovascular
  - Myocardial disease
  - Valvular disease
  - Accelerated atherosclerosis
- Serositis
  - Pleuritis
  - Pericarditis
  - Peritonitis
- Hematologic
  - Autoimmune cytopenias
  - Hemolytic uremic syndrome (HUS) and thrombotic thrombocytopenic purpura (TTP)
  - Autoimmune clotting factor deficiencies (overlap with antiphospholipid antibody syndrome)
- Musculoskeletal
  - Joints, tendons, and ligaments
  - Muscle disease
- Lupus in pregnancy
- Neonatal lupus
- Vasculitis
- Antiphospholipid antibody syndrome (APS)
  - Clinical features excluding pregnancy
  - Pregnancy
  - Catastrophic APS

Nonarticular and Regional Musculoskeletal Disorders — **7%** of Exam

Diffuse pain syndromes <2%

- Fibromyalgia
- Complex regional pain syndrome (reflex sympathetic dystrophy)
- Medication-induced diffuse pain

Regional musculoskeletal disorders 5%

- Axial syndromes
  - Back pain
  - Neck pain
  - Thoracic outlet syndrome
- Shoulder disorders
  - Joint
  - Soft tissue
- Elbow disorders
  - Joint
  - Soft tissue
- Wrist and hand disorders
  - Joint
  - Soft tissue
- Hip disorders
  - Joint
  - Soft tissue
- Knee disorders
  - Joint
  - Soft tissue
- Ankle and foot disorders
  - Joint
  - Soft tissue
- Leg disorders

Neuropathies <2%

- Axial disorders
- Peripheral disorders
  - Entrapment neuropathies
  - Mononeuritis multiplex
  - Polyneuropathy
  - Small fiber neuropathy

Nonrheumatic Systemic Disorders — **9%** of Exam

Hereditary, congenital, and inborn errors of metabolism associated with rheumatic syndromes <2%

- Disorders of connective tissue
  - Marfan syndrome

Osteogenesis imperfecta	
Ehlers-Danlos syndromes including hypermobility	
Mucopolysaccharidoses	
Osteochondrodysplasias	
Multiple epiphyseal dysplasia	
Spondyloepiphyseal dysplasia	
Inborn errors of metabolism affecting connective tissue	
Homocystinuria	
Ochronosis	
Storage disorders	
Immunodeficiencies	<2%
Immunoglobulin A (IgA) deficiency	
Complement component deficiencies	
Common variable immunodeficiency	
Metabolic-associated rheumatic disorders	2.5%
Diabetes mellitus	
Acromegaly	
Thyroid disease	
Cushing disease	
Parathyroid disease	
Renal failure and dialysis	
Hematologic and oncologic malignancy-associated rheumatic disorders	3%
Amyloidosis	
Primary	
Secondary	
Hereditary	
Lymphoma	
Myelodysplastic syndromes	
Leukemia	
Solid tumors	
Plasma cell dyscrasias	
Hemoglobinopathies	
Sickle cell	
Hemophilias	

Arthritic and rheumatic disorders 2%

- Hemochromatosis
- Myositis ossificans progressiva
- Wilson disease
- Sarcoidosis
- Scurvy
- Pancreatic disease
- Primary biliary cholangitis
- Cystic fibrosis
- Graft-versus-host disease
- Celiac disease
- Drug-associated
- Environmental agent-associated

Neurologic <2%

- Amyotrophic lateral sclerosis (ALS)
- Neuropathic arthropathy

Vasculitides — **8.5%** of Exam

Large-vessel vasculitis <2%

- Takayasu arteritis
- Giant cell arteritis

Medium-vessel vasculitis <2%

- Polyarteritis nodosa

Small-vessel vasculitis 2.5%

- Antineutrophil cytoplasmic antibody (ANCA)-associated vasculitis
  - Granulomatosis with polyangiitis
  - Microscopic polyangiitis
  - Eosinophilic granulomatosis with polyangiitis (Churg-Strauss)
- Immune complex small-vessel vasculitis
  - Anti-glomerular basement membrane disease
  - Cryoglobulinemic vasculitis
  - IgA vasculitis (Henoch-Schönlein purpura)
  - Hypocomplementemic urticarial vasculitis (anti-C1q vasculitis)

Variable-vessel vasculitis <2%

- Behçet disease
- Cogan syndrome

Single-organ vasculitis <2%

- Cutaneous leukocytoclastic angiitis
- Cutaneous arteritis
- Primary central nervous system angiitis
- Isolated aortitis

Vasculitis associated with probable etiology <2%

- Hepatitis C virus-associated cryoglobulinemic vasculitis
- Hepatitis B virus-associated vasculitis
- Syphilis-associated aortitis
- Drug-induced vasculitis
  - Drug-induced ANCA-associated vasculitis
  - Drug-induced immune complex vasculitis
  - Other drug-induced vasculitis
- Cancer-associated vasculitis

Vasculitis mimickers <2%

- Buerger disease (thromboangiitis obliterans)
- Cholesterol emboli
- Fibromuscular dysplasia
- Segmented arterial mediolysis
- Warfarin necrosis
- Reversible cerebral vasoconstriction syndrome
- Moyamoya disease
- Atrial myxoma
- Endocarditis
- Calciphylaxis
- Amyloid angiopathy

Miscellaneous Topics — **2%** of Exam

Arthrocentesis and injections <2%

- Anatomy
- Precautions
- Potential sequelae

General clinical care	<2%
Rehabilitation in rheumatic diseases	
Exercise	
Therapeutic modalities	
Thermal modalities	
Adaptive equipment and assistive devices	
Footwear and orthotics	
Functional status and disability determination	
Pain management	
Physiology of pain	
Opioid contract	
Psychosocial aspects of rheumatic diseases	
Psychological and emotional factors including sexuality	
Economic and vocational issues	
Perioperative management of rheumatic diseases	
Nutrition	
Complementary and alternative practices	
Treatment adherence	<2%
Barriers	
Health literacy	
Professionalism and ethical behavior	<2%
Ethical dilemmas	
Professionalism	
Communication	
Interpersonal communication skills	
Use of medical interpreters	

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