American Board of Internal Medicine®

Rheumatology

Certification Examination Blueprint

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%
Seronegative Spondyloarthropathies	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.

Exam format

The exam is composed of multiple-choice questions with a single best answer, predominantly describing clinical scenarios. Questions 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.

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
- Controls, validity, reliability, and responsiveness
- Outcome assessment techniques: scales, questionnaires, performance-based and capacity-based measurements, health status, disease activity, and functional assessment
- 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
  - Disease-modifying antirheumatic drugs (DMARDs) and immunosuppressive, cytotoxic, and immunomodulatory drugs
  - Biologics
- Urate-lowering therapy
- Antiresorptive bone agents
- Anabolic bone agents
- Opioid and nonopioid analgesics
- Colchicine
- Plasma exchange
- Vaccines
- Intravenous immunoglobulin (IVIG)
- Vasodilator medications
- Anti-fibrotic agents
- 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	
Lesch-Nyhan syndrome	
Other secondary types of 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's 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	
Medication-induced	
Other causes of bone loss	<2%
Paget's 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	
Late disease	
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	

Seronegative Spondyloarthropathies	**6.5%** of Exam
Ankylosing spondylitis	2%
Skeletal manifestations	
Extra-articular manifestations	
Reactive arthritis	<2%
Skeletal manifestations	
Extra-articular manifestations	
Arthropathy associated with inflammatory bowel disease (IBD)	<2%
Skeletal manifestations	
Extra-articular manifestations	
Psoriatic arthropathy	2%
Skeletal manifestations	
Extra-articular manifestations	
Arthritis associated with other skin diseases	<2%
SAPHO syndrome (synovitis, acne, pustulosis, hyperostosis, and osteitis)	
Undifferentiated spondyloarthropathies	<2%
Skeletal manifestations	
Extra-articular manifestations	

Other Rheumatic and Connective Tissue Disorders (ORCT)	**16.5%** of Exam
Raynaud's phenomenon	<2%
Primary	
Secondary	
Primarily fibrosing rheumatic diseases	3%
Systemic sclerosis	
Skin	
Gastrointestinal	
Cardiac	
Pulmonary	
Renal	
Scleroderma mimics	
Scleromyxedema	
Nephrogenic fibrosis	
Scleredema	
Eosinophilic fasciitis	
Retroperitoneal fibrosis (Ormond disease)	
Primarily myopathic rheumatic diseases	3%
Polymyositis	
Dermatomyositis	

Inclusion body myositis	
Metabolic myopathies	
Medication-associated	
Critical illness-associated	
Sjögren's syndrome	<2%
Primary antiphospholipid antibody syndrome	<2%
Primarily skin-associated rheumatic diseases	<2%
Erythema nodosum	
Other forms of panniculitis	
Multicentric reticulohistiocytosis	
Fever-associated rheumatic disorders	<2%
Autoinflammatory disorders	
Adult-onset Still's disease (AOSD)	
Hemophagocytic lymphohistiocytosis and macrophage activation syndrome (HLH/MAS)	
Primarily 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	
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	
Affective disorders	
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
  - Hypermobility syndrome
- 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's 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's arteritis	
Giant cell arteritis	
Medium-vessel vasculitis	<2%
Polyarteritis nodosa	

Small-vessel vasculitis	2.5%
Antineutrophil cytoplasmic antibody (ANCA)-associated vasculitis	
Granulomatosis with polyangiitis (Wegener's)	
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's disease	
Cogan's 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's disease (thromboangiitis obliterans)	
Cholesterol emboli	
Fibromuscular dysplasia	
Segmented arterial mediolysis	
Warfarin necrosis	
Reversible cerebral vasoconstriction syndrome	
Moyamoya disease	

- Atrial myxoma
- Endocarditis
- Calciphylaxis

Miscellaneous Topics	**2%** of Exam

- **Arthrocentesis and injections** <2%
  - Anatomy
  - Precautions
  - Potential sequelae
- **General clinical care** <2%
  - Rehabilitation in rheumatic diseases
    - Exercise
    - Rest and splinting
    - 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
    - Preoperative assessment
    - Perioperative assessment
    - Perioperative medication management
    - Postoperative management
  - Nutrition
  - Complementary and alternative practices
- **Treatment adherence** <2%
  - Barriers
  - Health literacy
- **Professionalism and ethical behavior** <2%
  - Medicolegal issues
    - Compliance with Health Insurance Portability and Accountability Act of 1996 (HIPAA)
    - Ethical dilemmas

- Professionalism
  - Conflict of interest
  - Impaired physician
- Communication
  - Interpersonal communication skills
  - Use of medical interpreters

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