

A **Competency-Based Guide** to Curriculum Development

Core Curriculum Outline

for Rheumatology Fellowship Programs

UPDATED 2023

AMERICAN COLLEGE
of RHEUMATOLOGY
Empowering Rheumatology Professionals

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INTRODUCTION

The subspecialty of rheumatology includes a wide array of autoimmune, inflammatory, and non-inflammatory conditions that affect the musculoskeletal and other organ systems. The purpose of rheumatology training programs is to 1) train fellows to be accomplished practitioners and consultants in the rheumatic diseases, and 2) encourage the professional and scholarly attitudes and approaches of a competent subspecialist that are needed to maintain an understanding of current concepts in rheumatology as advances occur.

This Core Curriculum Outline updates the previous ACR Core Curriculum Outline for Program Directors (2006, 2015) and is designed to reflect the Next Accreditation System (NAS) and the importance of competency-based training and assessment in graduate medical education, as defined by the Accreditation Council for Graduate Medical Education (ACGME). Also included in this core curriculum outline are:

- Rheumatology Milestones 2.0 (Appendix A)
- Rheumatology Entrustable Professional Activities (EPAs) (Appendix B)
- Rheumatology Curricular Milestones (Appendix C)
- Rheumatology Toolbox: Activities and Assessments (Appendix D)

The updated curriculum outline continues to be organized by the six ACGME core competencies. These are:

- Medical Knowledge
- Patient Care
- Practice-based Learning and Improvement
- Systems-based Practice
- Interpersonal and Communications Skills
- Professionalism

The two major sections of Basic Science and Clinical Science are incorporated into the medical knowledge section, which was updated in December 2020. Clinical aspects of these areas reside in the patient care section. Those aspects of the Core Curriculum that pertain to practice-based learning and improvement, systems-based practice, interpersonal and communication skills and professionalism are expanded into their own individual major sections. The purpose of specifically highlighting the core competencies in the Core Curriculum Outline is to clarify their essential components. The description of how and where they are acquired in the course of fellowship training, projected trainee performance benchmarks, and suggestions for tools to measure that performance are delineated within the Rheumatology Curricular Milestones (Appendix C, 2015) and Rheumatology Toolbox (Appendix D), the latter containing the educational activities and evaluation tools employed during fellowship training.

A major update to this 2020 Curriculum Outline is inclusion of pediatric rheumatology within the outline rather than as an appendix and includes a minimum set of core knowledge in pediatric rheumatology for the adult trainee. The ACGME suggests that “programs with the qualified faculty and facilities provide training in pediatric rheumatic disease.” The ACR recognizes that, because of the worldwide shortage of pediatric rheumatologists, many internist rheumatologists in clinical practice will be called upon to evaluate and treat children. The Core Curriculum reflects the ACR goal that every rheumatology fellow should have familiarity with pediatric rheumatic diseases, whether or not they have the opportunity to rotate through a pediatric rheumatology clinic. Because reading is not a substitute for direct experience, training programs are encouraged to find opportunities for their fellows to see patients in a pediatric rheumatology clinic.

This outline is consistent with the requirements of the ACGME Review Committee for training in rheumatology and serves as a guide for Training Program Directors and fellows in meeting these requirements.

The Core Curriculum Outline presents a comprehensive view of the components of a competency-based training program in rheumatology and is meant to provide a detailed guide for Program Directors to use in developing their own fellowship training curriculum. Individual training programs are expected to adapt this outline for their own curriculum and may reflect their particular areas of expertise and resources. This document is meant to be a practical resource for Program Directors to provide detailed descriptions of general competencies in rheumatology and provide tools for performance markers and assessments in these areas (see Rheumatology Curricular Milestones and Rheumatology Toolbox, Appendix C and Appendix D, respectively).

HOW TO USE THIS CURRICULUM OUTLINE

This Curriculum Outline divides each competency into several sections. A Definition of the competency in the context of rheumatology training is provided. The Essential Components of each competency are then listed and described. These components can be used to provide the rationale for selected training activities. Documentation of a competency-based curriculum involves describing the specific educational activities through which the training program works to develop and assess the six ACGME core competencies in its trainees during the course of the fellowship training program. According to the ACGME Program Requirements for Graduate Medical Education in Rheumatology, while the description of each educational activity (e.g., rotation, conference, or research activity) should delineate its goals and objectives, fellow responsibilities by year of training, and level of fellow supervision, the structure and methods used to evaluate the development of competency and the means by which the Program Director documents the educational activity components of the curriculum are all at the discretion of the individual fellowship program and may vary widely from program to program. Several Appendices have been included to provide milestones and tools that can be used to develop and document a competency-based curriculum.

I. MEDICAL KNOWLEDGE

The subspecialty of rheumatology includes a wide array of autoimmune, inflammatory, and non-inflammatory conditions that affect the musculoskeletal and other organ systems. A working knowledge of the basic and clinical sciences that relate to musculoskeletal and rheumatic disease is fundamental to the practice of rheumatology. Recognition of normal and pathogenic processes of the immune system form the basis of reliable diagnosis and the development and use of an increasingly sophisticated range of immunomodulatory treatments for the rheumatic diseases.

Similarly, knowledge of the basis for and use of laboratory tests of immune activity is a principal asset of the practicing rheumatologist. Rheumatology trainees must also have practical understanding of the approaches and modalities used by other specialists and health professionals (Nurses, Nurse Practitioners, Physician Assistants, etc.) for the treatment of rheumatic diseases in order to manage the care of their patients effectively. Training programs must teach and emphasize the cognitive skills that are necessary to apply this detailed knowledge to problem solving for diagnosis, treatment and research of the rheumatic diseases.

DEFINITION

Medical knowledge refers to the assimilation of established and evolving biomedical, clinical, and cognate sciences, and to the application of this knowledge to patient care.

ESSENTIAL COMPONENTS

BASIC SCIENCES

- A. Anatomy and biology of musculoskeletal tissues: for each tissue, consider the embryology, development, biochemistry and metabolism, structure, function, and classification
 - 1. Connective tissue cells, including fibroblasts, chondrocytes, osteoblasts/osteocytes
 - 2. Extracellular matrix (ECM) molecules: collagens (fibrillar collagens and minor collagens), proteoglycans/aggrecan, elastin, matrix glycoproteins. Enzymatic degradation of ECM (metalloproteases).
 - 3. Joints and joint tissues: diarthrodial joints, intervertebral discs, growth plate, synovium, cartilage (hyaline, elastic, and fibrocartilage), subchondral bone, meniscus.
 - 4. Bone: development, structure, turnover and remodeling (including the role of osteoclasts, osteoblasts, osteocytes, as well as hormonal and cytokine regulation)
 - 5. Muscle, tendons, ligaments.
 - 6. Vasculature and endothelium
 - 7. Skin
- B. Immunology
 - 1. Anatomy and cellular elements of the immune system
 - a. Lymphoid organs
 - i. Bone marrow, thymus, lymph nodes and tertiary lymph tissues
 - ii. Gross and microscopic anatomy, structure and function
 - b. Specific cells: for each cell type, the ontogeny, structure, phenotype, function, and major activation markers/receptors
 - i. Lymphocytes: T cells including naive, memory, and activated (Th1, Th2, Th17, regulatory); B cells; and innate lymphocytes
 - ii. Antigen presenting cells: dendritic cells, monocytes/macrophages
 - iii. Other cells: Neutrophils, eosinophils, natural killer (NK) cells, mast cells, epithelial cells, endothelial cells, platelets, fibroblasts
 - 2. Immune and inflammatory mechanisms
 - a. Innate mechanisms
 - i. Acute phase reactants and enzymatic defenses

- ii. Complement pathways, activation, and regulation
 - iii. Toll-like (TLR) and other pattern recognition receptors (PRR)
 - iv. Inflammasome components, activation, and function
 - v. Neutrophil extracellular traps (NETosis)
 - vi. NK cell activation and regulation
 - vii. Interactions with adaptive immune mechanisms
- b. Adaptive mechanisms
 - i. T cells: development, genetic basis of T cell receptor diversity, molecular basis of antigen recognition and cellular activation
 - ii. B cells: development, B cell receptor and antibody structure and genetic basis of diversity, cellular activation and effector functions Antigens: types, structure, processing, presentation, and elimination
 - iii. Major histocompatibility complex: structure, function, nomenclature, and immunogenetics
 - iv. Cellular activation and regulation: mechanisms of activation and suppression of function (e.g. T cell and B cell interactions via CD28:CD80/86)
- 3. Initiation of an immune response
 - a. Immune cell trafficking: adhesion molecules, chemokines
 - b. Inflammatory mediators: origin, structure, effect, site of action, metabolism, and regulation
 - c. Cytokines: origin, structure, effect, site of action, metabolism, regulation, signal transduction, and gene activation
- 4. Types of immune responses
 - a. Antibody-mediated: opsonization, complement fixation, and antibody dependent cellular cytotoxicity
 - b. Cell-mediated: cells and effector mechanisms in cellular cytotoxicity, granuloma formation, and delayed type hypersensitivity
 - c. IgE-mediated: acute and late-phase reactions
 - d. Mucosal immunity and the microbiome
 - e. Pathologic immune responses: immune complex-mediated (physicochemical properties and clearance of immune complexes), graft versus host response, abnormal apoptosis
- 5. Immunoregulation
 - a. Tolerance: mechanisms of central and peripheral tolerance, including clonal selection, deletion, and anergy
 - b. Cell-cell interactions: help and suppression; collaboration among cells for control of the immune response
 - c. Autoimmunity: pathogenesis of systemic and organ specific autoimmunity
 - d. Idiotype networks: inhibition and stimulation
- C. Crystalline disease metabolism
 - 1. Purine and uric acid metabolism
 - a. Purine: biochemistry, synthesis, and regulation
 - b. Uric acid: origin, elimination, and physicochemical properties
 - c. Purine pathway enzyme deficiencies and immunodeficiency: ADA, PNP
 - 2. Calcium-based crystal metabolism
 - a. Crystals: factors affecting formation, induction of inflammation
 - b. Genetic abnormalities contributing to crystal formation
- D. Genetics and epigenetics: monogenic vs. polygenic, single nucleotide polymorphisms, DNA methylation, histone modification
- E. Biomechanics of bones, joints, and muscles: principles of kinesiology of peripheral/axial joints and gait and how alterations in biomechanics contribute to musculoskeletal disorders
- F. Neurobiology of Pain
 - 1. Peripheral afferent nociceptive pathways (including joint innervation by nociceptors and proprioceptors).
 - 2. Central processing of nociceptive information (dorsal horn and supraspinal levels)
 - 3. Peripheral and central sensitization (hyperalgesia, allodynia, temporal summation)
 - 4. Acute vs. chronic pain.
 - 5. Biopsychosocial model of pain

CLINICAL SCIENCES

A. Rheumatic Diseases

For each disease, acquire knowledge of the epidemiology, genetics, disease pathogenesis, natural history, clinical expression (including clinical subtypes), pathology.

1. Rheumatoid arthritis
2. Spondyloarthritis
 - a. axial and peripheral: ankylosing spondylitis, reactive arthritis, psoriatic arthritis, inflammatory bowel disease-associated arthritis
 - b. arthritis associated with acne and other skin diseases like hidradenitis suppurativa, synovitis, acne, pustulosis, hyperostosis, and osteitis (SAPHO) syndrome, and undifferentiated spondyloarthritis
 - c. non-radiographic axial spondyloarthritis
3. Lupus and antiphospholipid syndrome: drug-related; anti-phospholipid antibody syndrome – primary and secondary
4. Scleroderma and other fibrosing skin disorders
 - a. Limited and Diffuse systemic sclerosis
 - b. Localized Scleroderma
 - c. Other fibrosing skin disorders (eosinophilic fasciitis, eosinophilia-myalgia syndrome, nephrogenic systemic fibrosis, scleromyxedema, scleredema of Buschke)
5. Other connective tissue diseases: Sjögren syndrome, mixed connective tissue disease, undifferentiated connective tissue disease, and overlap syndromes
6. Systemic vasculitides
 - a. Large vessel: giant cell arteritis/polymyalgia rheumatica, Takayasu arteritis
 - b. Medium vessel: polyarteritis nodosa, Kawasaki disease
 - c. Small vessel: ANCA-associated vasculitis such as granulomatosis with polyangiitis (GPA, formerly Wegener granulomatosis), eosinophilic granulomatosis with polyangiitis (EGPA, formerly Churg-Strauss syndrome) and microscopic polyangiitis, anti-glomerular basement membrane disease, cryoglobulinemia, Immunoglobulin A vasculitis (formerly Henoch-Schönlein purpura)
 - d. Other vasculitis syndromes: hypocomplementemic urticarial vasculitis, Behçet disease, Cogan syndrome, cutaneous leukocytoclastic angiitis, primary central nervous system vasculitis
 - e. Miscellaneous: isolated aortitis, vasculitis from systemic disorders, infections, drugs, malignancies
7. Crystalline arthropathies: monosodium urate monohydrate (gout), calcium pyrophosphate dihydrate deposition disease, basic calcium phosphate (hydroxyapatite), calcium oxalate
8. Immune-mediated inflammatory myositis:
 - a. polymyositis including immune-mediated necrotizing myositis, dermatomyositis, anti-synthetase syndrome, inclusion body myositis, myositis associated with other connective tissue diseases
 - b. Other myositis: ocular/orbital myositis, focal/nodular myositis, eosinophilic myositis, granulomatous myositis
9. Other autoimmune disease: relapsing polychondritis, panniculitis (lobular or septal [erythema nodosum]), adult-onset Still's disease, IgG4-related disease, retroperitoneal fibrosis, primary Raynaud's disease, neuromyelitis optica, interstitial pneumonia with autoimmune features (IPAF), sarcoidosis, Susac syndrome, palindromic rheumatism, autoimmune disorders associated with checkpoint inhibitors, orbital inflammatory disease, remitting seronegative symmetrical synovitis with pitting edema (RS3PE)
10. Autoinflammatory syndromes. See section B.1.h and B.1.i for complete list.
11. Inherited muscle diseases
 - a. Metabolic myopathies: glycogen storage diseases, lipid metabolism disorders, mitochondrial myopathies
 - b. Muscular dystrophies
 - c. Muscle channelopathies

12. Infectious

- a. Infectious arthritides: bacterial (non-gonococcal and gonococcal), mycobacterial, spirochetal (syphilis, Lyme), viral (HIV, hepatitis B, hepatitis C, parvovirus, chikungunya, dengue), fungal, parasitic, Whipple disease
- b. Post-infectious: acute rheumatic fever, arthritis associated with subacute bacterial endocarditis, intestinal bypass arthritis, post-dysenteric arthritides, post-immunization arthritis, other colitis-associated arthropathies

13. Metabolic, endocrine, and hematologic disease associated rheumatic disorders

- a. Endocrine-associated diseases: rheumatic syndromes associated with diabetes mellitus, acromegaly, parathyroid disease, thyroid disease, Cushing disease
- b. Hematologic-associated diseases: rheumatic syndromes associated with hemophilia, hemoglobinopathies, angioimmunoblastic lymphadenopathy or lymphoma, multiple myeloma, hemophagocytic lymphohistiocytosis/macrophage activation syndrome

14. Bone and cartilage disorders

- a. Osteoarthritis: primary and secondary osteoarthritis
- b. metabolic bone disease: low bone mass, osteoporosis, osteomalacia, bone disease related to renal disease
- c. Paget disease of bone
- d. Avascular necrosis of bone: idiopathic, secondary causes, osteochondritis dissecans
- e. Others: transient osteoporosis, hypertrophic osteoarthropathy, diffuse idiopathic skeletal hyperostosis

15. Hereditary, congenital, and inborn errors of metabolism associated with rheumatic syndromes

- a. Disorders of connective tissue: Marfan syndrome, osteogenesis imperfecta, Ehlers-Danlos syndrome, pseudoxanthoma elasticum, hypermobility syndrome
- b. Mucopolysaccharidoses
- c. Osteochondrodysplasias: multiple epiphyseal dysplasia, spondyloepiphyseal dysplasia
- d. Inborn errors of metabolism affecting connective tissue: homocystinuria, ochronosis
- e. Storage disorders: Gaucher disease, Fabry disease
- f. Immunodeficiency: IgA deficiency, complement component deficiency, SCID and ADA deficiency, PNP deficiency, others
- g. Others: hemochromatosis, hyperlipidemic arthropathy, myositis ossificans progressiva, Wilson disease, others

16. Non-articular and regional musculoskeletal disorders

- a. Fibromyalgia
- b. Myofascial pain syndromes
- c. Axial syndromes: low back pain, spinal stenosis, intervertebral disc disease and radiculopathies, cervical pain syndromes, coccydynia, osteitis condensans ilii, osteitis pubis, spondylolisthesis/spondylolysis, discitis
- d. Regional musculoskeletal disorders: in addition to bursitis, tendinitis, or enthesitis occurring around each joint, other characteristic disorders occurring at each specific joint site (e.g., shoulder: rotator cuff tear, subacromial bursitis, adhesive capsulitis, impingement syndrome; wrist: ganglion cysts, De Quervain tenosynovitis; trigger fingers/stenosing tenosynovitis, Dupuytren contractures; knee-synovial plica syndrome, internal derangements, popliteal cyst; foot/ankle: plantar fasciitis, achilles tendinitis, Morton neuroma; other: temporomandibular joint syndromes, femoral acetabular impingement, costochondritis)
- e. Biomechanical/anatomic abnormalities associated with regional pain syndromes: scoliosis and kyphosis, genu valgum, genu varum, leg length discrepancy, foot deformities
- f. Overuse rheumatic syndromes: occupational, sports, recreational, performing artists
- g. Sports medicine: injuries, strains, sprains, nutrition, medication issues
- h. Entrapment neuropathies: thoracic outlet syndrome, upper extremity entrapments, lower extremity entrapments
- i. Other: peripheral neuropathies (polyneuropathy, small fiber neuropathy), mononeuritis multiplex, complex regional pain syndrome (formerly reflex sympathetic dystrophy), erythromelalgia

17. Neoplasms and tumor-like lesions

- a. Benign
 - i. Joints: loose bodies, fatty and vascular lesions, synovial osteochondromatosis, pigmented villonodular synovitis, ganglions
 - ii. Tendon sheaths: fibroma, giant cell tumor, nodular tenosynovitis
 - iii. Bone: osteoid osteoma
 - b. Malignant
 - i. Primary: synovial sarcoma, osteosarcoma, chondrosarcoma
 - ii. Secondary: leukemia, myeloma, metastatic malignant tumors
 - iii. Malignancy-associated rheumatic syndromes: carcinomatous polyarthritis, palmoplantar fasciitis, Sweet syndrome, paraneoplastic presentations of rheumatic diseases
- 18. Rheumatic diseases in special populations
 - a. Geriatric population
 - b. Pregnant women
 - c. Dialysis patients
 - d. Transplant patients
- 19. Miscellaneous rheumatic disorders
 - a. Amyloidosis: primary, secondary, hereditary
 - b. Charcot joint
 - c. Multicentric reticulohistiocytosis
 - d. Arthritic and rheumatic syndromes associated with plant thorn synovitis, scurvy, pancreatic disease, primary biliary cirrhosis, drugs, frost bite, and environmental agents
- B. Pediatric rheumatic diseases

Some rheumatic diseases in children and adults can share similar features of pathogenesis, presentation, clinical course, and treatment. These diseases (such as systemic lupus, scleroderma spectrum diseases, the systemic vasculitides, and enteropathic arthritides) are not specifically addressed in this section. Other diseases or specific aspects thereof that are unique or more prevalent in children are included in this outline of knowledge content.

 - 1. Rheumatic diseases that occur primarily in children: diagnosis and recognition of similarities and differences to comparable diseases in adults
 - a. Juvenile idiopathic arthritis (JIA)
 - i. Special considerations in pediatric arthritis
 - ii. Exam variations to match developmental status
 - iii. Variable clinical presentations: painless effusions or contractures
 - iv. Variable rates of serologic markers by JIA subtype
 - v. Inflammatory markers may be normal even with active inflammation
 - b. JIA subtypes
 - i. Systemic Onset (Still's disease in adults) (also see autoinflammatory disease below)
 - ii. Oligoarticular
 - iii. Polyarticular (RF positive, RF negative) (polyJIA, RF positive – similar to adult RA)
 - iv. Enthesitis-related
 - v. Psoriatic arthritis
 - vi. Undifferentiated arthritis
 - c. Juvenile dermatomyositis
 - d. Kawasaki Disease
 - e. IgA Vasculitis (formerly known as Henoch-Schönlein Purpura, HSP)
 - f. Acute rheumatic fever and post-streptococcal reactive arthritis
 - g. Neonatal lupus syndrome
 - h. Monogenic autoinflammatory diseases:

- i. Inflammasomopathies: Familial Mediterranean Fever (FMF), hyperimmunoglobulinemia D syndrome (HIDS), tumor necrosis factor receptor-associated periodic syndromes (TRAPS), pyogenic sterile arthritis pyoderma gangrenosum and acne syndrome (PAPA), and cryopyrin associated periodic syndrome (CAPS) including Muckle-Wells syndrome, familial cold autoinflammatory syndrome, and neonatal-onset multisystemic inflammatory disease (NOMID)
 - ii. Interferonopathies: STING-associated vasculopathy with onset in infancy (SAVI), Aicardi-Goutieres Syndrome, chronic atypical neutrophilic dermatosis with lipodystrophy and elevated temperature (CANDLE) syndrome, and coatmer protein complex subunit alpha (COPA) syndrome
 - iii. Others: deficiency of interleukin-1 receptor agonist (DIRA), deficiency of interleukin-36 receptor antagonist (DITRA), Majeed syndrome, Blau syndrome (NOD2/CARD15), A20 haploinsufficiency (HA20), deficiency of adenosine deaminase 2 (DADA2)
 - i. Polygenic autoinflammatory diseases: Periodic fever with aphthous stomatitis, pharyngitis, and adenitis (PFAPA), chronic recurrent multifocal osteomyelitis (CRMO), and Schnitzler syndrome
- 2. Notable differences, major sequelae and life-threatening complications of rheumatic diseases that are seen in children
 - a. Systemic onset JIA
 - i. Hemophagocytic lymphohistiocytosis/macrophage activation syndrome (MAS)
 - ii. Cardiac tamponade
 - iii. Lung disease (pulmonary arterial hypertension, alveolar proteinosis, interstitial lung disease)
 - b. ANA+ oligo, polyarticular, and psoriatic JIA
 - i. Chronic uveitis
 - c. Enthesitis-related arthritis
 - i. Some advance to ankylosing spondylitis
 - ii. May be HLA b27 associated
 - d. Juvenile dermatomyositis
 - i. Rarely associated with malignancy
 - ii. GI vasculitis
 - iii. Calcinosis
 - iv. Joint contractures
 - v. Dysphagia and aspiration
 - vi. Interstitial lung disease
 - e. Kawasaki Disease
 - i. Aneurysms of coronary and other arteries
 - ii. Hemophagocytic lymphohistiocytosis/Macrophage activation syndrome (MAS)
 - f. IgA Vasculitis (formerly known as Henoch-Schonlein Purpura, HSP)
 - i. GI- intussusception, intestinal infarction
 - ii. Renal - chronic IgA mediated glomerulonephritis
 - g. Neonatal lupus syndrome
 - i. Congenital heart block
 - ii. Thrombocytopenia
 - iii. Hepatitis
- 3. Appropriate treatments of the above childhood rheumatic disorders and complications of

treatment

4. Non-rheumatic disorders in children that can mimic rheumatic diseases
 - a. Infectious or post-infectious syndromes
 - i. Septic arthritis and osteomyelitis
 - ii. Transient (toxic) synovitis of the hip
 - iii. Post-infectious arthritis and arthralgia including gastrointestinal and GU infections
 - iv. Post-viral myositis
 - b. GI-related autoimmune disorders
 - i. Autoinflammatory bowel disease
 - ii. Celiac disease
 - c. Orthopedic conditions
 - i. Legg-Calve-Perthes disease and other avascular necrosis syndromes
 - ii. Slipped capital femoral epiphysis
 - iii. Spondylolysis and spondylolisthesis
 - iv. Patellofemoral syndrome
 - d. Non-rheumatic pain
 - i. Benign limb pains of childhood ("growing pains")
 - ii. Benign hypermobility syndrome
 - e. Neoplasms
 - i. Leukemia
 - ii. Lymphoma
 - iii. Primary bone tumors (especially osteosarcoma and Ewing sarcoma)
 - iv. Tumors metastatic to bone (especially neuroblastoma)
 - f. Bone and cartilage dysplasias, and inherited disorders of metabolism (Marfan syndrome, osteogenesis imperfecta, Ehlers-Danlos syndrome, pseudoxanthoma elasticum)
5. Non-articular and regional musculoskeletal disorders
 - a. Pain amplification syndromes
 - i. Pediatric Fibromyalgia
 - ii. Complex Regional Pain Syndrome (CRPS) type I (also known as Reflex sympathetic dystrophy)
6. Special considerations in childhood of rheumatic diseases and treatments
 - a. Disease effects on growth
 - i. Accelerated or decelerated growth of limbs or digits affected by arthritis (muscle atrophy, leg length discrepancy)
 - ii. Altered growth of mandible in TMJ arthritis
 - iii. Short stature and failure to thrive
 - b. Regular surveillance for uveitis in JIA
 - i. Asymptomatic nature of most JIA-associated uveitis
 - ii. Screening schedule based on age of JIA onset, JIA type, duration of disease, ANA status
 - iii. Potential sequelae: Cataracts, glaucoma, synechiae, vision loss
7. Drugs
 - a. FDA approved drugs for childhood rheumatic diseases
 - b. Pediatric dosing and special considerations in terms of pharmacokinetics and drug metabolism

- c. Off label use of medications may be necessary
- 8. Child-specific side effects of chronic glucocorticoid treatment
 - a. Growth retardation
 - b. Delay of puberty
- 9. Physical and occupational therapy
 - a. Exercises
 - b. Splinting
- 10. Psychosocial and developmental issues
 - a. Peer and sibling interaction
 - b. Family adjustment
 - c. School accommodations for disability
 - d. School and recreational activities
 - e. Delayed or regressed developmental milestones
- 11. Transition to adulthood
 - a. Transition of care
- C. Therapeutic modalities and strategies
 - 1. Pharmacology: for each medication, the dosing, pharmacokinetics, metabolism, mechanisms of action, side effects, drug interactions, adherence issues, costs, and use in specific patient populations, such as chronic kidney disease and including fertile, lactating, and pregnant women and fertile men as well as across the age spectrum
 - a. Nonsteroidal anti-inflammatory drugs
 - b. Glucocorticoids: topical, intra-articular, systemic
 - c. Systemic anti-rheumatic drugs
 - i. DMARDs
 - (1) Anti-malarials
 - (2) Anti-inflammatory
 - (3) Anti-metabolites
 - (4) Alkylating agent
 - ii. Calcineurin inhibitors
 - iii. Biologic agents and biosimilar agents
 - (1) Interleukin inhibitors (1, 5, 6, 12, 17, 23)
 - (2) Tumor necrosis factor inhibitors (soluble or monoclonal)
 - (3) T cell co-stimulatory inhibitors
 - (4) B cell depletion therapy
 - (5) Inhibitor of B-lymphocyte stimulator
 - iv. Small molecule inhibitors of Janus kinase (JAK) enzymes
 - v. Phosphodiesterase 4 inhibitors
 - vi. Inhibitors of complement components
 - vii. Historical agents such as gold compounds, penicillamine, and minocycline
 - d. Urate lowering therapy
 - i. Xanthine oxidase inhibitors
 - ii. Uricosuric
 - iii. Uricase agents
 - e. Bone disorder medications
 - i. Bisphosphonates
 - ii. Anabolic agents
 - iii. RANKL inhibition

- iv. Sclerostin monoclonal antibody
 - v. Hormonal therapy
 - vi. Calcium and Vitamin D
- f. Vasodilators
 - i. Calcium channel blockers
 - ii. Topical nitrates
 - iii. Prostacyclin analogs
 - iv. Endothelin receptor antagonists
 - v. Phosphodiesterase 5 inhibitors
 - vi. Guanylate cyclase agonist
- g. Antibiotic therapy for septic joints
- h. Opioid and non-opioid analgesics
- i. Colchicine
- j. Agents used for pain modulation: anti-depressants, anti-convulsants, gapentinoids, muscle relaxants
- k. Cholinergics and non-pharmacologic agents used for the treatment of sicca symptoms
- l. Vaccines
- m. Intravenous immunoglobulin (IVIG)
- n. Plasma exchange
- o. Rehabilitation and disability Multidisciplinary approaches to rehabilitation and pain control: appropriate use of and referral/prescription to rehabilitation specialists and pain clinics
- p. Methods of rehabilitation: for each method, principles, mechanism of action, indications, precautions and contraindications, potential side effects, and costs
 - i. Exercise
 - ii. Rest and splinting
 - iii. Thermal Modalities
 - (1) Ultrasound
 - (2) Phonophoresis
 - (3) Spa therapy
 - (4) Icing
- q. Adaptive equipment and assistive devices
- r. Footwear and orthotics
- 2. Surgical and perioperative management
 - a. For each procedure, the fellow should demonstrate a working knowledge of indications, pre-operative evaluation and medication adjustments, contraindications, complications, postoperative management, and expected outcome.
 - i. Bone biopsy
 - ii. Arthroscopy
 - iii. Synovectomy of tendons and joints
 - iv. Entrapment neuropathy release
 - v. Osteotomies: hip, knee
 - vi. Arthrodesis
 - vii. Spine surgery: radiculopathy, stenosis, and instability
 - viii. Reconstructive surgery of hand and foot
 - ix. Total joint replacement
 - x. Specific surgical management problems:
 - (1) Patient with rheumatoid arthritis
 - (2) Infected joint: arthroscopy vs. arthrotomy

- (3) Infected prosthetic joint
- (4) Patient with ankylosing spondylitis
- (5) Pediatric patient with rheumatic disease
- (6) Prevention and treatment of deep venous thrombosis
- (7) Peri-operative anti-rheumatic medication management
3. Complementary and alternative medical practices, including but not limited to: diet, nutritional supplements, acupuncture, chiropractic

DIAGNOSTIC TESTING

- A. Laboratory tests: rationale, methods for performing, and utility/limitations of specific laboratory tests including but limited to:
 1. Erythrocyte sedimentation rate, C-reactive protein, and other acute phase reactants (*ferritin, haptoglobin, ceruloplasmin, complement*)
 2. Rheumatoid factors, cryoglobulins, and circulating immune complexes (*C1q*)
 3. Anti-cyclic citrullinated peptide antibodies
 4. Antibodies against nuclear antigens: ANA, anti-dsDNA, anti-Smith, anti-SSA, anti-SSB, anti-U1 RNP, anti-centromere, anti-histone, anti-ribosomal P, anti-topoisomerase 1, anti-U3 RNP, anti-RNA Polymerase III
 5. Lupus Erythematosus (LE) cell preparation
 6. Myositis-specific autoantibodies (anti-Jo-1 and other anti-synthetases, anti-Mi-2, anti-SRP, anti-HMG CoA reductase [200/100], anti-TIF1-gamma [p155/140], anti-MJ [NXP-2], anti-CADM-140 [MDA-5], anti-SAE) and myositis-associated (anti-Ro, anti-U1RNP, anti-Ku, anti-PM-Scl) antibodies
 7. Other disease-associated auto-antibodies: anti-mitochondrial, anti-smooth muscle, anti-neuronal
 8. Anti-neutrophil cytoplasmic antibodies (anti-proteinase 3, anti-myeloperoxidase)
 9. Anti-phospholipid antibodies including RPR, lupus anticoagulant, anti-cardiolipin, anti-beta-2-glycoprotein I and antiphosphatidylserine
 10. Antibodies to formed blood elements including direct and indirect Coombs testing, anti-platelet antibodies, anti-granulocyte antibodies
 11. Assays for complement activity (CH50) and components of the complement cascade
 12. Serum immunoglobulin levels, serum protein electrophoresis and immunofixation electrophoresis
 13. HLA typing (*B27, B51, B5801*)
 14. ASO and other streptococcal antibody tests
 15. Appropriate testing for Lyme disease, HIV, Hepatitis B, Hepatitis C, parvovirus, N. gonorrhea, chikungunya and other infectious agents
 16. Appropriate screening for hepatitis B, hepatitis C, tuberculosis
 17. Serum and urine measurements for uric acid
 18. Iron studies including total iron binding capacity, ferritin
 19. Flow cytometry studies for analysis of lymphocyte subsets and function
 20. Specific genetic testing
- B. Diagnostic imaging techniques: basic underlying principles and technical considerations in the use of plain radiographs, computed tomography, magnetic resonance imaging, ultrasonography and radionuclide scanning of bones, joints, periarticular and vascular structures
- C. Synovial fluid analysis: cell count and differential, Gram stain and bacterial culture, crystal identification, viscosity, and other special stains/analyses (AFB, fungal culture)
- D. Laboratory test-performance characteristics: principles of sensitivity, specificity, predictive value, and likelihood ratios

RESEARCH PRINCIPLES

- A. Basic Science Research: Fellows should demonstrate a basic knowledge of the principles of basic science research and the process of scientific experimentation and hypothesis testing including:
 1. Generating an experimental question and hypothesis

2. Experimental design
 - a. Designation of experimental group
 - b. Designation and selection of appropriate control group
 - c. Replication of results to assure reliability and validity
3. Laboratory techniques commonly used in research related to rheumatologic diseases – basic understanding of methods
 - a. Clinical: ELISA, RIA, nephelometry, protein electrophoresis, multiplex bead-based immunoassays
 - b. Cellular: cell lines, lymphocyte proliferation, flow cytometry, fluorescence activated cell sorting (FACS), confocal microscopy
 - c. Immunohistochemistry and immunofluorescence of tissues.
 - d. Molecular: Western blot analysis, polymerase chain reaction; gene sequencing; genomics techniques (GWAS, SNPs, microarray techniques), proteomics techniques
 - e. Hybridoma and monoclonal antibody production
 - f. Mouse models: transgenic, knock-out/knock-in, chimeras
4. Statistical methods and reporting
 - a. Statistical tests for analysis of variables
 - b. Statistical significance and sample size
- B. Clinical Research: Fellows should understand the principles of research involving patients in order to answer clinically relevant questions, recognizing the limitations and biases of different study designs
 1. Generating an experimental question and hypothesis
 2. Research study design – distinguish the critical components of clinical studies
 - a. Clinical trial design
 - i. Phase I clinical trials
 - ii. Phase IIa and IIb clinical trials
 - iii. Phase III clinical trials
 - iv. Randomized, double-masked, placebo-controlled trial
 - v. Cross-over trial designs
 - vi. Randomized discontinuation trial
 - vii. Open-label extensions
 - b. Observational study designs
 - c. Other study design
 - i. Meta-analysis
 - ii. Systematic Review
 3. Inclusion and exclusion criteria
 4. Concept of equipoise and its impact on study design
 5. Statistical methods and reporting
 - a. Sensitivity and specificity calculations
 - b. Odds ratios, hazards ratio, relative risk, number needed to treat, number needed to harm
 - c. Statistical significance, sample size, and power calculations
 - d. Student t-test, Chi-squared test, logistic regression, 95% confidence intervals
- C. Epidemiological and health services research: Fellows should recognize how research focused on population level measures, or on implementation and delivery of interventions is carried out at the local and global level
 1. Epidemiology study design
 - a. Types: Retrospective, case series, case-control, cohort, cross-sectional
 - b. Analysis: incidence, prevalence, correlation, predictive variables
 2. Outcomes measures
 - a. Patient reported outcomes (e.g. SF36, WOMAC, global assessments)
 - b. Disease activity indices (e.g. DAS, RAPID3, CDAI, SLEDAI, BASDAI, PASI, BVAS and others)
 - c. Composite indices (e.g. BILAG, SRI, BICLA, ACR Composite)
 3. Quality improvement science

- a. Plan-Do-Study-Act (PDSA) cycle
 - b. Team leadership skills
- 4. Comparative effectiveness research
- D. Research Ethics: Fellows should know and practice the guiding principles of ethical research with a focus on the core principles of beneficence and non-maleficence
 - 1. Guiding principles
 - a. Nuremberg code
 - b. Declaration of Helsinki
 - c. Belmont Report
 - 2. Independent review
 - a. Institutional Review Boards (IRB)
 - b. Data safety monitoring boards
 - 3. Informed consent
 - 4. Right to withdraw
 - 5. Data management
 - a. Confidentiality
 - b. Documentation
 - 6. Data security
- E. Critical literature review
 - 1. Evidence based medicine principles
 - 2. Critical appraisal of the literature

TELEHEALTH PRINCIPLES

- A. Fellows should demonstrate a basic knowledge of the principles of telehealth including:
 - 1. Types of Telehealth Encounters, as Categorized by:
 - a. Timing
 - i. Synchronous
 - ii. Asynchronous
 - b. Personnel Involved
 - i. eConsult
 - ii. Direct patient-to-provider virtual visits
 - iii. Patient to provider via mediator, where the patient is onsite with an auxiliary provider who may perform physical exam maneuvers and/or assist the patient with working telemedicine equipment
 - c. Method
 - i. Telephone visit
 - ii. Video visit
 - iii. Medical record review
 - 2. Equipment Used in Virtual Medicine
 - a. Videoconferencing equipment (i.e. telephone, camera, etc.)
 - b. HIPAA Compliant Videoconferencing platforms (i.e. Zoom, Doximity, etc.)
 - c. Telemedicine peripherals (i.e. remote stethoscopes, otoscopes, ultrasound, etc.)
 - 3. Legal Regulations
 - a. Local, state, and federal licensure laws for telehealth
 - b. Components of patients' informed consent for virtual encounters
 - i. Risks including breach of patient privacy, potential shortcomings of virtual encounters, etc.
 - ii. Benefits including improved access to care, convenience, etc.

II. PATIENT CARE

The ability to provide quality patient care is the ultimate goal of clinical training in rheumatology. The fellowship program must require its trainees to attain competence in patient care to the level expected for independent practice, as defined by the Rheumatology Entrustable Professional Activities (EPA's) (Appendix B). Programs must define the specific knowledge, skills, behaviors, and attitudes required, as well as provide educational experiences as needed in order for their trainees to demonstrate quality patient care.

DEFINITION

Patient Care that is compassionate, appropriate, and effective for the treatment of disease and the promotion of health.

ESSENTIAL COMPONENTS

The essence of being a rheumatologist is the ability to use information derived about a patient (history, physical examination, laboratory and imaging studies) along with medical knowledge to orderly synthesize a differential diagnosis, plan of further evaluation and comprehensive management for the patient being evaluated for rheumatic disease or rheumatic disease manifestations. The rheumatologist should provide consultation when requested, in support of the primary care relationship, for patients with rheumatic symptoms and signs and appropriately integrate recommendations from other health care providers into the evaluation and management plan.

This may broadly be categorized under four components:

COMPONENT 1 - INFORMATION GATHERING

The fellow should be able to:

1. Obtain an accurate and comprehensive but relevant clinical history, including review of all available records.
2. Perform a thorough and relevant review of systems, and assess functional status of patients with rheumatic disease symptoms.
3. Perform and interpret a comprehensive, accurate physical examination, using common and advanced techniques, where applicable.
4. Perform and interpret the examination of all axial and peripheral joints, peri-articular structures, peripheral nerves and muscles.
5. Identify extra-articular findings that are associated with specific rheumatic diseases.
6. Recognize the indications for and costs of ordering laboratory tests and procedures to establish a diagnosis of rheumatic disease
7. Recognize the indications for and costs of different therapies used in the management of rheumatic diseases.
8. Recognize the indications for and demonstrate competence in arthrocentesis, joint and soft tissue injections. The fellow should be able to distinguish the anatomy, precautions (including OSHA requirements) and potential sequelae of arthrocentesis and demonstrate competency in obtaining synovial fluid from diarthrodial joints, bursae and tenosynovial structures after obtaining informed consent from the patient or caregiver.
9. Perform synovial fluid analysis including the examination and interpretation of synovial fluid under conventional and polarized light microscopy from patients with a variety of rheumatic diseases.

10. Obtain and interpret appropriate tests, including laboratory tests, imaging studies, and other indicated testing to evaluate patients presenting with known or possible rheumatic disease:
 - a. Radiographs of normal and diseased joints, bones, peri-articular structures and prosthetic joints
 - b. Bone densitometry
 - c. Arthrography, ultrasonography, computed tomography, magnetic resonance imaging of joints, bones, peri-articular structures and muscle
 - d. Radionuclide scans of bones and joints
 - e. Arteriograms (conventional, CT and MR) for patients with suspected or confirmed vasculitis
 - f. Computed tomography of lungs and paranasal sinuses
 - g. Magnetic resonance imaging of the central nervous system (brain and spinal cord)
 - h. Electromyograms and nerve conduction studies
 - i. Biopsy specimens including histochemistry and immunofluorescence of tissues relevant to the diagnosis of rheumatic diseases: skin, synovium, muscle, nerve, bone, minor salivary gland, artery, kidney and lung
 - j. Specific laboratory tests : See Medical Knowledge, Clinical Sciences, Diagnostic Testing A (*vide supra*)
 - k. Arthroscopy
 - l. Schirmer's and tests of corneal integrity; parotid scans and salivary flow studies

COMPONENT 2 - SYNTHESIS OF TREATMENT PLAN

Informed medical decision-making based on current scientific information and clinical judgment that also accounts for patient preferences and circumstances.

The fellow should be able to:

1. Construct a differential diagnosis in patients presenting with signs and symptoms related to rheumatologic diseases and to outline further testing necessary to establish the correct diagnosis
2. Construct and implement an appropriate treatment plan for the care of a patient with a rheumatologic problem integrating the prescribing of medications (oral, injectable or infused), counseling and psychosocial aspects, rehabilitative medicine, and, when necessary, surgical or other consultation. The fellow should be able to explain the rationale as well as the risks and benefits for the treatment plan
3. Formulate and implement a management plan for patients with rheumatic emergencies (including organ or life threatening conditions), with a need for emergent, urgent or changes in level or goals of care
4. Recognize disease-related exacerbations and formulate and implement a management plan
5. Refer to, or consult with other health care providers for the co-management of patients with rheumatic disease
6. Identify opportunities for referral to clinical registries and trials

COMPONENT 3 - IMPLEMENTATION OF TREATMENT

A. Prescribing medications and rehabilitation

The fellows should be able to:

Demonstrate a working knowledge of clinical pharmacology including the dosing, pharmacokinetics, metabolism, mechanisms of action, side effects, drug interactions, compliance issues, costs, and use in specific patient populations, such as chronic kidney disease and including fertile, lactating, and pregnant women and fertile men as well as across the age spectrum.

1. Nonsteroidal anti-inflammatory drugs and adequate gastroprotection
2. Glucocorticoids: topical, intra-articular, systemic
3. Systemic anti-rheumatic drugs
 - a. DMARDs, small molecules: anti-malarials, sulfasalazine, methotrexate, leflunomide, azathioprine, cyclophosphamide, mycophenolate mofetil, calcineurin inhibitors, JAK kinase inhibitors, phosphodiesterase inhibitors
 - b. Biologic agents: interleukin inhibitors (1, 6, 12, 17, 23), tumor necrosis factor inhibitors, T cell co-stimulatory inhibitors, anti-B cell therapy
 - c. Historical agents such as gold compounds
4. Urate lowering therapy:
 - a. Xanthine oxidase inhibitors: allopurinol, febuxostat
 - b. Uricosuric: probenecid
 - c. Uricase agents: pegylated uricase, rasburicase
5. Bone disorder medications
 - a. Bisphosphonates: alendronate, risedronate, ibandronate, zoledronic acid
 - b. Anabolic agents: teriparatide
 - c. RANKL inhibition: denosumab
 - d. Hormonal therapy: estrogen, selective estrogen receptor modulators, calcitonin
 - e. Calcium and Vitamin D
6. Vasodilators
 - a. Calcium channel blockers
 - b. Topical nitrates
 - c. Prostacyclin analogs
 - d. Endothelin receptor antagonists
 - e. Phosphodiesterase inhibitors
 - f. Guanylate cyclase agonist
7. Antibiotic therapy for septic joints
8. Opioid and non-opioid analgesics
9. Colchicine
10. Agents used for pain modulation: anti-depressants, anti-convulsants, pregabalin, muscle relaxants
11. Anti-cholinergics and non-pharmacologic agents used for the treatment of sicca symptoms
12. Vaccines
13. Intravenous immunoglobulin (IVIg)
14. Plasma exchange

B. Pain assessment and pain management

The fellow should be able to utilize:

1. Methods of pain assessment including visual analog scale scores, pain questionnaires
2. Non-pharmacological modalities of pain management including exercise, cognitive behavioral therapy
3. Pharmacological therapy including:
 - a. Immunosuppressive and anti-inflammatory management of underlying rheumatic disorder.
 - b. Analgesic agents including acetaminophen, nonsteroidal anti-inflammatory agents and narcotic analgesics.
 - c. Antidepressants
4. Means to identify physical impairment; relate the impairment to the observed functional deficits; prescribe appropriate rehabilitation (physical therapy, occupational therapy) to achieve goals to improve the defined impairment.

C. Surgical management

The fellow should be able to:

1. Distinguish indications for surgical and orthopedic consultation in acute and chronic rheumatic diseases.
2. Perform peri-operative management of the surgical patient:
 - a. Peri-operative evaluation, appropriate referral and medication adjustments.
 - b. Rehabilitation of the patient with rheumatic disease after a surgical or orthopedic procedure, as well as aspects of post-operative medical management pertaining to the rheumatologic condition.

D. Non-pharmacologic management

The fellow should be able to:

1. Describe complementary and unconventional medical practices: diet, nutritional supplements, antimicrobials, acupuncture, topical therapeutic agents, homeopathic remedies, venoms, and others.
2. Perform patient education and counseling

E. Preventive medicine and proactive care

The fellow should be able to:

1. Appropriately assess and manage of bone health in a patient starting or taking glucocorticoid therapy
2. Counsel for risk factor modification for patients at risk for fracture
3. Recognize the importance of lipid panel monitoring in patients with rheumatic disease
4. Appropriately implement prophylaxis against pneumocystis pneumonia
5. Counsel for tobacco cessation
6. Appropriately screen for risk for reactivation of infectious diseases (viral hepatitis, tuberculosis) in patients beginning disease modifying, small molecules or biologic therapy
7. Counsel for appropriate dental evaluation and management
8. Counsel for appropriate vaccination administration

COMPONENT 4 - REASSESSMENT AND PATIENT FOLLOW UP

The fellow should be able to:

1. Reassess the patient over time, including recognition of treatment related adverse events, and alter the treatment plan accordingly.
2. Utilize the validated instruments in the assessment of pain, disease activity, function, and quality of life over time to monitor and adjust therapy
3. Address comorbid illness in patients with rheumatic diseases and incorporate these considerations into the care plan
4. Enumerate disease- and treatment-related complications that may lead to long term morbidity, considering implications of comorbid diseases and effects of aging

III. PRACTICE-BASED LEARNING AND IMPROVEMENT

The practice of rheumatology entails the assessment and treatment of patients with clinical disorders that are often complex with regard to the different organ systems involved, variations in musculoskeletal and immune system biology, and impact upon patient lifestyle and livelihood. The rapid advances in understanding and the complexity of both disease pathogenesis and treatment of the rheumatic diseases demand that the rheumatologist continually evaluate and improve the quality of his/her care in the context of his/her own clinical practice. The development of skills in self-directed, reflective learning and practice improvement will facilitate the delivery of state-of-the-art, evidence-based patient care that maximizes the likelihood for successful clinical outcomes.

DEFINITION

Practice-based learning and improvement involves the evaluation of care provided to both individual patients as well as to groups of patients in a given practice, the appraisal and assimilation of scientific evidence relevant to clinical problems encountered, evaluations of the care provided in the context of this evidence, and effecting improvements in patient care based upon these evaluations.

ESSENTIAL COMPONENTS

In addition to structured learning of the basic components of medical knowledge and patient care, the rheumatologist must evaluate his/her knowledge base and care delivery on an ongoing basis with the goal of continually improving that care. This process includes the following components:

- A. Independent Learning - The fellow should be able to:
 - 1. Learn and improve at the point of care to enhance future clinical interactions
 - 2. Seek resources to enhance future clinical interactions.
 - 3. Recognize, and implement ways to improve his/her role in the effective management of a practice.
 - 4. Incorporate technology to manage information (HIPAA compliant), support patient care decisions using evidence-based medicine and enhance both patient and physician education
- B. Self-evaluation of performance - The fellow should be able to:
 - 1. Monitor practice with goal for improvement
 - 2. Honestly reflect on knowledge, skills or attitude gaps to guide ongoing learning, using internal and external sources
 - 3. Actively seek, reflect on, and develop plans for practice improvement based on feedback from all members of the health care team including faculty, peers, students, health professionals, patients and patient advocates.
- C. Incorporation of feedback into improvement of clinical activity - The fellow should be able to:
 - 1. Demonstrate that s/he learns from errors through actions taken to improve the system or processes of care.
 - 2. Display the ability to change practice based on an audit of a panel of patients using standardized, disease specific, and evidence based criteria.
 - 3. Independently construct and pursue answers to clinical questions, and perform self-reflection to incorporate learning for future clinical encounters.
 - 4. Demonstrate the ability to respond to meet situational needs, and customize management based on clinical evidence for individualized patient care.
- D. Incorporation of feedback into improvement of clinical activity - The fellow should be able to:
 - 1. Demonstrate that s/he learns from errors through actions taken to improve the system or processes of care.

2. Display the ability to change practice based on an audit of a panel of patients using standardized, disease specific, and evidence based criteria.
3. Independently construct and pursue answers to clinical questions, and perform self-reflection to incorporate learning for future clinical encounters.
4. Demonstrate the ability to respond to meet situational needs, and customize management based on clinical evidence for individualized patient care.

IV. SYSTEMS-BASED PRACTICE

The increasing complexity and diversity of health care delivery systems presents both challenges and opportunities for the practice of rheumatology. Knowledge of the nature and variety of the external and internal systems that can impact clinical practice and the effective utilization of that knowledge to positively impact patient care is an essential skill. It is important for trainees to both recognize how their own practices intersect with others, and to work in teams to improve health care delivery.

The knowledge base of systems-based practice comprises the advantages and disadvantages of different health care systems that impact patients with rheumatic diseases. Some of these include the academic system in which rheumatology fellows are training, the various private and public health care delivery systems, the governmental agencies and programs that regulate these systems, the volunteer, private and governmental agencies that are available to educate and assist patients, the challenges faced by disabled patients negotiating these systems and the social and economic burden of chronic rheumatic diseases. The goal of the systems-based practice curriculum is to enhance the ability of rheumatology trainees to positively influence patient care by effectively utilizing these internal and external resources, to serve as effective advocates for their patients, and to provide cost-effective patient care. In some cases this may also mean identifying and organizing changes in the local systems' problems that can improve patient care.

DEFINITION

Systems-based practice reflects an understanding of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care.

ESSENTIAL COMPONENTS

- A. Partners in health care delivery: the various providers and resources available to deliver optimal care.

This partnership starts with coordinating both a multidisciplinary and interprofessional approach to patient-centered care. The principal partners in delivering health care to patients with rheumatic diseases include providers such as administrative and nursing staff, referring and consulting physicians, nurse practitioners, physician assistants and other health professionals participating in the local health care system. Partners also include outside volunteer agencies, both locally and nationally, such as the American College of Rheumatology, Association of Rheumatology Health Professionals, the Rheumatology Research Foundation, the Arthritis Foundation, the disease-specific foundations (including but not limited to Lupus, Scleroderma, Ankylosing Spondylitis, Vasculitis), the National Institute of Health (NIH) and its component institutes and pharmaceutical companies that have specific patient-related initiatives. Other agencies that have impact on the practice of rheumatology include the American Medical Association (AMA), the Food and Drug Administration (FDA) and the Center for Medicare and Medicaid Services (CMS).

Working within interprofessional and interdisciplinary teams, rheumatologists should work to promote patient safety. It is also important to identify risks for and strategies to prevent medical errors and to

address them appropriately if they occur.

B. Systems thinking: a concept of “systems thinking” in health care delivery

This includes an appreciation for the spectrum of practice models for health care delivery (academic/public/private/Veterans Affairs) including the fundamentals of office and personnel management, practice management strategies, managed care, health insurance, appropriate coding and reimbursement policies.

It also comprises an ongoing analysis of the limitations and opportunities within the local health care system, in both the inpatient and outpatient settings, and its impact on the health care delivery to patients with rheumatic diseases. In particular, efforts should be made to identify potentially correctable systems’ weaknesses and medical errors due to systems’ failures and to develop strategies to rectify the problems (i.e. quality improvement projects).

Systems thinking includes implementing strategies to coordinate care and transition patients safely and efficiently across multiple delivery systems, including ambulatory, sub-acute, acute, rehabilitation and skilled nursing facilities.

C. Advocacy for the patient: the importance, opportunities and limits of patient advocacy

This advocacy includes assisting patients with applications for medical disability determinations, completing preauthorization documents for the use of certain medications and appealing to insurance companies with respect to denial of certain treatments, benefits and claims.

It is also important to recognize opportunities to address disparities in disease and in health care delivery impacting patient care, including socio-economic factors, health care literacy, medical disability and health care insurance coverage.

Activities may include broader advocacy for populations on a local, state or national level.

D. Cost-effective health care: the principles of cost allocation and resource management within the external (state, national) and local systems

The delivery of cost-effective health care includes realizing how the cost and availability of certain diagnostic tests, drugs and other therapies impact patient care. The utilization of evidence-based cost-conscious best practice strategies for the diagnosis and treatment of patients with rheumatic diseases is paramount.

V. INTERPERSONAL AND COMMUNICATION SKILLS

Interpersonal and communication skills are essential for the formation of a desirable and effective physician-patient relationship. The complexity of most of the rheumatic diseases, as well as the increasingly complicated treatment regimens, require a working partnership between patient and physician, and often between both physician and the patient's family or caregiver(s), as well as physician and members of an interprofessional team of providers. In addition to improved patient satisfaction, confidence and understanding, such working partnerships promote medical compliance. Effective physician collegial relationships are also dependent upon these skills.

DEFINITION

Interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and other health professionals.

ESSENTIAL COMPONENTS

- A. Gathering information
Reliable and effective communication depends upon the availability of accurate and complete information obtained from patients, their families, other health professionals, and the complete medical record. This requires the use of effective listening and communication skills.
- B. Recognizing and incorporating the patient's perspective
Such understanding impacts the ability of the physician to appreciate the functional impact of disease and the desire and ability of the patient to be an active partner in decision-making and treatment efforts. Evaluation and management plans should demonstrate sensitivity to, and integrate differences in patient characteristics.
- C. Providing information
Communication regarding disease manifestations, diagnosis and treatment is only effective if the recipient has gained appropriate understanding of the information at the end of the exchange. Effective explanation and documentation therefore require that the physician communicate in a manner that is clear and is adjusted to the specific context, situation, and/or audience.
- D. Trust
Establishment of trust with the patient, the patient's family or caregiver(s), and other health professionals is paramount.

VI. PROFESSIONALISM

Professionalism is one of the foundations of the practice of medicine. By virtue of their prior medical school education and internal medicine training, rheumatology fellows have typically already attained a substantial level of professionalism, which can be further enriched during the fellowship training period. The complexity of rheumatic diseases and their management requires effective interactions between rheumatology trainees and referring providers, subspecialty consultants, other health care providers, hospital administrators and health insurance representatives in providing care for their patients. Trainees in many programs interact with patients from a wide range of cultural and socioeconomic backgrounds. In addition, fellows must learn to recognize and manage potential conflicts of interest with professional activities as well as with pharmaceutical companies (i.e. clinical research trials, pharmaceutical company interactions, grant review processes). A high level of professionalism is thus essential to maintain the balance required by an effective rheumatologist.

DEFINITION

Professionalism is manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to patients of diverse backgrounds.

ESSENTIAL COMPONENTS

A. Primacy of patient interest

Placing the interest of the patient before all other external interests is the most fundamental aspect of the medical profession and forms part of the unwritten contract in the patient-physician relationship.

This primacy also implies patient autonomy in the determination of treatment. As a demonstration of patient advocacy, the fellow needs to respond to each patient's unique characteristics and needs. This includes but is not limited to:

1. Demonstrating empathy and compassion to all patients,
2. Addressing disparities in health care that may impact patient care, and
3. Taking responsibility for situations where public health supersedes individual privacy (e.g. reportable infectious diseases).

B. Physician responsibility and accountability

The practice of medicine incurs responsibility and accountability to patients, colleagues, society, and self. The physician must maintain professional and respectful interactions with patients, caregivers, and members of the interprofessional team (e.g., peers, consultants, nursing, ancillary professionals, and support personnel).

1. To demonstrate commitment to providing safe patient care, the physician must recognize, respond to, and report either the impairment in colleagues, or the provision of substandard care, via a peer review process.
2. To demonstrate the professional attribute of accessibility, the physician accepts responsibility and follows through on tasks, including but not limited to completion of clinical, administrative, curricular and research-related tasks.
3. To demonstrate the professional attribute of personal accountability, the physician should contribute to the fiscally sound practice of medicine.
4. Physicians should responsibly use technology and social media.
5. To manage conflicts of interest the physician must maintain ethical relationships with patients, colleagues, members of the interprofessional team, office staff and industry.

C. Humanistic qualities and altruism

Physicians should treat patients with dignity, civility and respect, regardless of race, culture, gender, sexual orientation, socioeconomic status, literacy, and religious beliefs.

1. To demonstrate compassion and respect to patients and their caregivers, physicians should endeavor to support patients' needs (physical, psychological, social, and spiritual)

D. Ethical behavior

The physician must exhibit integrity and ethical behavior in professional conduct.

1. This includes, but is not limited to, accepting personal errors and honestly acknowledging them, maintaining patient confidentiality, upholding ethical expectations of clinical, scholarly and research activities, as well as maintenance of credentialing requirements.
2. The physician must address personal, psychological, and physical limitations that may affect professional performance.
3. Integrity must pervade all of the components of professionalism.

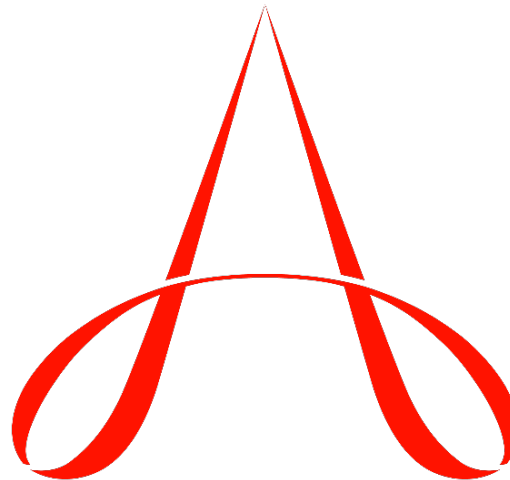
APPENDICES

APPENDIX A. RHEUMATOLOGY MILESTONES 2.0



Rheumatology Milestones

The Accreditation Council for Graduate Medical Education



ACGME

Second Revision: August 2020

First Revision: October 2014

Rheumatology Milestones

The Milestones are designed only for use in evaluation of fellows in the context of their participation in ACGME-accredited residency or fellowship programs. The Milestones provide a framework for the assessment of the development of the fellow in key dimensions of the elements of physician competence in a specialty or subspecialty. They neither represent the entirety of the dimensions of the six domains of physician competence, nor are they designed to be relevant in any other context.

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American Board of Internal Medicine

American College of Rheumatology

Review Committee for Internal Medicine

Understanding Milestone Levels and Reporting

This document presents the Milestones, which programs use in a semi-annual review of fellow performance, and then report to the ACGME. Milestones are knowledge, skills, attitudes, and other attributes for each of the ACGME Competencies organized in a developmental framework. The narrative descriptions are targets for resident/fellow performance throughout their educational program.

Milestones are arranged into levels. Tracking from Level 1 to Level 5 is synonymous with moving from novice to expert fellow in the specialty or subspecialty. For each reporting period, the Clinical Competency Committee will review the completed evaluations to select the milestone levels that best describe each learner's current performance, abilities, and attributes for each subcompetency.

These levels *do not* correspond with post-graduate year of education. Depending on previous experience, a junior fellow may achieve higher levels early in his/her educational program just as a senior fellow may be at a lower level later in his/her educational program. There is no predetermined timing for a resident to attain any particular level. Fellows may also regress in achievement of their milestones. This may happen for many reasons, such as over scoring in a previous review, a disjointed experience in a particular procedure, or a significant act by the fellow.

Selection of a level implies the fellow substantially demonstrates the milestones in that level, as well as those in lower levels (see the diagram on page vi).

Additional Notes

Level 4 is designed as a graduation *goal* but *does not* represent a graduation *requirement*. Making decisions about readiness for graduation and unsupervised practice is the purview of the program director. Furthermore, Milestones 2.0 include revisions and changes that preclude using Milestones as a sole assessment in high-stakes decisions (i.e., determination of eligibility for certification or credentialing). Level 5 is designed to represent an expert fellow whose achievements in a subcompetency are greater than the expectation. Milestones are primarily designed for formative, developmental purposes to support continuous quality improvement for individual learners, education programs, and the specialty. The ACGME and its partners will continue to evaluate and perform research on the Milestones to assess their impact and value.

Some milestone descriptions include statements about performing independently. These activities must occur in conformity to ACGME supervision guidelines as described in the Program Requirements, as well as to institutional and program policies. For example, a fellow who performs a procedure independently must, at a minimum, be supervised through oversight.

A Supplemental Guide is also available to provide the intent of each subcompetency, examples for each level, assessment methods or tools, and other available resources. The Supplemental Guide, like examples contained within the Milestones, is designed only to assist the program director and Clinical Competency Committee, and is not meant to demonstrate any required element or outcome.

Additional resources are available in the [Milestones](#) section of the ACGME website. Follow the links under “What We Do” at www.acgme.org.

The diagram below presents an example set of milestones for one sub-competency in the same format as the ACGME Report Worksheet. For each reporting period, a fellow's performance on the milestones for each subcompetency will be indicated by selecting the level of milestones that best describes that fellow's performance in relation to those milestones.

Practice-Based Learning and Improvement 2: Commitment to Reflective Practice and Personal Growth				
Level 1	Level 2	Level 3	Level 4	Level 5
Establishes personal and professional goals, identifying gap(s) between goals and current performance	Demonstrates receptiveness to feedback, analyzing and reflecting on factors contributing to gap(s) between goals and current performance Designs and implements a learning plan, with prompting	Seeks feedback episodically, and institutes behavioral change(s) when necessary Independently creates and implements an individualized learning plan	Seeks feedback consistently, and sustains behavioral change as necessary Uses performance data to measure the effectiveness of the learning plan and when necessary, improves it	Role models consistently seeking performance data with adaptability and humility, and coaches others on reflective practice Facilitates the design and implementing learning plans for others
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				

Selecting a response box in the middle of a level implies that milestones in that level and in lower levels have been substantially demonstrated.

Selecting a response box on the line in between levels indicates that milestones in lower levels have been substantially demonstrated as well as **some** milestones in the higher level(s).

Patient Care 1: Gathers an Essential and Accurate Patient History				
Level 1	Level 2	Level 3	Level 4	Level 5
Acquires a basic rheumatic history	Integrates a rheumatic history with a comprehensive medical history, including functional aspects	Acquires a tailored comprehensive rheumatic history, including historical subtleties and psychosocial aspects	Integrates the current patient history with the complete medical record, supplemental information, and disease activity measures	Identified as a role model in interpreting subtleties and resolving ambiguities in the patient history
Reviews available medical records	Identifies relevant findings in the medical record	Independently requests additional information to supplement available medical records		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;"> Not Yet Completed Level 1 <input type="checkbox"/> Not Yet Assessable <input type="checkbox"/> </div>				

Patient Care 2: Physical Examination				
Level 1	Level 2	Level 3	Level 4	Level 5
Identifies the elements of a comprehensive physical examination	Performs all elements of a comprehensive physical examination	Performs a tailored comprehensive physical examination including advanced techniques, when applicable	Performs a tailored comprehensive physical examination that elicits subtle findings	Identified as a role model for performing and interpreting a comprehensive, accurate physical and musculoskeletal examination
Identifies the elements of a musculoskeletal examination	Performs all elements of a musculoskeletal examination	Performs a tailored comprehensive musculoskeletal examination including advanced techniques, when applicable	Performs a tailored comprehensive musculoskeletal examination that elicits subtle findings	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;"> Not Yet Completed Level 1 <input type="checkbox"/> Not Yet Assessable <input type="checkbox"/> </div>				

Patient Care 3: Comprehensive Management Plan Development				
Level 1	Level 2	Level 3	Level 4	Level 5
With supervision, formulates a differential diagnosis for a patient	Independently formulates a broad differential diagnosis for typical disease presentations	Independently formulates a prioritized differential diagnosis for typical disease presentations	Independently formulates a prioritized differential diagnosis with consideration of typical and atypical disease presentations	Independently formulates a prioritized differential diagnosis with consideration of newly recognized and emerging conditions
Demonstrates an awareness of disease activity measures	Identifies applicable disease activity measures	Incorporates and interprets the results of disease activity measure	Independently develops and implements a prioritized management plan with consideration of acuity and complexity of disease presentation	Identified as an expert resource for management of a focused disease area
With supervision, develops a management plan	Independently develops a management plan for a patient with common disease presentations	Independently recognizes disease acuity, and with supervision, develops a prioritized management plan		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;"> Not Yet Completed Level 1 <input type="checkbox"/> Not Yet Assessable <input type="checkbox"/> </div>				

Patient Care 4: Therapeutics, including Immunomodulatory Agents				
Level 1	Level 2	Level 3	Level 4	Level 5
Identifies indications and adverse effects of medications used to treat patients with common rheumatic conditions	<p>Prescribes and monitors medications used in patients with common rheumatic conditions</p> <p>Evaluates for comorbidities that may alter therapeutic recommendations</p>	<p>Prescribes, monitors, and assesses the response to pharmacotherapy used in the management of patients with common rheumatic conditions</p> <p>Modifies treatment plans to address comorbidities, with supervision</p>	<p>Integrates best available evidence to prescribe, monitor, and assess the response to pharmacotherapy used in the management of patients with common and complex rheumatic conditions</p> <p>Independently modifies treatment plans to address comorbidities</p>	Develops a clinical practice pathway for management of patients with rheumatic conditions
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="float: right;"> Not Yet Completed Level 1 <input type="checkbox"/> Not Yet Assessable <input type="checkbox"/> </div>				

Patient Care 5: Procedures				
Level 1	Level 2	Level 3	Level 4	Level 5
Identifies indications for joint and soft tissue aspirations and injections, and discusses principles of informed consent	<p>Performs common joint and soft tissue injections and aspirations with direct supervision, including independently discussing risks and benefits, obtaining informed consent, identifying anatomic landmarks, and demonstrating aseptic technique</p> <p>Recognizes the role of musculoskeletal ultrasound in the diagnosis and treatment of patients with rheumatic conditions</p>	<p>Performs common joint and soft tissue aspirations and injections with indirect supervision</p> <p>Interprets the findings of musculoskeletal ultrasound for common conditions with supervision</p>	<p>Independently performs common joint and soft tissue aspirations and injections</p> <p>Independently interprets the findings of musculoskeletal ultrasound for common conditions, and recognizes the role of ultrasound in non-musculoskeletal rheumatic conditions</p>	<p>Independently performs complex joint and soft tissue aspirations or injections, including unusual sites, anatomic abnormalities, or incorporating imaging guidance</p> <p>Independently performs and interprets point-of-care diagnostic ultrasound and uses ultrasound to guide invasive procedures</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;"> Not Yet Completed Level 1 <input type="checkbox"/> Not Yet Assessable <input type="checkbox"/> </div>				

Patient Care 6: Provides Consultative Care				
Level 1	Level 2	Level 3	Level 4	Level 5
Respectfully receives a consultation request	Clearly and concisely responds to a consultation request	Verifies understanding of recommendations with the primary team when providing consultation	Integrates recommendations from different members of the health care team and effectively conveys consultative assessment and rationale to all health care team members	Identified as a role model for the provision of consultative care across the spectrum of disease complexity and acuity
With supervision, recognizes disease acuity	Independently recognizes disease acuity	Recognizes disease acuity and prioritizes management steps	Mobilizes resources to provide care in high-acuity situations	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;"> Not Yet Completed Level 1 <input type="checkbox"/> Not Yet Assessable <input type="checkbox"/> </div>				

Medical Knowledge 1: Possesses Clinical Knowledge				
Level 1	Level 2	Level 3	Level 4	Level 5
Identifies key features of common rheumatic conditions	Demonstrates broad knowledge of common rheumatic conditions	Demonstrates knowledge of less common rheumatic conditions as well as common rheumatic conditions associated with higher complexity	Integrates knowledge of the pathogenesis, epidemiology, clinical expression, treatments, and prognosis of a broad range of rheumatic conditions	Identified as a subject matter expert in basic and/or clinical science of rheumatic conditions
Demonstrates basic knowledge of anatomy, physiology, and other basic sciences	Demonstrates basic knowledge of anatomy, genetics, immunology, metabolism, and other basic sciences pertaining to rheumatic conditions	Demonstrates in-depth knowledge of anatomy, genetics, immunology, metabolism, and other basic sciences pertaining to rheumatic conditions	Integrates knowledge of anatomy, genetics, immunology, metabolism, and other basic sciences pertaining to a broad range of rheumatic conditions	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;"> Not Yet Completed Level 1 <input type="checkbox"/> Not Yet Assessable <input type="checkbox"/> </div>				

Medical Knowledge 2: Knowledge of Diagnostic Testing				
Level 1	Level 2	Level 3	Level 4	Level 5
Explains the rationale, risks, and benefits for common diagnostic testing in patients being evaluated for rheumatic conditions	Integrates value and test characteristics into diagnostic strategies in patients with uncomplicated rheumatic conditions	Integrates value and test characteristics into diagnostic strategies in patients with complex rheumatic conditions	Integrates and reconciles information, including non-specific and/or conflicting diagnostic test results to form a cohesive evaluation	Identified as an expert in testing strategies and in the selection and interpretation of complex, new, or emerging tests
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:			Not Yet Completed Level 1 <input type="checkbox"/> Not Yet Assessable <input type="checkbox"/>	

Medical Knowledge 3: Scholarly Activity				
Level 1	Level 2	Level 3	Level 4	Level 5
Identifies areas worthy of scholarly investigation, with supervision	Designs a scholarly activity with a mentor(s)	Engages in scholarly work, incorporates feedback, and participates in critical appraisal and analysis of project data	Produces scholarly work suitable for dissemination as an abstract or presentation	Dissemination of independent scholarly work that has generated new medical knowledge, educational programs, or process improvement
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;"> Not Yet Completed Level 1 <input type="checkbox"/> Not Yet Assessable <input type="checkbox"/> </div>				

Systems-Based Practice 1: Patient Safety and Quality Improvement				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of common patient safety events	Identifies system factors that lead to patient safety events	Participates in analysis of patient safety events (simulated or actual)	Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual)	Actively engages teams and processes to modify systems to prevent patient safety events
Demonstrates knowledge of how to report patient safety events	Reports patient safety events through institutional reporting systems (actual or simulated)	Participates in disclosure of patient safety events to patients and families (simulated or actual)	Discloses patient safety events to patients and families (simulated or actual)	Role models or mentors others in the disclosure of patient safety events
Demonstrates knowledge of basic quality improvement methodologies and metrics	Describes quality improvement initiatives relevant to rheumatology practice	Participates in quality improvement initiatives relevant to rheumatology practice	Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project	Creates, implements, and assesses quality improvement initiatives at the institutional or community level
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				

Systems-Based Practice 2: System Navigation for Patient-Centered Care				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of care coordination	Coordinates care of patients in routine clinical situations effectively using the roles of the interprofessional teams	Coordinates care of patients in complex clinical situations effectively using the roles of their interprofessional teams	Role models effective coordination of patient-centered care among different disciplines and specialties	Leads in the design and implementation of improvements to the care coordination process
Identifies key elements for safe and effective transitions of care and hand-offs	Performs safe and effective transitions of care/hand-offs in routine clinical situations	Performs safe and effective transitions of care/hand-offs in complex clinical situations	Role models and advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems including outpatient settings	Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes
Demonstrates knowledge of population and community health needs and disparities	Identifies specific population and community health needs and inequities for their local population	Uses local resources effectively to meet the needs of a patient population and community	Participates in changing and adapting practice to provide for the needs of specific populations	Leads innovations and advocates for populations and communities with health care inequities
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				

Systems-Based Practice 3: Physician Role in Health Care Systems				
Level 1	Level 2	Level 3	Level 4	Level 5
Identifies key components of the complex health care system (e.g., hospital, skilled nursing facility, finance, personnel, technology)	Describes how components of a complex health care system are interrelated, and how this impacts patient care	Discusses how individual practice affects the broader system (e.g., length of stay, readmission rates, clinical efficiency)	Manages various components of the complex health care system to provide efficient and effective patient care and transition of care	Advocates for or leads systems change that enhances high-value, efficient, and effective patient care and transition of care
Recognizes the impact of cost and patient payment model on care decisions	Identify the principles of high-value care and delivers care with consideration of each patient's payment model	Engages with patients in shared decision making and incorporates principles of high-value care into management plans	Advocates for individual patient care needs to provide high-value care	Participates in health policy advocacy activities
	Demonstrates use of information technology (e.g., electronic health record) needed for clinical practice	Demonstrates knowledge of current evaluation and management billing practices	Independently completes proper documentation and coding for a patient encounter	Educates others on proper documentation, billing, and coding practices
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				

Practice-Based Learning and Improvement 1: Evidence-Based and Informed Practice				
Level 1	Level 2	Level 3	Level 4	Level 5
Formulates clinical questions and elicits patient preferences to inform care	Locates available evidence and incorporates patient preferences to inform patient care	Evaluates and applies best available evidence and incorporates patient preferences and values in order to provide care tailored to individual patients	Critically appraises and applies evidence, and recognizes gaps and conflicting evidence to guide care tailored to individual patients	Coaches others to critically appraise and apply evidence for complex patients; and/or participates in the development of guidelines
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				

Practice-Based Learning and Improvement 2: Commitment to Reflective Practice and Personal Growth				
Level 1	Level 2	Level 3	Level 4	Level 5
Establishes personal and professional goals, identifying gap(s) between goals and current performance	Demonstrates receptiveness to feedback, analyzing and reflecting on factors contributing to gap(s) between goals and current performance Designs and implements a learning plan, with prompting	Seeks feedback episodically, and institutes behavioral change(s) when necessary Independently creates and implements an individualized learning plan	Seeks feedback consistently, and sustains behavioral change as necessary Uses data and feedback from multiple sources to measure the effectiveness of the learning plan and when necessary, improves it	Role models consistently seeking performance data with adaptability and humility, and coaches others on reflective practice Facilitates the design and the implementation of learning plans for others
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				

Professionalism 1: Professional Behavior				
Level 1	Level 2	Level 3	Level 4	Level 5
Describes when and how to appropriately report professionalism lapses, including strategies for addressing common barriers	Identifies and describes triggers for professionalism lapses and takes responsibility for own professional behavior	Proactively recognizes situations that may trigger professionalism lapses	Demonstrates professional behavior in complex or stressful situations and intervenes to prevent lapses in self and others	Coaches others when behavior fails to meet professional expectations
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				

Professionalism 2: Ethical Principles				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of basic ethical principles	Applies basic principles to resolve straightforward ethical situations	Analyzes complex situations using ethical principles and recognizes need to seek help in resolving complex ethical situations	Manages and resolves complex ethical dilemmas using available resources	Identifies and seeks to address system-level factors that induce or exacerbate ethical problems or impede their resolution
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				

Professionalism 3: Accountability/Conscientiousness				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Performs tasks and responsibilities, with prompting</p> <p>Takes responsibility for failure to complete tasks and responsibilities</p>	<p>Performs tasks and responsibilities in a timely manner with attention to detail in routine situations</p> <p>Recognizes situations that may impact own ability to complete tasks and responsibilities in a timely manner</p>	<p>Performs tasks and responsibilities in a timely manner with attention to detail in complex or stressful situations</p> <p>Recognizes situations that may impact others' ability to complete tasks and responsibilities in a timely manner</p>	<p>Demonstrates leadership to ensure tasks and responsibilities are completed in a timely manner with attention to detail in complex or stressful situations</p> <p>Proactively implements strategies to ensure that the needs of patients, teams, and systems are met</p>	<p>Creates strategies to enhance others' ability to efficiently complete tasks and responsibilities</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Comments:</p> <p style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></p>				

Professionalism 4: Self-Awareness and Help-Seeking				
Level 1	Level 2	Level 3	Level 4	Level 5
Recognizes status of own and others' well-being, with assistance	Independently recognizes status of own and others' well-being, and asks for help when needed	Recognizes the impact of own and others' well-being on the patient and team, with assistance	Independently recognizes the impact of own and others' well-being on the patient and team, and asks for help when needed	Leads initiatives to improve wellness at the program or institutional level
With assistance recognizes personal gaps in knowledge, skills, and attitudes	Independently recognizes limits in personal knowledge, skills, and attitudes	With assistance, develops a plan to improve personal knowledge, skills, and attitudes	Independently implements a plan to improve personal knowledge, skills, and attitudes	Coaches others when limitations in knowledge, skills, and attitudes do not meet professional expectations
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				

Interpersonal and Communication Skills 1: Patient- and Family-Centered Communication				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Uses language and nonverbal behavior to demonstrate respect and establish rapport</p> <p>Recognizes common barriers to effective communication (e.g., language, disability) while accurately communicating own role within the health care system</p>	<p>Establishes a therapeutic relationship with the patient in uncomplicated clinical encounters using active listening and clear language</p> <p>Recognizes complex barriers to effective communication (e.g., health literacy, cultural competency)</p>	<p>Establishes a therapeutic relationship with the patient in challenging clinical encounters</p> <p>Adjusts communication strategies based on identified barriers, incorporating patient and caregiver expectations and goals of care</p>	<p>Consistently establishes and maintains therapeutic relationships using shared decision making</p> <p>Uses self-reflection to proactively minimize communication barriers</p>	<p>Serves as a role model in establishing respectful, culturally sensitive therapeutic relationships while mitigating communication barriers</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Comments:</p> <p style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></p>				

Interpersonal and Communication Skills 2: Interprofessional and Team Communication				
Level 1	Level 2	Level 3	Level 4	Level 5
Uses language that is respectful and values all members of the health care team	Communicates basic information effectively with all health care team members	Communicates highly complex information effectively with all health care team members	Optimizes flexible communication strategies using input from all team members to build consensus and resolve conflicts, as needed	Demonstrates leadership in promoting open and safe communication within and between teams
Accepts feedback from team members	Solicits feedback on performance as a member of the health care team	Provides feedback to peers and other learners on the team	Communicates detailed and effective feedback to any member of the health care team	Educates others in providing effective feedback
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				

Interpersonal and Communication Skills 3: Patient-Centered Interprofessional Communication within Health Care Systems				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Accurately records information in the patient record</p> <p>Safeguards patient personal health information in direct (e.g., telephone, in-person) and indirect (e.g., progress notes, text messages) communications</p>	<p>Demonstrates organized diagnostic and therapeutic reasoning through notes in the patient record</p> <p>Accurate and timely documentation with appropriate use of documentation tools</p>	<p>Concisely reports diagnostic and therapeutic reasoning in the patient record</p> <p>Appropriately selects direct and indirect forms of communication based on context</p>	<p>Communicates clearly, concisely, timely, and in an organized written form, including anticipatory guidance</p> <p>Produces written or verbal communication (e.g., patient notes, email) that could serve as an example for others to follow</p>	<p>Participates in establishing communication tools or policies for the division, department, or institution</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Comments:</p> <p style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></p>				



Adult Rheumatology Entrustable Professional Activities (EPA)

Approved by the American College of Rheumatology

1. Manage the care of patients with acute and chronic, common and complex rheumatologic diseases across multiple care settings.
MK, PC, ICS, P, PBLI, SBP
2. Demonstrate expertise in the performance and interpretation of the musculoskeletal examination.
MK, PC, ICS, P
3. Demonstrate expertise in the indications for and interpretation of diagnostic tests and imaging studies relevant to the evaluation of patients with suspected or established rheumatic and musculoskeletal disease.
MK, PC, ICS, P
4. Prescribe and manage immunomodulatory therapy.
MK, PC, ICS, P, PBLI, SBP
5. Perform procedures including arthrocentesis and injections, compensated polarized microscopy, and interpretation of synovial fluid analysis.
MK, PC, ICS, P, PBLI
6. Provide rheumatology consultation to other specialties and providers.
MK, PC, ICS, P, PBLI, SBP
7. Demonstrate professional, compassionate and ethical behavior.
ICS, P
8. Effectively communicate and manage transitions of care with other healthcare providers.
MK, PC, ICS, P

9. Collaborate and work effectively as a member or leader of interprofessional health care teams.

MK, PC, ICS, P, PBLI, SBP

10. Facilitate the learning of patients, families, and members of the interprofessional team.

MK, PC, ICS, P

11. Enhance and promote patient safety and the quality of health care at both the individual and systems level.

MK, PC, ICS, P, PBLI, SBP

12. Advocate for individual patients.

MK, PC, ICS, P, SBP

13. Contribute to the fiscally sound and ethical management of a practice.

PC, ICS, P, SBP

14. Engage in lifelong learning.

MK, PBLI, SBP

APPENDIX C. RHEUMATOLOGY CURRICULAR MILESTONES

1. Gathers and synthesizes essential and accurate information to define each patient's clinical problem(s). (PC1)					
Rheumatology Curricular Milestones					
Number	By the listed time the fellow should be able to				For this curricular milestone
	6 months	12 months	18 months	24 months	
PC1-01	Obtain and report	Formulate with relevance	Incorporate; Teach others the elements of		a comprehensive, accurate history, including review of all available records, on patients with rheumatic symptoms and signs.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PC1-02	Perform and report		Distinguish with relevance; Integrate	Teach others to perform	a comprehensive, accurate physical examination, using common and advanced techniques where applicable, on patients with rheumatic symptoms and signs.
	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
PC1-03	Order and review	Interpret	Incorporate	Teach others about the clinical application of	diagnostic tests including, but not limited to, laboratory, imaging, electrodiagnostic and pathologic studies for the evaluation of the patient with rheumatic symptoms and signs.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PC1-04	List the steps of	Recognize normal anatomy	Differentiate abnormal findings	Teach others to detect abnormalities	using a standardized approach to the interpretation of musculoskeletal plain radiographs.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PC1-05	Describe applications, indications and limitations		Recognize normal anatomy; Differentiate abnormal findings		using a standardized approach for the interpretation of musculoskeletal ultrasonography for diagnostic purposes.
	<input type="checkbox"/>		<input type="checkbox"/>		

PC1-06	Recognize the need to	Without faculty member prompting,			collaboratively review imaging and tissue specimens with radiology and pathology services, respectively, to enhance patient safety and care
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

2. Develops and achieves comprehensive management plan for each patient. (PC2)

Rheumatology Curricular Milestones						
Number	By the listed time the fellow should be able to				For this curricular milestone	
	6 months	12 months	18 months	24 months		
PC2-01	List the components of	For uncomplicated presentations construct and implement	For complicated presentations construct and implement	Teach others to formulate	a comprehensive treatment plan, based on clinical evidence, clinical context, and patient preferences, counsel patients, and assess response to therapy.	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
PC2-02	Describe state and federal regulations for prescription of controlled substances as part of	Describe non-pharmacologic and pharmacologic components of; Implement, and monitor response to therapy, patient compliance, and detect signs and symptoms indicative of analgesic abuse as part of			a pain management strategy of the care plan.	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
PC2-03	Describes indications and potential adverse events of	Obtains verbal or written informed consent for treatment with	Prescribe, monitor and assess response to	Teaches others to prescribe, monitor and assess response to	pharmacotherapy, including immunomodulatory agents, used in the management of patients with rheumatic diseases.	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
PC2-04	In comparison to adults, discuss the similarities and differences in drug disposition and its consequences regarding; List the currently used		Prescribe and adjust accordingly		pharmacotherapies for use in children and adolescents with rheumatic diseases.	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
PC2-05	Discuss how the changes in pharmacokinetics that occur with age affect		Prescribe and adjust appropriately	Teach others about	therapeutic and management strategies in the aging population with	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>

					rheumatic diseases.
PC2-06	List options for	Describe applications and indications for	Incorporate	Teach others to incorporate	exercise and other rehabilitation strategies in the care of patients with rheumatic disorders.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PC2-07	With attending supervision	With attending supervision for complicated presentations	Independently; Teach others to		formulate and implement a management plan for patients with rheumatic emergencies (including organ or life threatening conditions), with a need for emergent, urgent or changes in level or goals of care.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

3. Manages patients with progressive responsibility and independence. (PC3)

Rheumatology Curricular Milestones					
Number	By the listed time the fellow should be able to				For this curricular milestone
	6 months	12 months	18 months	24 months	
PC3-01	Describe the potential manifestations of	Formulate plans to screen for and manage	Implement and monitor plans for	Teach others to recognize and manage	disease-related exacerbations and the influence of comorbid illness during the provision of longitudinal and customized care to patients with rheumatic diseases.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PC3-02	Identify	Formulate plans to screen, assess severity, and manage	Implement and monitor plans to screen, assess severity, and manage	Teach others to recognize and manage	disease- and treatment-related complications that may lead to long term morbidity, including the consideration for implications of comorbid diseases and the effects of aging.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PC3-03	Recognize	Develop strategies to manage		Implement strategies to manage	the psychosocial aspects of rheumatic diseases.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PC3-04	List and describe the utility of	Incorporate into practice	Teach others to incorporate into practice		the varied validated instruments in the assessment of pain, disease
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

		activity, function, and quality of life over time to monitor and adjust therapy.
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4a. Demonstrates skill in performing and interpreting invasive procedures. (PC4a) NOTE: PC4a and PC4b (non-invasive procedures) converted to single template of Skill in performing procedures

Rheumatology Curricular Milestones					
Number	By the listed time the fellow should be able to				For this curricular milestone
	6 months	12 months	18 months	24 months	
PC4-01	With attending supervision	Independently; Teach others to			obtain verbal or written informed consent from patient or caregiver for procedures.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PC4-02	With attending supervision	With attending assistance for those that are complicated or previously unperformed		Independently; Teach others to	perform procedures including arthrocentesis and joint and soft tissue injections.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PC4-03	With attending supervision; With attending assistance for those that are complicated or previously unperformed; Independently; Teach others to				perform procedures including arthrocentesis and joint and soft tissue injections with ultrasound guidance, when appropriate and feasible.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PC4-04	With attending supervision	Independently	Teach others to		perform compensated polarized microscopy to examine and interpret synovial fluid.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

5. Requests and provides consultative care. (PC5)

Rheumatology Curricular Milestones					
Number	By the listed time the fellow should be able to				For this curricular milestone
	6 months	12 months	18 months	24 months	
PC5-01	Identify the indications to	Proactively	Teach others why, when, and how to		refer to other healthcare providers for the co-management of patients with rheumatic disease.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PC5-02	Recognize the tissues commonly considered for	List the indications, expected risks and benefits, and available alternatives for	Implement plans to refer for; Teach others how to incorporate		diagnostic biopsies (including, but not limited to, temporal artery, renal, lung,

	<div><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/></div>							muscle, nerve, skin, minor salivary gland, and brain) in the evaluation of rheumatic diseases, and refers when indicated and appropriate.	
PC5-03	Identify opportunities for referral					Refer when indicated		to clinical registries and trials.	
	<div><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/></div>								
PC5-04	With attending supervision		Independently						provide consultation when requested, in support of the primary care relationship, for patients with rheumatic symptoms and signs and appropriately integrate recommendations from other healthcare providers into the evaluation and management plan.
	<div><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/></div>								

6. Possesses Clinical knowledge (MK1)									
Rheumatology Curricular Milestones									
Number	By the listed time the fellow should be able to						For this curricular milestone		
	6 months		12 months		18 months			24 months	
MK1-01	Demonstrate basic				Demonstrate comprehensive				knowledge of the relevant structure and function of the musculoskeletal system, immune system and basic science for describing the pathophysiology of rheumatologic conditions.
	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	
MK1-02	Acknowledge the indications for	Independently distinguish indications for		Independently formulate specific consultative questions for				referrals to other subspecialists and ancillary services including orthopedics and rehabilitation medicine.	
	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>			

MK1-03	List	Explain	Differentiate subtle differences in		relevant mechanisms of action and potential adverse effects of agents used in the management of patients with rheumatologic conditions.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MK1-04	Report on		List		the anatomy, physiology and management of pain in patients with rheumatologic conditions.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MK1-05	List		Describe in detail	Explain the significance of	similarities and differences of the clinical presentation and management between adults and children with rheumatic conditions.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MK1-06	In uncomplicated cases, construct	In cases demonstrating increasing complexity, construct	In highly complex cases, with multi-system involvement, construct	Teach others to construct	a differential diagnosis for rheumatologic conditions, including consideration of non-rheumatic diseases.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MK1-07	Demonstrate basic		Demonstrate comprehensive		knowledge regarding the need for preventive care in patients with rheumatic conditions.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MK1-08	Demonstrate basic		Demonstrate comprehensive		knowledge to evaluate complex rheumatic diseases in the setting of multiple coexistent conditions, including the effects of aging.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MK1-09	Demonstrate basic		Demonstrate comprehensive		knowledge of socio-behavioral sciences including but not limited to health care economics and medical ethics.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

7. Knowledge of diagnostic testing and procedures. (MK2)

Rheumatology Curricular Milestones

Number	By the listed time the fellow should be able to				For this curricular milestone
	6 months	12 months	18 months	24 months	

8. Scholarship. (MK3)						
Rheumatology Curricular Milestones						
Number	By the listed time the fellow should be able to				For this curricular milestone	
	6 months	12 months	18 months	24 months		
MK3-01	Demonstrate basic	Demonstrate comprehensive				knowledge of principles underlying critical appraisal of the medical literature.
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MK3-02	List	Describe	Explain the significance of; Implement and interpret			basic biostatistical testing and epidemiological principles.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MK3-03	Describe principles underlying research study design for		Generate a hypothesis and select methodology for	Perform data collection and analysis for; Disseminate findings of; Recognize components of grant writing and submission for		a scholarly project related to clinical practice, quality improvement, patient safety, medical education or research in collaboration with a faculty mentor.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MK3-04	Prepare and submit an abstract			Prepare and submit a peer-reviewed manuscript; Prepare and submit a non-peer reviewed manuscript for publication (e.g. clinical review, book chapter)		to demonstrate effective scientific writing skills.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MK3-05	Effectively present orally at conferences, including but not limited to rheumatology grand rounds, lay education, local and national meetings		Present an abstract locally, regionally, or nationally			to disseminate scholarly work.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MK3-06	List	Describe; Explain the significance of; Enact				principles of informed consent as it pertains to investigation, involving human subjects.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

9. Works effectively within an interprofessional team (e.g., with peers, consultants, nursing, ancillary professionals, and other support personnel). (SBP1)

Rheumatology Curricular Milestones

Number	By the listed time the fellow should be able to				For this curricular milestone
	6 months	12 months	18 months	24 months	
SBP1-01	Acknowledge the contributions from	Actively participate and work with			health care providers from varied disciplines to promote patient-centered care.
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SBP1-02	Recognize the varied	Explain the contributions of	Participate in the activities of		health care providers who work to promote patient safety and to identify risks for and strategies to prevent medical errors.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SBP1-03	List the individual components that contribute to	Ascribe levels of complexity to the components that comprise		Implement	appropriate coding based on documentation and reimbursement policies.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SBP1-04	Describes	Differentiates among		Works effectively within	the spectrum of practice models for health care delivery, including the fundamentals of office and personnel management.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

10. Recognizes system error and advocates for system improvement. (SBP2)

Rheumatology Curricular Milestones

Number	By the listed time the fellow should be able to				For this curricular milestone
	6 months	12 months	18 months	24 months	
SBP2-01	Recognize situations leading to inefficiencies, safety concerns and/or preventable medical errors when	Participate in a system level quality improvement initiatives while	Design and implement a system level quality improvement initiative while		partnering with other healthcare teams and professionals to improve the quality of care and patient safety within the system.
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SBP2-02	Demonstrate ability to		Assist others within one's own system to; Assist the public to		recognize opportunities to address causes of disparity in disease and healthcare delivery.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

11. Identifies forces that impact the cost of health care, and advocates for and practices cost-effective care. (SBP3)

Rheumatology Curricular Milestones

Rheumatology Curricular Milestones					
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Number	By the listed time the fellow should be able to				For this curricular milestone
	6 months	12 months	18 months	24 months	
SBP3-01	Recognize the necessity to integrate	Participate in decisions that reflect		Independently incorporate considerations of	cost awareness and cost benefit analysis for disease specific care as well as in individual patients.
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SBP3-02	Recognize	Identify ways to address; Advocate for change of		Implement measures to correct	barriers impacting patient care, including socio-economic factors, healthcare literacy, medical disability and health care insurance coverage.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SBP3-03	Identify	Describe the impact on health care cost and access by		Leverage the advantages, for individual patients, of	the various health care settings (academic /public/private/VA) and stakeholders in the healthcare economy.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

12. Transitions patients effectively within and across health delivery systems. (SBP4)

Rheumatology Curricular Milestones					
Number	By the listed time the fellow should be able to				For this curricular milestone
	6 months	12 months	18 months	24 months	
SBP4-01	Identify the providers, therapies, and potential obstacles to successfully	Discuss strategies to overcome the obstacles to successfully		Implement strategies to successfully	coordinate care across multiple delivery systems, including ambulatory, subacute, acute, rehabilitation and skilled nursing facilities.
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

13. Monitors practice with a goal for improvement. (PBL11)

Rheumatology Curricular Milestones					
Number	By the listed time the fellow should be able to				For this curricular milestone
	6 months	12 months	18 months	24 months	
PBL11-01	Acknowledge the importance of reflection to	Routinely reflect on clinical interactions to; Describe his or her own efforts to	Seek resources to address		identify(ied) knowledge or skills gaps to enhance future clinical interactions.
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

16. Learns and improves at the point of care. (PBLI4)

Rheumatology Curricular Milestones

Number	By the listed time the fellow should be able to				For this curricular milestone
	6 months	12 months	18 months	24 months	
PBLI4-01	Identify basic knowledge gaps and seek	In all cases, independently construct and pursue			answers to clinical questions, and performs self-reflection to incorporate learning for future clinical encounters.
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PBLI4-02	Independently	Teach others to			use(s) technology to manage information (HIPAA compliant), support patient care decisions using evidence-based medicine and enhance both patient and physician education.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PBLI4-03	With prompting from faculty	Independently			maintains awareness of the situation in the moment, and responds to meet situational needs.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PBLI4-04	Customizes management based on; Determines applicability of				clinical evidence for individualized patient care.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

17. Has professional and respectful interactions with patients, caregivers, and members of the interprofessional team (e.g., peers, consultants, nursing, ancillary professionals, and support personnel). (PROF1)

Rheumatology Curricular Milestones

Number	By the listed time the fellow should be able to				For this curricular milestone
	6 months	12 months	18 months	24 months	
PROF1-01	Recognize and manage differences of opinion with patients to; Recognize and manage differences of opinion with other members of the interprofessional team to; Provide constructive feedback to other members of the health care team to				demonstrate respectful professional interactions.
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PROF1-02	Provide responsible team leadership to				demonstrate respect for patient dignity and autonomy.
	<input type="checkbox"/>	<input type="checkbox"/>			

PROF1-03	Recognize, respond to, and report impairment in colleagues or substandard care via peer review process		as a demonstration of commitment to providing safe patient care.
	<input type="checkbox"/>	<input type="checkbox"/>	

18. Accepts responsibility and follows through on tasks. (PROF2)

Rheumatology Curricular Milestones					
Number	By the listed time the fellow should be able to				For this curricular milestone
	6 months	12 months	18 months	24 months	
PROF2-01	Demonstrates appropriate professional appearance (1 month); Recognize the scope of his/her abilities and ask for supervision and assistance appropriately; When indicated, identify and assist colleagues in need of assistance in the provision of duties	Through his/her actions, serve as a professional role model for peers and learners	Contribute to the fiscally sound practice of an office		as demonstration of personal accountability.
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PROF2-02	Respond promptly and appropriately to clinical responsibilities including but not limited to calls and pages; Carry out timely interactions with colleagues, patients, and their designated caregivers	Ensure prompt completion of clinical, administrative, curricular and research-related tasks			as a demonstration of the professional attribute of accessibility.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

19. Responds to each patient's unique characteristics and needs. (PROF3)

Rheumatology Curricular Milestones					
Number	By the listed time the fellow should be able to				For this curricular milestone
	6 months	12 months	18 months	24 months	
PROF3-01	Represent individual patient	Address disparities in health			as a demonstration of being

	needs; Show empathy and compassion to all patients; Take responsibility for situations where public health supersedes individual privacy (e.g. reportable infectious diseases)	care among populations that may impact patient care			an advocate for all patients.
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PROF3-02	Treat patients with dignity, civility and respect, regardless of race, culture, gender, sexual orientation, socioeconomic status, literacy, and religious beliefs; Make efforts to support (physical, psychological, social, and spiritual) patients with acute and chronic, basic and complex rheumatic diseases and their caregivers.				as a demonstration of showing compassion and respect to patients.
	<input type="checkbox"/>	<input type="checkbox"/>			

20. Exhibits integrity and ethical behavior in professional conduct. (PROF4)

Rheumatology Curricular Milestones

Number	By the listed time the fellow should be able to				For this curricular milestone
	6 months	12 months	18 months	24 months	
PROF4-01	Document and report clinical and research information truthfully; Follow formal policies; Accept personal errors and honestly acknowledge them; Maintain patient confidentiality; Uphold ethical expectations of clinical, scholarly activity and research including maintenance of up-to-date				as a demonstration of adhering to basic ethical principles.

	certifications for all professional activities		
	<input type="checkbox"/>	<input type="checkbox"/>	
PROF4-02	Maintain and monitor patient care relationships with colleagues, members of the interprofessional team and office staff to; Use technology and social media appropriately to; Maintain ethical relationships with industry to; Addresses personal, psychological, and physical limitations that may affect professional performance to		manage conflicts of interest.
	<input type="checkbox"/>	<input type="checkbox"/>	

21. Communicates effectively with patients and caregivers. (ICS1)

Rheumatology Curricular Milestones					
Number	By the listed time the fellow should be able to				For this curricular milestone
	6 months	12 months	18 months	24 months	
ICS1-01	Use nonverbal skills, and without interruption; Ask thoughtful questions based on ability to				listen carefully to patients and caregivers to create rapport and build a therapeutic relationship.
	<input type="checkbox"/>	<input type="checkbox"/>			
ICS1-02	Use plain language, avoiding technical medical terms, to; Appropriately use an interpreter to	Encourage questions, answering clearly, incorporating new insights to			explain and counsel patients and caregivers about their problems, proposed examinations and treatments, and findings.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
ICS1-03	Recognize the need to	Incorporate patient	Solicit and incorporate patient	Solicit and incorporate	share decision-making in

	incorporate patient preferences to	preferences to	preferences surrounding uncomplicated situations to	patient preferences surrounding ambiguous or controversial situations to	both diagnostic and therapeutic scenarios.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
ICS1-04	Demonstrate sensitivity to	Actively seek to understand	Integrate into evaluation and management plans		differences in patients including, but not limited to race, culture, gender, sexual orientation, socioeconomic status, literacy, religious beliefs.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

22. Communicates effectively in interprofessional teams (e.g., with peers, consultants, nursing, ancillary professionals, and other support personnel). (ICS2)

Rheumatology Curricular Milestones

Number	By the listed time the fellow should be able to				For this curricular milestone
	6 months	12 months	18 months	24 months	
ICS2-01	Describe the importance of	Proactively initiate			communication with other healthcare providers in order to maintain appropriate continuity during transitions of care, including from pediatric to adult rheumatology care.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
ICS2-02	Recognize the roles and acknowledge the contributions of individuals in support of	Interact, adapting and shifting roles as necessary, in support of	Initiate problem solving for; Assume a leadership role in the education of all members in support of		productive interaction within interprofessional teams.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
ICS2-03	Utilize common technologies for	Tailor topic selection, presentation technology, and verbal and nonverbal skills for		Role model proficiency in tailored topic selection, presentation technology, and verbal and nonverbal skills for	effective presentation for the specific audience.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

23. Appropriate utilization and completion of health records. (ICS3)

Rheumatology Curricular Milestones

Number	By the listed time the fellow should be able to	For this curricular milestone
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	6 months	12 months	18 months	24 months	
ICS3-01	Document through templates/scripts to create	Adjust communication on the basis of context, audience and/or situation for relevant and succinct,	Organize complex cases into relevant and succinct,		timely and legible authentic documentation that includes a differential diagnosis and clinical reasoning, and support for the appropriate level of reimbursement.
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

APPENDIX D. RHEUMATOLOGY TOOLBOX: ACTIVITIES AND ASSESSMENTS

Rheumatology Toolbox for Tracking of Curricular Milestone Implementation

Directions: The Curricular Milestones are formatted in two different ways (Appendix C and below for the Rheumatology Toolbox). Utilizing the two far right columns in the Curricular Milestones tables, provided in the Rheumatology Toolbox, you may populate activities and assessment tools specific to your program that encompass each Curricular Milestone. You may utilize the provided list of activities and assessments and supplement with others that are unique to your program.

Activities

Experience	Activity
Clinical experience in mentored setting	General Rheumatology Continuity Clinic
	<ul style="list-style-type: none"> Outpatient clinic <ul style="list-style-type: none"> VA Satellite office Inflammatory arthritis Gout SLE Scleroderma Vasculitis Myositis Pediatric Rheumatology Osteoporosis Rheumatology/Dermatology Rheumatology/Pulmonary Musculoskeletal ultrasound Other
	Inpatient consult service (by site)
	Inpatient Rheumatology service (by site)
	<ul style="list-style-type: none"> Elective <ul style="list-style-type: none"> Physical Medicine and Rehab Sports medicine Orthopaedics Pediatric orthopaedics PT/OT Podiatry Pain management Rheumatology private practice Other
Committee participation	<ul style="list-style-type: none"> Participation on committee <ul style="list-style-type: none"> Division of Rheumatology Department of Medicine Regional National
Didactics: Large group	<ul style="list-style-type: none"> Rheumatology Grand Rounds Medicine Grand Rounds Rheumatology Core Curriculum Conference Evidence-Based Medicine Conference Rheumatology Journal Club Basic Science Journal Club Rheumatology Research Conference Basic Science Conference Immunology Conference Rheumatology/Radiology Rheumatology/Pathology Professors Rounds Rheumatology Case Conference Other Grand Rounds(Other interdisciplinary conference Summer Rheumatology Review
	Certificate/Degree program
	<ul style="list-style-type: none"> Attendance at <ul style="list-style-type: none"> Local Specialty Conferences Regional Specialty Conferences National Conferences <ul style="list-style-type: none"> ACR Annual Meeting ACR Fellows' SOTA

	▪ ACR SOTA
Didactics: Small group	Faculty facilitated group discussion
	Workshop participation
Self study	Self Study Module
	<ul style="list-style-type: none"> Independent Readings <ul style="list-style-type: none"> Textbook Journal articles Internet based research Internet based study Web-based modules Other
Fellow projects and presentations	<ul style="list-style-type: none"> Presentation by Fellow <ul style="list-style-type: none"> Rheumatology journal club Basic science journal club Research conference Case conference Rheumatology Grand Rounds Community education Other
	Preparation of patient care portfolio
	<ul style="list-style-type: none"> Clinical research project Basic science research project
	<ul style="list-style-type: none"> QI Patient safety project
	<ul style="list-style-type: none"> Scientific writing Abstract presentation <ul style="list-style-type: none"> Poster Podium
Simulation	<ul style="list-style-type: none"> Simulation with models Simulation with standardized patients

Assessment Tools

Methods	Rheumatology Assessment Tools
Anatomic model	<ul style="list-style-type: none"> Joint simulator Cadaver lab
Direct Observation	<ul style="list-style-type: none"> Mini CEX (clinical) Mini-PEX (procedure)
ACR In training exam	
Multisource assessment	<ul style="list-style-type: none"> Self- assessment Faculty evaluations (rotations) Faculty evaluations (3, 6 mo) Research mentor evaluation 360 degree (administrative, nursing, health professionals, technical staff) Peer Patient evaluations Procedural Competency Assessment (arthrocentesis evaluation form, 6 months) Semiannual Program Director review ACGME Reporting Milestones by Clinical Competency Committee
Objective structured clinical exam (OSCE)	
Videotaped or recorded assessment	
Oral Examination	
Practice/billing audit	Medical documentation review
Presentation skills	Feedback forms for presentations <ul style="list-style-type: none"> Rheumatology Journal Club Basic Science Journal Club Grand Rounds Case Conference Morbidity and Mortality
Project assessment	<ul style="list-style-type: none"> QI

by faculty	<ul style="list-style-type: none"> Research
Record/chart review	
Trainee experience narrative	Reflection
Review case/procedure log	
Review of drug prescribing	
Review of patient outcomes	<ul style="list-style-type: none"> QI project Registry review
Role play or simulations	
Simulations/models	Joint injection
Standardized patient exams	
Structured case discussions	
	Portfolio review

Rheumatology Curricular Milestones Tables

MEDICAL KNOWLEDGE

Subspecialty Reporting Milestone	Rheumatology Curricular Milestones				Your Training Program	
	Number	By this time (months)	The fellow should be able to	For this curricular milestone	Activities	Assessment Tools
Clinical Knowledge (MK1)	MK1-01	12	Demonstrate basic	knowledge of the relevant structure and function of the musculoskeletal system, immune system and basic science for describing the pathophysiology of rheumatologic conditions.		
		24	Demonstrate comprehensive			
	MK1-02	6	Acknowledge the indications for	referrals to other subspecialists and ancillary services including orthopedics and rehabilitation medicine.		
		12	Independently distinguish indications for			
		18	Independently formulate specific consultative questions for			
	MK1-03	6	List	relevant mechanisms of action and potential adverse effects of agents used in the management of patients with rheumatologic conditions.		
		12	Explain			
		18	Differentiate subtle differences in			
	MK1-04	12	Report on	the anatomy, physiology and management of pain in patients with rheumatologic conditions.		
		18	Teach others			
	MK1-05	12	List	similarities and differences of the clinical presentation and management between adults and children with rheumatic conditions.		
		18	Describe in detail			
		24	Explain the significance of			
	MK1-06	6	In uncomplicated cases, construct	a differential diagnosis for rheumatologic conditions, including consideration of non-rheumatic diseases.		
		12	In cases demonstrating increasing complexity, construct			
		18	In highly complex cases, with multi-system involvement, construct			
		24	Teach others to construct			
	MK1-07	12	Demonstrate basic	knowledge regarding the need for preventive care in patients with rheumatic conditions.		
		18	Demonstrate comprehensive			
	MK1-08	12	Demonstrate basic	knowledge to evaluate complex rheumatic diseases in the setting of multiple		

Knowledge of Diagnostic Testing and Procedures (MK2)	MK1-09	18	Demonstrate comprehensive	coexistent conditions, including the effects of aging.		
		12	Demonstrate basic	knowledge of socio-behavioral sciences including but not limited to health care economics and medical ethics.		
		24	Demonstrate comprehensive			
	MK2-01	6	Identify	indications, risks and benefits of rheumatologic diagnostic testing, including but not limited to immunoassays, synovial fluid analysis, routine blood chemistries, hematologic studies, coagulation studies, radiographs, and DXA scanning.		
		12	Describe			
		18	Differentiate			
		24	Teach			
	MK2-02	12	Explain	major findings and interpretation of rheumatologic diagnostic testing, including but not limited to immunoassays, synovial fluid analysis, routine blood chemistries, hematologic studies, coagulation studies, radiographs, and DXA scanning.		
		24	Teach others about			
	MK2-03	6	List	indications, risks and benefits for more advanced diagnostic tests including imaging techniques (isotopic, PET, CT and MRI scanning, angiography and musculoskeletal ultrasound) and pathologic examination of tissues involved with rheumatic diseases.		
		18	Explain			
		24	Differentiate			
	MK2-04	12	Explain	major findings and interpretation of more advanced diagnostic tests including imaging techniques (isotopic, PET, CT and MRI scanning, angiography and musculoskeletal ultrasound) and pathologic examination of tissues involved with rheumatic diseases.		
		24	Teach others about			
Scholarship (MK3)	MK3-01	6	Demonstrate basic	knowledge of principles underlying critical appraisal of the medical literature.		
		24	Demonstrate comprehensive			
	MK3-02	6	List	basic biostatistical testing and epidemiological principles.		
		12	Describe			
		24	Explain the significance of			
		24	Implement and interpret			
	MK3-03	12	Describe principles underlying research study design for	a scholarly project related to clinical practice, quality improvement, patient safety, medical education or research in collaboration with a faculty mentor.		
		18	Generate a hypothesis and select methodology for			
		24	Perform data collection and analysis for			
		24	Disseminate findings of			
		24	Recognize components of grant writing and submission for			
	MK3-05	18	Prepare and submit an abstract	to demonstrate effective scientific writing skills.		
		24	Prepare and submit a peer-reviewed manuscript			

		24	Prepare and submit a non-peer reviewed manuscript for publication (e.g. clinical review, book chapter)			
	MK3-06	12	Effectively present orally at conferences, including but not limited to rheumatology grand rounds, lay education, local and national meetings	to disseminate scholarly work.		
		18	Present an abstract locally, regionally, or nationally			
	MK3-07	6	List	principles of informed consent as it pertains to investigation, involving human subjects.		
		12	Describe			
		12	Explain the significance of			
		12	Enact			

PATIENT CARE

Subspecialty Reporting Milestone	Rheumatology Curricular Milestones				Your Training Program	
	Number	By this time (months)	The fellow should be able to	For this curricular milestone	Activities	Assessment Tools
Gathers and synthesizes essential and accurate information to define each patient's clinical problem(s). (PC1)	PC1-01	6	Obtain and report	a comprehensive, accurate history, including review of all available records, on patients with rheumatic symptoms and signs.		
		12	Formulate with relevance			
		18	Incorporate			
		18	Teach others the elements of			
	PC1-02	12	Perform and report	a comprehensive, accurate physical examination, using common and advanced techniques where applicable, on patients with rheumatic symptoms and signs.		
		18	Distinguish with relevance			
		18	Integrate			
		24	Teach others to perform			
	PC1-03	6	Order and review	diagnostic tests including, but not limited to, laboratory, imaging, electrodiagnostic and pathologic studies for the evaluation of the patient with rheumatic symptoms and signs.		
		12	Interpret			
		18	Incorporate			
		24	Teach others about the clinical application of			
	PC1-04	6	List the steps of	using a standardized approach to the interpretation of musculoskeletal plain radiographs.		
		12	Recognize normal anatomy			
		18	Differentiate abnormal findings			
		24	Teach others to detect abnormalities			
	PC1-05	12	Describe applications, indications and limitations	using a standardized approach for the interpretation of musculoskeletal ultrasonography for diagnostic purposes.		
		24	Recognize normal anatomy			
		24	Differentiate abnormal findings			
	PC1-06	6	Recognize the need to	collaboratively review imaging and tissue specimens with radiology and pathology services, respectively, to enhance patient safety and care		
		12	Without faculty member prompting,			
Develops and achieves comprehensive management plan for each patient. (PC2)	PC2-01	6	List the components of	a comprehensive treatment plan, based on clinical evidence, clinical context, and patient preferences, counsel patients, and assess response to therapy.		
		12	For uncomplicated presentations construct and implement			
		18	For complicated presentations construct and implement			
		24	Teach others to formulate			

	PC2-02	6	Describe state and federal regulations for prescription of controlled substances as part of	a pain management strategy of the care plan.		
		12	Describe non-pharmacologic and pharmacologic components of			
		12	Implement, and monitor response to therapy, patient compliance, and detect signs and symptoms indicative of analgesic abuse as part of			
	PC2-03	6	Describes indications and potential adverse events of	pharmacotherapy, including immunomodulatory agents, used in the management of patients with rheumatic diseases.		
		12	Obtains verbal or written informed consent for treatment with			
		18	Prescribe, monitor and assess response to			
		24	Teaches others to prescribe, monitor and assess response to			
	PC2-04	12	In comparison to adults, discuss the similarities and differences in drug disposition and its consequences regarding	pharmacotherapies for use in children and adolescents with rheumatic diseases.		
		12	List the currently used			
		24	Prescribe and adjust accordingly			
	PC2-05	12	Discuss how the changes in pharmacokinetics that occur with age affect	therapeutic and management strategies in the aging population with rheumatic diseases.		
		18	Prescribe and adjust appropriately			
		24	Teach others about			
	PC2-06	6	List options for	exercise and other rehabilitation strategies in the care of patients with rheumatic disorders.		
		12	Describe applications and indications for			
		18	Incorporate			
		24	Teach others to incorporate			
	PC2-07	6	With attending supervision	formulate and implement a management plan for patients with rheumatic emergencies (including organ or life threatening conditions), with a need for emergent, urgent or changes in level or goals of care.		
		12	With attending supervision for complicated presentations			
		24	Independently			
		24	Teach others to			
Manages patients with progressive responsibility and independence. (PC3)	PC3-01	6	Describe the potential manifestations of	disease-related exacerbations and the influence of comorbid illness during the provision of longitudinal and customized care to patients with rheumatic diseases.		
		12	Formulate plans to screen for and manage			
		18	Implement and monitor plans for			
		24	Teach others to recognize and manage			
	PC3-02	6	Identify	disease- and treatment-related complications that may lead to long term morbidity, including the consideration for implications of comorbid diseases and the effects of aging.		
		12	Formulate plans to screen, assess severity, and manage			
		18	Implement and monitor plans to screen, assess severity, and manage			
		24	Teach others to recognize and manage			
	PC3-03	6	Recognize	the psychosocial aspects of rheumatic diseases.		
		18	Develop strategies to manage			
		24	Implement strategies to manage			
	PC3-04	6	List and describe the utility of	the varied validated instruments in the assessment of pain, disease activity, function, and quality of life over time to monitor and adjust therapy.		
		12	Incorporate into practice			
		18	Teach others to incorporate into practice			
Skill in performing procedures. (PC4)	PC4-01	6	With attending supervision	obtain verbal or written informed consent from patient or caregiver for procedures.		
		12	Independently			
		12	Teach others to			
	PC4-02	6	With attending supervision	perform procedures including arthrocentesis and joint and soft tissue injections.		
		18	With attending assistance for those that are			

Requests and provides consultative care. (PC5)			complicated or previously unperformed			
		24	Independently			
		24	Teach others to			
	PC4-03	24	With attending supervision	perform procedures including arthrocentesis and joint and soft tissue injections with ultrasound guidance, when appropriate and feasible.		
		24	With attending assistance for those that are complicated or previously unperformed			
		24	Independently			
		24	Teach others to			
	PC4-04	6	With attending supervision	perform compensated polarized microscopy to examine and interpret synovial fluid.		
		12	Independently			
		18	Teach others to			
	PC5-01	6	Identify the indications to	refer to other healthcare providers for the co-management of patients with rheumatic disease.		
		12	Proactively			
		18	Teach others why, when, and how to			
	PC5-02	6	Recognize the tissues commonly considered for	diagnostic biopsies (including, but not limited to, temporal artery, renal, lung, muscle, nerve, skin, minor salivary gland, and brain) in the evaluation of rheumatic diseases, and refers when indicated and appropriate.		
		12	List the indications, expected risks and benefits, and available alternatives for			
		18	Implement plans to refer for			
		18	Teach others how to incorporate			
	PC5-03	18	Identify opportunities for referral	to clinical registries and trials.		
		24	Refer when indicated			
	PC5-04	6	With attending supervision	provide consultation when requested, in support of the primary care relationship, for patients with rheumatic symptoms and signs and appropriately integrate recommendations from other healthcare providers into the evaluation and management plan.		
		24	Independently			

BASED LEARNING AND IMPROVEMENT

PRACTICE-

Subspecialty Reporting Milestone	Rheumatology Curricular Milestones				Your Training Program	
	Number	Activities	Activities	For this curricular milestone	Activities	Assessment Tools
Monitors Practice with goal for improvement (PBLI1)	PBLI1-01	6	Acknowledge the importance of reflection to	identify(ied) knowledge or skills gaps to enhance future clinical interactions.		
		12	Routinely reflect on clinical interactions to			
		12	Describe his or her own efforts to			
		18	Seek resources to address			
	PBLI1-02	18	Recognize	ways to improve his/her role in the effective management of a practice.		
		24	Implement			
Learns and improves via performance audit. (PBLI2)	PBLI2-01	6	Can describe what s/he	learns from errors.		
		18	Independently identify and describe what s/he			
		24	Demonstrate through actions taken to improve the system or processes of care that s/he			
	PBLI2-02	18	Identify an area of inquiry to direct	an audit of a panel of patients using standardized, disease-specific, and evidence-based criteria.		
		24	Design the method for			
		24	Perform and analyze			

		24	Reflect on and hypothesize an explanation for deficiencies found (including doctor-related, system-related, and patient-related factors) through			
		24	Change practice based on results of			
Learns and improves via feedback. (PBLI3)	PBLI3-01	12	Accept and reflect on	feedback from all members of the health care team including faculty, peers, students, nurses, allied health workers, patients and their advocates.		
		12	Actively seek and reflect on			
		12	Develop plans for practice improvement based on			
		12				
Learns and improves at the point of care. (PBLI4)	PBLI4-01	6	Identify basic knowledge gaps and seek	answers to clinical questions, and performs self-reflection to incorporate learning for future clinical encounters.		
		12	In all cases, independently construct and pursue			
	PBLI4-02	6	Independently	use(s) technology to manage information (HIPAA compliant), support patient care decisions using evidence-based medicine and enhance both patient and physician education.		
		12	Teach others to			
	PBLI4-03	6	With prompting from faculty	maintains awareness of the situation in the moment, and responds to meet situational needs.		
		12	Independently			
	PBLI4-04	12	Determines applicability of	clinical evidence for individualized patient care.		
		12	Customizes management based on			

SYSTEMS BASED PRACTICE

Subspecialty Reporting Milestone	Rheumatology Curricular Milestones				Your Training Program	
	Number	By this time (months)	The fellow should be able to	For this curricular milestone	Activities	Assessment Tools
Works effectively within an interprofessional team (e.g. peers, consultants, nursing, therapists, nurses, home care workers, pharmacists, social workers and other ancillary professionals and other support personnel). (SBP1)	SBP1-01	6	Acknowledge the contributions from	health care providers from varied disciplines to promote patient-centered care.		
		12	Actively participate and work with			
	SBP1-02	6	Recognize the varied	health care providers who work to promote patient safety and to identify risks for and strategies to prevent medical errors.		
		12	Explain the contributions of			
		24	Participate in the activities of			
	SBP1-03	6	List the individual components that contribute to	appropriate coding based on documentation and reimbursement policies.		
		18	Ascribe levels of complexity to the components that comprise			
		24	Implement			
	SBP1-04	6	Describes	the spectrum of practice models for health care delivery, including the fundamentals of office and personnel management.		
		18	Differentiates among			
		24	Works effectively within			
Recognizes system error and advocates for system improvement. (SPB2)	SBP2-01	6	Recognize situations leading to inefficiencies, safety concerns and/or preventable medical errors when	partnering with other healthcare teams and professionals to improve the quality of care and patient safety within the system.		
		12	Participate in a system level quality improvement initiatives while			
		24	Design and implement a system level quality improvement initiative while			
	SBP2-02	12	Demonstrate ability to	recognize opportunities to address causes of disparity in disease and healthcare delivery.		
		24	Assist others within one's own system to			

Identifies factors that impact the cost of health care, and advocates for, and practices cost-effective care. (SBP3)	SBP3-01	24	Assist the public to	cost awareness and cost benefit analysis for disease specific care as well as in individual patients.		
		6	Recognize the necessity to integrate			
		18	Participate in decisions that reflect			
		24	Independently incorporate considerations of			
	SBP3-02	6	Recognize	barriers impacting patient care, including socio-economic factors, healthcare literacy, medical disability and health care insurance coverage.		
		18	Identify ways to address			
		18	Advocate for change of			
		24	Implement measures to correct			
	SBP3-03	6	Identify	the various health care settings (academic/public/private/VA) and stakeholders in the healthcare economy.		
		18	Describe the impact on health care cost and access by			
		24	Leverage the advantages, for individual patients, of			
Transitions patients effectively within and across health delivery systems. (SBP4)	SBP4-01	6	Identify the providers, therapies, and potential obstacles to successfully	coordinate care across multiple delivery systems, including ambulatory, subacute, acute, rehabilitation and skilled nursing facilities.		
		18	Discuss strategies to overcome the obstacles to successfully			
		24	Implement strategies to successfully			

INTERPERSONAL AND COMMUNICATION SKILLS

Subspecialty Reporting Milestone	Rheumatology Curricular Milestones				Your Training Program	
	Number	By this time (months)	The fellow should be able to	For this curricular milestone	Activities	Assessment Tools
Communicates effectively with patients and caregivers. (ICS1)	ICS1-01	6	Use nonverbal skills, and without interruption	listen carefully to patients and caregivers to create rapport and build a therapeutic relationship.		
		6	Ask thoughtful questions based on ability to			
	ICS1-02	6	Use plain language, avoiding technical medical terms, to	explain and counsel patients and caregivers about their problems, proposed examinations and treatments, and findings.		
		6	Appropriately use an interpreter to			
		12	Encourage questions, answering clearly, incorporating new insights to			
	ICS1-03	6	Recognize the need to incorporate patient preferences to	share decision-making in both diagnostic and therapeutic scenarios.		
		12	Incorporate patient preferences to			
		18	Solicit and incorporate patient preferences surrounding uncomplicated situations to			
		24	Solicit and incorporate patient preferences surrounding ambiguous or controversial situations to			
	ICS1-04	6	Demonstrate sensitivity to	differences in patients including, but not limited to race, culture, gender, sexual orientation, socioeconomic status, literacy, religious beliefs.		
		12	Actively seek to understand			
		18	Integrate into evaluation and management plans			
Communicates effectively in interprofessional teams	ICS2-01	6	Describe the importance of	communication with other healthcare providers in order to maintain appropriate continuity during transitions of care, including from pediatric to adult rheumatology care.		
		12	Proactively initiate			

(e.g., with peers, consultants, nursing, ancillary professionals, and other support personnel). (ICS2)	ICS2-02	6	Recognize the roles and acknowledge the contributions of individuals in support of	productive interaction within interprofessional teams.		
		12	Interact, adapting and shifting roles as necessary, in support of			
		18	Initiate problem solving for			
		18	Assume a leadership role in the education of all members in support of			
	ICS2-03	6	Utilize common technologies for	effective presentation for the specific audience.		
		18	Tailor topic selection, presentation technology, and verbal and nonverbal skills for			
		24	Role model proficiency in tailored topic selection, presentation technology, and verbal and nonverbal skills for			
Appropriate utilization and completion of health records. (ICS3)	ICS3-01	6	Document through templates/scripts to create	timely and legible authentic documentation that includes a differential diagnosis and clinical reasoning, and support for the appropriate level of reimbursement.		
		12	Adjust communication on the basis of context, audience and/or situation for relevant and succinct,			
		18	Organize complex cases into relevant and succinct,			

PROFESSIONALISM

Subspecialty Reporting Milestone	Rheumatology Curricular Milestones				Your Training Program	
	Number	Activities	Activities	For this curricular milestone	Activities	Assessment Tools
Has professional and respectful interactions with patients, caregivers, and members of the interprofessional team (e.g., peers, consultants, nursing, ancillary professionals, and support personnel). (PROF1)	PROF1-01	12	Recognize and manage differences of opinion with patients to	demonstrate respectful professional interactions.		
		12	Recognize and manage differences of opinion with other members of the interprofessional team to			
		12	Provide constructive feedback to other members of the health care team to			
	PROF1-02	6	Provide responsible team leadership to	demonstrate respect for patient dignity and autonomy.		
	PROF1-03	6	Recognize, respond to, and report impairment in colleagues or substandard care via peer review process	as a demonstration of commitment to providing safe patient care.		
Accepts responsibility and follows through on tasks. (PROF2)	PROF2-01	6	Recognize the scope of his/her abilities and ask for supervision and assistance appropriately	as demonstration of personal accountability.		
		6	When indicated, identify and assist colleagues in need of assistance in the provision of duties			
		12	Through his/her actions, serve as a professional role model for peers and learners			
		24	Contribute to the fiscally sound practice of an office			

	PROF2-02	1	Demonstrates appropriate professional appearance	as a demonstration of the professional attribute of accessibility.		
		6	Respond promptly and appropriately to clinical responsibilities including but not limited to calls and pages			
		6	Carry out timely interactions with colleagues, patients, and their designated caregivers			
		12	Ensure prompt completion of clinical, administrative, curricular and research-related tasks			
Responds to each patient's unique characteristics and needs. (PROF3)	PROF3-01	6	Represent individual patient needs	as a demonstration of being an advocate for all patients.		
			Show empathy and compassion to all patients			
		12	Address disparities in health care among populations that may impact patient care			
		6	Take responsibility for situations where public health supersedes individual privacy (e.g. reportable infectious diseases)			
	PROF3-02	6	Treat patients with dignity, civility and respect, regardless of race, culture, gender, sexual orientation, socioeconomic status, literacy, and religious beliefs	as a demonstration of showing compassion and respect to patients.		
		6	Make efforts to support (physical, psychological, social, and spiritual) patients with acute and chronic, basic and complex rheumatic diseases and their caregivers.			
Exhibits integrity and ethical behavior in professional conduct. (PROF4)	PROF4-01	6	Document and report clinical and research information truthfully	as a demonstration of adhering to basic ethical principles.		
		6	Follow formal policies			
		6	Accept personal errors and honestly acknowledge them			
		6	Maintain patient confidentiality			
		6	Uphold ethical expectations of clinical, scholarly activity and research including maintenance of up-to-date certifications for all professional activities			
	PROF4-02	6	Maintain and monitor patient care relationships with colleagues, members of the interprofessional team and office staff to	manage conflicts of interest.		
		6	Use technology and social media appropriately to			
		6	Maintain ethical relationships with industry to			
		6	Addresses personal, psychological, and physical limitations that may affect professional performance to			

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Pediatrics Core Curriculum Outline

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